



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

RARIES



5837 1







NEW YORK
PUBLIC
LIBRARY

THE AMERICAN EPHEMERIS

U.S.
— AND
NAUTICAL ALMANAC *Office*

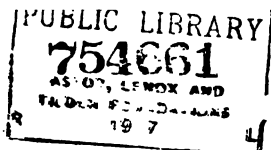
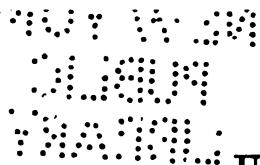
FOR THE YEAR

1919

PUBLISHED BY THE NAUTICAL ALMANAC OFFICE, U. S.
NAVAL OBSERVATORY, BY DIRECTION OF THE SECRETARY
OF THE NAVY AND UNDER THE AUTHORITY OF CONGRESS.
SOLD BY THE SUPERINTENDENT OF DOCUMENTS,
GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C.
PRICE ONE DOLLAR



WASHINGTON
GOVERNMENT PRINTING OFFICE
1917



U. S. NAVAL OBSERVATORY.

Capt. J. A. HOOGWERFF, *U. S. N., Superintendent.*

ASTRONOMICAL COUNCIL.

Capt. J. A. HOOGWERFF, <i>U. S. N.</i>	Prof. A. HALL, <i>U. S. N.</i>
Capt. W. D. MACDOUGALL, <i>U. S. N.</i>	Assistant Astronomer G. A. HILL.
Prof. W. S. EICHELBERGER, <i>U. S. N.</i>	Assistant Astronomer J. C. HAMMON.
Prof. F. B. LITTELL, <i>U. S. N.</i>	Assistant Astronomer H. R. MORGAN.

DEPARTMENT OF THE NAUTICAL ALMANAC.

Prof. W. S. EICHELBERGER, *U. S. N., Director.*

ASSISTANTS.

JAMES ROBERTSON.	GEORGE F. CRAWLEY.
WILLIAM T. CARRIGAN.	CLIFFORD S. LEWIS.
ARTHUR SNOW.	JOSEPH J. ARNAUD.
WALTER M. HAMILTON.	FRANK LANGELLOTTI.
ARTHUR NEWTON.	REUBEN WEINSTEIN.
PEREZ FISCH.	MORRIS LIFEROCK.

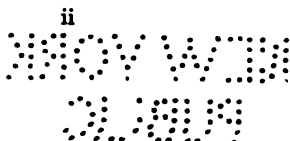
PIECEWORKERS.

<i>Elizabeth B. Davis.</i>	<i>George B. Merriman.</i>
<i>Janet McWilliam.</i>	<i>Frank E. Ross.</i>
<i>Hannah F. M. Hedrick.</i>	<i>Henry B. Hedrick.</i>
<i>Alfred Doolittle.</i>	<i>Thomas E. Trott.</i>
<i>Henry B. Evans.</i>	<i>Louis Lindsey.</i>

Isabel M. Lewis.

NOTE.—Those whose names are printed in italics devote only a small portion of their time to work of the Nautical Almanac Office.

July, 1916.



PREFACE.

This volume of the *American Ephemeris and Nautical Almanac* was prepared under the immediate supervision of Professor W. S. EICHELBERGER, U. S. N., the Director. The character of the matter herein contained and its arrangement are the same as in the immediately preceding volumes.

This is the fourth volume to be issued under the international agreement resulting from the *Congrès International des Éphémérides Astronomiques* held at Paris in October, 1911.

The naval appropriation bill approved August 22, 1912, contained the following:

The Secretary of the Navy is hereby authorized to arrange for the exchange of data with such foreign almanac offices as he may from time to time deem desirable, with a view to reducing the amount of duplication of work in preparing the different national nautical and astronomical almanacs and increasing the total data which may be of use to navigators and astronomers available for publication in the *American Ephemeris and Nautical Almanac*: *Provided*, That any such arrangement shall be terminable on one year's notice: *Provided further*, That the work of the Nautical Almanac Office during the continuance of any such arrangement shall be conducted so that in case of emergency the entire portion of the work intended for the use of navigators may be computed by the force employed by that office, and without any foreign cooperation whatsoever: *Provided further*, That any employee of the Nautical Almanac Office who may be authorized in any annual appropriation bill and whose services in whole or in part can be spared from the duty of preparing for publication the annual volumes of the *American Ephemeris and Nautical Almanac* may be employed by said office in the duty of improving the tables of the planets, moon, and stars, to be used in preparing for publication the annual volumes of the office: *Provided further*, That section four hundred and thirty-five, Revised Statutes, is hereby repealed.

The Greenwich ephemerides of the Sun, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune, and the right ascension and declination of the Moon for each hour were furnished by the office of the *British Nautical Almanac*.

The Greenwich ephemeris of Mercury and the apparent places for Greenwich transit of 518 ten-day stars were furnished by the office of the *Berliner Jahrbuch*.

The conjunctions, phenomena, and configurations of Jupiter's satellites I-IV and the apparent places for Greenwich transit of 38 circumpolar stars were furnished by the office of the *Connaissance des Temps*.

The longitude, latitude, and horizontal parallax of the Moon, and the apparent places for Greenwich transit of 121 ten-day stars were furnished by the office of the *Almanaque Nautico*.

The apparent places for Greenwich transit of 137 ten-day stars were furnished by the office of the *Annuario Astronomico di Torino*.

In accordance with the recommendations of the *Congrès International des Éphémérides Astronomiques*, most of the material furnished from abroad is based upon tables prepared in the American Nautical Almanac Office: In the Introduction are mentioned the various tables upon which the different ephemerides are based.

The following computations were made by the American Nautical Almanac Office:

In Part I, all the hourly and daily variations for the quantities furnished from abroad except in the case of the right ascension and declination of the Moon.

In Part II, the quantities used in computing the apparent places of the stars from their mean places; the mean place list; the interpolation of the apparent places of 814 stars from transit at Greenwich to transit at Washington; the apparent places of 11 stars; the interpolation of the ephemerides of the Sun, Moon, and planets from Greenwich noon to transit at Washington; the stellar magnitudes of the planets.

In Part III, the data relating to the eclipses of the Sun and Moon; the data relating to the occultations of stars and planets by the Moon; the ephemerides for physical observations of the Sun, Moon, Mars, and Jupiter; the elements of the illuminated disks of Mercury and Venus; the stellar magnitudes of the planets; the data concerning the satellites of Saturn, Uranus, Neptune, and the fifth, sixth, and seventh satellites of Jupiter; the diagrams of all the satellite orbits; the list of phenomena; the list of observatories with their geographical coordinates; the tables for the determination of latitude and azimuth from observations of Polaris; and the tables for the determination of the time of the rising and setting of the Sun and Moon.

All computations made in the American Nautical Almanac Office and those received from the other offices were subjected to checks to insure absence of errors.

J. A. HOOGEWERFF,
Captain, U. S. Navy,
Superintendent Naval Observatory.

U. S. NAVAL OBSERVATORY, July, 1916.

CONTENTS.

	Page.
tion	vi
series and Festivals	vii
gical Eras and Cycles	xiv
nical Constants	xv
and Abbreviations	xvi
	xviii
PART I—EPHEMERIS FOR THE MERIDIAN OF GREENWICH.	
ris of the Sun	2
ris of the Moon	26
f the Moon	117-
rides of the Planets Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune	134
PART II—EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.	
s Formulæ for Star-Reductions	200
n and Independent Star-Numbers	202
1, Terms of Short Period in the	215
aces of 790 Standard Stars for 1919.0	217
aces of 35 Circumpolar Stars for 1919.0	231
t Places of 35 Circumpolar Stars	232
t Places of 790 Standard Stars	316
ris of the Sun for Apparent Noon	514
liminations	522
Ephemerides of the Planets Mercury, Venus, Jupiter, Saturn, Uranus, Neptune	538
PART III—PHENOMENA.	
aces of Stars Occulted by the Moon	556
s for the Prediction of Occultations	564
ions Visible at Washington	568
ris for Physical Observations of the Sun	606
ean Equator, Orbit, and Mean Longitude	608
ris for Physical Observations of the Moon	609
Mercury and Venus	610
ris for Physical Observations of Mars	618
ris for Physical Observations of Jupiter	620
s of Jupiter, Saturn, Uranus, and Neptune	622
ana, Planetary Configurations	626
s of Observatories	666
s in Lunar Distances	668
	678
TABLES.	
—For Finding the Latitude by an Observed Altitude of Polaris	679
—Auxiliary Table of Corrections for Latitudes other than 45°	683
—Sidereal into Mean Solar Time	684
I—Mean Solar into Sidereal Time	687
—Azimuth of Polaris at all Hour Angles	690
—Correction for Declination	695
—Azimuth of Polaris at Elongation	696
—For Reduction of Observations Near Elongation	701
—For Finding the Times of Upper and Lower Culmination of Polaris	702
—Apparent Place, Upper Culmination, and Elongations, of Polaris	703
—Sunrise and Sunset for Northern Latitudes	704
—Sunrise and Sunset for Southern Latitudes	720
—Moonrise and Moonset	722
rrangement and Use of <i>The American Ephemeris and Nautical Almanac</i>	739
Apparent Places of Stars	765
Index	769

ERRATA.

		<i>The American Ephemeris, 1916.</i>			
Page.					
231	Footnote, 32 H. Camelop.	. . . . .	for	$5^m, 19''.8$ s. pr.	read $5^m.8, 21''.6$ n. pr.
		<i>The American Ephemeris, 1917.</i>			
231	Footnote, 32 H Camelop.	. . . . .	for	$5^m, 19''.8$ s. pr.	read $5^m.8, 21''.6$ n. pr.
		<i>The American Ephemeris, 1918.</i>			
149	Dec. 32, Helioc. Latitude	. . . . .	for	37.0	read 36.7
231	Footnote, 32 H. Camelop.	. . . . .	for	$5^m, 19''.8$ s. pr.	read $5^m.8, 21''.6$ n. pr.
730	Lines 2, 4, and 6, of computation of magni-				
	tude	. . . . .	for	ξ	read ζ
734	Line 20 of computation	. . . . .	for	$\sin d$	read $\sin \delta$

INTRODUCTION.

The ephemeris of the Sun is constructed from NEWCOMB'S *Tables of the Sun, Astronomical Papers of the American Ephemeris*, Vol. VI, part 1.

The adopted value of the mean equatorial horizontal parallax of the Sun is 8''.80, *Paris Conference, May, 1896*.

The Sun's rectangular equatorial coordinates are computed from the longitudes and latitudes by the following formulæ:

$$\begin{aligned} X &= R \cos \lambda \\ Y &= R \sin \lambda \cos \omega - 19.3 R \beta \\ Z &= R \sin \lambda \sin \omega + 44.5 R \beta \end{aligned}$$

The reductions to mean equinox are computed by the formulæ—

$$\begin{aligned} \Delta X &= + Y \sec \omega \Delta \lambda \sin 1'' \\ \Delta Y &= -X \cos \omega \Delta \lambda \sin 1'' + Z \Delta \omega \sin 1'' + 9.1 \tau R \sin (\lambda + 6^\circ) \\ \Delta Z &= -X \sin \omega \Delta \lambda \sin 1'' - Y \Delta \omega \sin 1'' - 21.0 \tau R \sin (\lambda + 6^\circ) \end{aligned}$$

where the numerical coefficients are in units of the seventh place of decimals and

R —the Sun's distance from the Earth.

λ —the Sun's true longitude,

β —the Sun's true latitude, expressed in seconds of arc,

ω —the obliquity of the ecliptic,

$\Delta \lambda$ —the reduction of longitude for precession and nutation from the beginning of the Besselian fictitious year,

$\Delta \omega$ —the reduction of the mean to the apparent obliquity,

τ —the fraction of the year since the beginning of the Besselian fictitious year.

The longitude, latitude, and parallax of the Moon are derived from HANSEN'S *Tables de la Lune* (London, 1857), the mean longitude being corrected as in previous years, beginning with the volume for the year 1883. The statement concerning these corrections which is contained in the volumes from 1883 to 1911, inclusive, is erroneous, in that they have not been computed strictly in accordance with the formula in NEWCOMB'S *Researches on the Motion of the Moon*, part 1, page 268, *Washington Observations*, 1875, Appendix II. That formula is,

$$-1''.14-29''.17 T-3''.86 T^2-V_2-0''.09 \sin A-15''.49 \cos A,$$

while the expression actually used is,

$$-1''.14-29''.17 T-3''.76 T^2-V_2-15''.49 \cos A.$$

In these formulæ T is the time in units of 100 years reckoned from 1800.

The ephemerides of Mercury, Venus, and Mars are derived from NEWCOMB'S tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VI, parts 2, 3, and 4.

The ephemerides of Jupiter and Saturn are derived from the tables constructed in this office by GEORGE W. HILL, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 1 and 2.

The ephemerides of Uranus and Neptune are derived from NEWCOMB'S tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 3 and 4.

The nutation used in computing the ephemerides of the Sun, Moon, and planets has been taken from Tables XXXII and XXXIII of NEWCOMB'S *Tables of the Sun*, *Astronomical Papers of the American Ephemeris*, Vol. VI, part 1. The formulæ from which this nutation is computed are as follows, the time interval T being expressed in units of 100 years, reckoned from 1900. See *Tables of the Sun*, page 26.

$$\begin{array}{ll}
 \delta\psi = -(17''.234 + 0''.017 T) \sin \Omega & \delta\epsilon = +9''.214 \cos \Omega \\
 + 0''.209 \sin 2 \Omega & -0''.090 \cos 2 \Omega \\
 - 1''.257 \sin 2 L & +0''.546 \cos 2 L \\
 - 0''.049 \sin (3 L + 78^\circ.7) & +0''.021 \cos (3 L + 78^\circ.7) \\
 + 0''.110 \sin (L + 75^\circ.3) & -0''.009 \cos (L - 78^\circ.7)
 \end{array}$$

The formulæ for the nutation used in computing the Besselian and Independent Star Numbers are as follows:

Terms of Long Period.	Terms of Short Period.
$\delta\psi = -(17''.234 + 0''.017 T) \sin \Omega$	$-0''.204 \sin 2 \zeta$
$+ 0''.209 \sin 2 \Omega$	$+0''.011 \sin (\zeta + \Gamma')$
$- 1''.272 \sin 2 L$	$+0''.068 \sin (\zeta - \Gamma')$
$+ 0''.126 \sin (L - \Gamma)$	$-0''.034 \sin (2 \zeta - \Omega)$
$- 0''.050 \sin (3 L - \Gamma)$	$-0''.026 \sin (3 \zeta - \Gamma')$
$+ 0''.021 \sin (L + \Gamma)$	$+0''.015 \sin (\zeta - 2 L + \Gamma')$
$+ 0''.012 \sin (2 L - \Omega)$	$+0''.006 \sin 2 (\zeta - L)$
$\delta\epsilon = + (9''.210 + 0''.0009 T) \cos \Omega$	$+0''.088 \cos 2 \zeta$
$- 0''.090 \cos 2 \Omega$	$+0''.018 \cos (2 \zeta - \Omega)$
$+ 0''.551 \cos 2 L$	$+0''.011 \cos (3 \zeta - \Gamma')$
$+ 0''.022 \cos (3 L - \Gamma)$	$-0''.005 \cos (\zeta + \Gamma')$
$- 0''.009 \cos (L + \Gamma)$	
$- 0''.007 \cos (2 L - \Omega)$	

The meaning of the symbols used and the manner in which these latter formulæ have been employed in computing the ephemerides of the stars are explained on pages 200 and 201. The slight discrepancy between the terms in 2 L in these two sets of formulæ is due to the correction of an error in the first set. See *Bulletin Astronomique*, 1898, Vol. XV, page 244.

The list of 825 stars contained in Part II has been selected from NEWCOMB'S *Catalogue of Fundamental Stars*, *Astronomical Papers of the American Ephemeris*, Vol. VIII, part 2.

In general, the names of the stars are the same as in NEWCOMB'S Suggested List of Fundamental Stars, except that the FLAMSTEED number has been omitted in all cases where Greek or italic letters are available. In some cases the constellation and number of the uranometries of HEIS or GOULD have been used. In all such cases, Hⁱ or the letter G precedes the constellation name, as, for example, 5 Hⁱ. Cassiopeiæ and 38 G. Horologii.

The magnitudes of the stars have, with a few exceptions, been taken from *Annals of the Harvard College Observatory*, Vol. L, 1908.

The spectral classification has been furnished by the Harvard College Observatory. The notation is that of *Annals of Harvard College Observatory*, Vol. LVI.

The mean places, annual variations, and annual proper motions of the stars have been taken from NEWCOMB's Catalogue, except that those of ϵ Hydri, 38 G. Horologii, and π Centauri have been taken from *Veröffentlichungen des Königlich Astronomischen Rechen-Instituts zu Berlin*, 1907, No. 33.

The values of $\Delta\alpha$ and $\Delta\delta$ which are given for the companions to the stars γ Andromedæ, α^1 Crucis, ζ^1 Ursæ Majoris and 61 Cygni, have been taken from BOSS's *Preliminary General Catalogue*, and those for α^2 Geminorum from DOBERCK's elements given in the *Astronomische Nachrichten*, 1904, vol. 166, page 145.

The formulæ for the computation of the Besselian and Independent Star Numbers are given on page 200, the coefficients being those given by NEWCOMB in *Bulletin Astronomique*, 1898, Vol. XV, page 241.

The terms of short period of the nutation, depending on the Moon's mean longitude, have been computed from the formulæ for these terms given above.

The method by which the right ascensions and declinations of the stars interpolated from the 10-day ephemerides are corrected for the effect of these short-period terms is given on page 201.

According to the formulæ on pages 200 and 201 the star constants a , b , c , d , a' , b' , c' , d' are computed for each star from its mean place at the beginning of the year, but if strict accuracy is required they should be computed from the star's mean place at date, and the following second-order terms should be added to the usual expressions for the reduction from mean to apparent place, namely—

To $\alpha - \alpha$,	To $\delta - \delta$,
$\left. \begin{aligned} &+0.000\ 003\ \tau^2 \sin \alpha \\ &-0.000\ 149\ \tau^2 \cos \alpha \end{aligned} \right\} \tan \delta$ $\left. \begin{aligned} &-0.000\ 0650\ \tau^2 \sin 2\alpha \\ &+0.000\ 0103\ \sin 2\ \odot \cos 2\alpha \\ &-0.000\ 0107\ \cos 2\ \odot \sin 2\alpha \end{aligned} \right\} \tan^2 \delta$ $\left. \begin{aligned} &+0.000\ 0620\ \sin 2\ \odot \cos 2\alpha \\ &-0.000\ 0622\ \cos 2\ \odot \sin 2\alpha \end{aligned} \right\} \sec^2 \delta$ $\left. \begin{aligned} &+0.000\ 0513\ \sin (\odot + \odot) \cos 2\alpha \\ &-0.000\ 0507\ \cos (\odot + \odot) \sin 2\alpha \\ &+0.000\ 0097\ \sin (\odot - \odot) \cos 2\alpha \\ &-0.000\ 0053\ \cos (\odot - \odot) \sin 2\alpha \end{aligned} \right\} \tan \delta \sec \delta$	$\left. \begin{aligned} &+0.000\ 975\ \tau^2 \sin^2 \alpha \\ &-0.000\ 023\ \cos 2\ \odot \\ &-0.000\ 080\ \cos 2\ \odot \cos 2\alpha \\ &-0.000\ 077\ \sin 2\ \odot \sin 2\alpha \end{aligned} \right\} \tan \delta$ $\left. \begin{aligned} &+0.000\ 040\ \cos 2\ \odot \\ &-0.000\ 467\ \cos 2\ \odot \cos 2\alpha \\ &-0.000\ 465\ \sin 2\ \odot \sin 2\alpha \end{aligned} \right\}$ $\left. \begin{aligned} &-0.000\ 039\ \cos (\odot + \odot) \\ &-0.000\ 380\ \cos (\odot + \odot) \cos 2\alpha \\ &-0.000\ 385\ \sin (\odot + \odot) \sin 2\alpha \\ &-0.000\ 380\ \cos (\odot - \odot) \\ &-0.000\ 040\ \cos (\odot - \odot) \cos 2\alpha \\ &-0.000\ 072\ \sin (\odot - \odot) \sin 2\alpha \end{aligned} \right\} \sin \delta \tan \delta$

These terms are negligible for stars whose declination is numerically less than 80° , but in computing the apparent places given in the American Ephemeris they have been applied whenever sensible.

The *apparent* places of seven stars have been corrected for the effect of annual parallax. These stars, with the adopted values of the annual parallax, are—

τ Ceti	0.31	α Centauri	0.75
ϵ Eridani	0.32	α Aquilæ (Altair)	0.23
α Canis Majoris (Sirius).	0.38	61 Cygni	0.30
α Canis Minoris (Procyon).	0.33		

THE AMERICAN EPHEMERIS.

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), and α^2 Centauri have been corrected for the effect of orbital motion. AUWERS's elements were used for Sirius and Procyon, and SEE's elements for α^2 Centauri. The values of these corrections are given on pages 98 and 99 of *Veröffentlichungen des Königlich Astronomischen Rechen-Instituts zu Berlin*, 1907, No. 33, but those for Sirius and Procyon need an additional correction to refer them to the center of the orbit before they are applicable to the mean places taken from NEWCOMB's Fundamental Catalogue. These additional corrections for Sirius and Procyon were omitted in the *Star List of the American Ephemeris* [*Supplement to the American Ephemeris and Nautical Almanac*] for 1910 and 1911, and in the *American Ephemeris and Nautical Almanac* for 1912 and 1913. The values of the corrections for the three stars are—

	Sirius.		Procyon.		α^2 Centauri.	
	1919.0	1920.0	1919.0	1920.0	1919.0	1920.0
$\Delta\alpha$	-0".143	-0".141	-0".057	-0".051	+0".620	+0".605
$\Delta\delta$	-0".84	-0".96	+0".31	+0".43	+5".41	+5".10

These corrections have not been applied to the mean places as published in this volume.

The stars occulted by the Moon have been selected from the *Catalogue of Zodiacal Stars* contained in Vol. VIII, part 3, *Astronomical Papers of the American Ephemeris*, and the mean places have been derived from the same catalogue.

In Part III the elements of eclipses of the Sun and occultations of stars by the Moon are given in accordance with BESSEL's method, the special forms employed being a modification of those developed in CHAUVENET's *Spherical and Practical Astronomy*.

In the computation of the elements of eclipses, the following corrections to the longitude, latitude, and parallax of the Moon, deduced by NEWCOMB from recent observations of occultations of stars by the Moon, *Astronomical Papers of the American Ephemeris*, Vol. IX, part 1, have been applied. These corrections have been assumed in each case to be constant during the eclipse.

G. M. T.		δv	δb	$\delta \pi$
1919		"	"	"
May 29 ^d	1 ^h	+6.8	+1.3	+0.49
Nov. 7	12	+6.0	+1.6	+0.50
Nov. 22	3	+5.4	-0.1	+0.40

The elongations of the satellites of Mars are derived from elements given by H. STRUVE in *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften*, 1911, page 1073.

The conjunctions and phenomena of Jupiter's four brighter satellites are derived from SAMPSON's tables. The configurations are derived from a continuation of DAMOISEAU's tables by M. POTTIER.

The elongations of the Vth satellite of Jupiter are derived from unpublished elements deduced from the observations of BARNARD.

The differential coordinates of Jupiter's VIth and VIIth satellites are derived from elements and tables given in *Lick Observatory Bulletin*, 1906, Vol. IV, No. 112, and in *Astronomische Nachrichten*, 1907, Vol. 174, page 359, respectively.

The positions of the rings and the elongations and conjunctions of the satellites of Saturn are derived from elements given by H. STRUVE in *Observations de Poulkova*, Supplement 1, St. Petersburg, 1888; *Publications de Poulkovo*, Second Series, Vol. XI, St. Petersburg, 1898; with corrections communicated by H. STRUVE to the *Berliner Jahrbuch*. The differential coordinates of Phosbe are derived from elements and tables given in *Annals of Harvard College Observatory*, 1905, Vol. LIII, No. VI.

The apparent outer dimensions (a and b) of the rings of Saturn are also according to STRUVE; the relative dimensions of the rings are computed from BESSEL's data, except those for the dusky ring, which are based on the observations of various astronomers.

The elongations of Ariel and Umbriel, the inner satellites of Uranus, are derived from the data of NEWCOMB's *Uranian and Neptunian Systems*, *Washington Observations*, 1873, Appendix I. The elongations of Titania and Oberon, the outer satellites of Uranus, are derived from elements given by H. STRUVE in *Abhandlungen der K. Preussischen Akademie der Wissenschaften*, 1912.

The elongations of the satellite of Neptune are derived from elements given by A. HALL in the *Astronomical Journal*, 1898, Vol. XIX, page 65.

The adopted apparent semidiameter of the Sun at the Earth's mean distances is $16' 1''.50$, while in the computation of eclipses the value given by AUWERS in the *Astronomische Nachrichten*, 1891, Vol. 128, page 367, is employed, viz., $15' 59''.63$.

In the computation of the ephemeris for physical observations of the Sun the following elements by CARRINGTON have been used:

Inclination of the Sun's equator to the ecliptic	$7^{\circ} 15'$
Longitude of the ascending node of the Sun's equator on the ecliptic	$73^{\circ} 40' + 50''.25 (t-1850)$
Sidereal period of rotation (mean solar days)	$25^d.38$

The apparent semidiameter of the Moon is computed from the Moon's equatorial horizontal parallax, π , by the formula,

$$S = 0.272\,506\,\pi + 1''.50$$

where the constant 0.272 506 is based on data from occultations given by J. PETERS in the *Astronomische Nachrichten*, 1895, Vol. 138, page 147; and the constant $1''.50$ is added to cover the average effect of irradiation.

The value of the Moon's semidiameter employed in the computation of eclipses is computed from the formula,

$$\sin S = 0.272\,274 \sin \pi$$

In the computation of the ephemeris for physical observations of the Moon, the following notation and formulæ have been used, the value of I and the formulæ for physical libration being those given by F. HAYN in *Abhandlungen der K. Sächsischen Gesell. der Wissenschaften*, Vols. 29 and 30, 1904, 1907:

I —the inclination of the Moon's mean equator to the ecliptic ($-1^{\circ} 32'.1$),

Ω —the longitude of the ascending node of the Moon's orbit, or the longitude of the descending node of the Moon's mean equator,

C —the angle at the center of the Moon's disk made by a lunar meridian with the circle of declination, counted from north to east,

$\lambda, \beta, \alpha, \delta$ —the geocentric longitude, latitude, right ascension, and declination of the Moon,

i —the inclination of the Moon's mean equator to the Earth's true equator,
 Δ —the distance on the Moon's mean equator from its ascending node on the Earth's true equator to its ascending node on the ecliptic,
 Ω_0 —the distance along the Earth's true equator from the true equinox to the ascending node of the Moon's mean equator,
 \mathcal{C} —the Moon's mean longitude, referred to the mean equinox,
 g' —the Earth's mean anomaly,
 g —the Moon's mean anomaly,
 ω —the angular distance of the perigee of the Moon's orbit from its ascending node on the ecliptic,
 b, l —the optical librations in latitude and longitude, respectively,
 $\delta b, \delta l$ —the physical librations in latitude and longitude, respectively,
 $b+\delta b$ —the Moon's geocentric libration in latitude—the Earth's selenographic latitude,
 $l+\delta l$ —the Moon's geocentric libration in longitude—the Earth's selenographic longitude,
 δC —the physical libration of C ,
 $\mu = -0'.617 \sin 2(\Omega_0 - \lambda)$,
 $A = \sin I \cos(\Omega_0 - \lambda)$,
 $\tan B = \tan I \sin(\Omega_0 - \lambda)$,
 $\lambda' = \lambda + \mu + Ab$,
 $b = B - \beta$,
 $l = \lambda' - \mathcal{C}$,
 $\sin C' = \sin i \frac{\cos(\lambda' + \Delta - \Omega_0)}{\cos \delta} = -\sin i \frac{\cos(\alpha - \Omega_0')}{\cos b}$,
 $\delta b = +108'' \sin(\omega + l) + 37'' \sin(\omega - l) - 11'' \sin(g + \omega - l)$,
 $\delta l = +12'' \sin g - 59'' \sin g' - 18'' \sin 2\omega$,
 $\quad - [108'' \cos(\omega + l) - 37'' \cos(\omega - l) + 11'' \cos(g + \omega - l)] \tan b$,
 $\delta C = -[108'' \cos(\omega + l) - 37'' \cos(\omega - l) + 11'' \cos(g + \omega - l)] \sec b$,
 $C = C' + \delta C$.

The Sun's selenographic latitude and longitude have been computed from formulæ the same as those given above except that the heliocentric coordinates of the Moon have been substituted for the geocentric coordinates.

The following elements have been used in computing the ephemerides for physical observations of the planets Mars and Jupiter:

Position of north pole of Mars	$\left\{ \begin{array}{l} \alpha = 21^h 10^m 0^s + 1^s.565(t-1905) \\ \delta = 54^\circ 30' 0'' + 12''.60(t-1905) \end{array} \right.$
Position of north pole of Jupiter	$\left\{ \begin{array}{l} \alpha = 17^h 52^m 0^s.84 + 0^s.247(t-1910) \\ \delta = 64^\circ 33' 34''.6 - 0''.60(t-1910) \end{array} \right.$
Rotation period of Mars	$24^h 37^m 22^s.65$
Rotation period of Jupiter	$\left\{ \begin{array}{l} \text{System I.} \quad 9^h 50^m 30^s.004 \\ \text{System II.} \quad 9^h 55^m 40^s.632 \end{array} \right.$
Longitude of Central Meridian of Mars, May 15, 1897, Greenwich Mean Noon	$52^\circ.01$
Longitude of Central Meridian of Jupiter (System I.), July 14, 1897, Greenwich Mean Noon	$47^\circ.31$
Longitude of Central Meridian of Jupiter (System II.), July 14, 1897, Greenwich Mean Noon	$96^\circ.58$

The position of the north pole of Mars is as given by LOWELL and CROMMELIN (see *Monthly Notices R. A. S.*, 1905, Vol. 66, page 56), while that of the north pole of Jupiter has been deduced from the position given by DAMOISEAU for 1750 (see *Tables Écliptiques des Satellites de Jupiter*, page (1)). The rotation periods of Mars and of Jupiter and the longitudes of the central meridians are according to MARTH (see *Monthly Notices R. A. S.*, 1896, Vol. 56, pages 395–403 and 517–524). The longitude of the Great Red Spot and the time of

its transit across the Central Meridian given in the volumes for 1913 and 1914 have been replaced by those of System II. of MARTH. This change has been made in view of the following facts: The Paris Conference of October, 1911, assigned to the office of the American Ephemeris and Nautical Almanac the preparation of the ephemerides for the physical observations of the planets; a general desire exists that the use of System II. of MARTH should not be discontinued; and the position of the Great Red Spot during the opposition of 1912 was about 70° from the place predicted from the elements adopted in the *American Ephemeris and Nautical Almanac* for 1913.

The adopted semidiameters of the planets, with the authority for each, are given on page xvii. Their stellar magnitudes have been computed from formulæ given by G. MUELLER in *Publicationen des Astrophysikalischen Observatoriums zu Potsdam*, 1893, Vol. 8, page 366.

In the list of observatories the authority for the various positions is given in each case. The latitudes given are in most cases astronomical. In some instances they have been determined by geodetic triangulation from other points. The reductions from geographic to geocentric latitude, $\varphi' - \varphi$, and the distance from the center of the earth, ρ , are computed from the formulæ on page xvi, using the flattening $\frac{1}{297}$ obtained by JOHN F. HAYFORD in *Supplementary Investigation in 1909 of the Figure of the Earth and Isostasy*, U. S. Coast and Geodetic Survey, 1910, and adopted by the *Paris Conference*, October, 1911.

ANNIVERSARIES AND FESTIVALS, 1919.

New Year's Day	Wednesday, Jan. 1.
Epiphany	Monday, Jan. 6.
Lincoln's Birthday	Wednesday, Feb. 12.
Septuagesima Sunday	Sunday, Feb. 16.
Washington's Birthday	Saturday, Feb. 22.
Quinquagesima (Shrove Sunday)	Sunday, Mar. 2.
Ash Wednesday	Wednesday, Mar. 5.
Palm Sunday	Sunday, Apr. 13.
First Day of Passover	Tuesday, Apr. 15.
Good Friday	Friday, Apr. 18.
Easter Sunday	Sunday, Apr. 20.
Rogation Sunday	Sunday, May 25.
Ascension Day (Holy Thursday)	Thursday, May 29.
Memorial Day	Friday, May 30.
Hebrew Pentecost (Shebuoth)	Wednesday, June 4.
Pentecost (Whit Sunday)	Sunday, June 8.
Trinity Sunday	Sunday, June 15.
Corpus Christi	Thursday, June 19.
Independence Day	Friday, July 4.
Labor Day	Monday, Sept. 1.
Hebrew New Year (Rosh Hashanah)	Thursday, Sept. 25.
Day of Atonement (Yom Kippur)	Saturday, Oct. 4.
First Day of Tabernacle (Sucoth)	Thursday, Oct. 9.
Columbus Day	Sunday, Oct. 12.
Election Day (in certain States)	Tuesday, Nov. 4.
Thanksgiving Day	Thursday, Nov. 27.
First Sunday in Advent	Sunday, Nov. 30.
Christmas Day	Thursday, Dec. 25.

CHRONOLOGICAL ERAS AND CYCLES.

CHRONOLOGICAL ERAS.

The year 1919 of the Christian era comprises the latter part of the 143d and the beginning of the 144th year of the independence of the United States of America, and corresponds to the year 6632 of the Julian period.

Of the peoples using the Christian era some employ the Gregorian calendar and some the Julian. January 1, 1919, Julian calendar, corresponds to January 14, 1919, Gregorian calendar.

The year 7428 of the Byzantine era begins on September 1, 1919, Julian calendar.

The year 5680 of the Jewish era begins at sunset on September 24, 1919, Gregorian calendar.

The year 2672 since the foundation of Rome, according to VARRO, begins on January 1, 1919, Julian calendar.

The year 2668 of the era of NABONASSAR begins on May 1, 1919, Julian calendar.

The year 2579 of the Japanese era, being the 8th year of the period Taisho, begins on January 1, 1919, Gregorian calendar.

The year 2231 of the Grecian era, or the era of the SELEUCIDÆ, begins in the present-day usage of the Syrians on September 1, 1919, or on October 1, 1919, Julian calendar, according to different sects; but in the ancient usage of Damascus and Arabia Petræa the year began with the vernal equinox.

The year 1636 of the era of DIOCLETIAN begins on August 30, 1919, Julian calendar.

The year 1338 of the Mohammedan era, or the era of the Hegira, begins at sunset on September 25, 1919, Gregorian calendar.

2 421 960 is the Julian day number of January 1, 1919, Gregorian calendar.

CHRONOLOGICAL CYCLES.

Dominical Letter	E	Solar Cycle	24
Epoct	29	Roman Indiction	2
Janar Cycle or Golden Number	1	Julian Period	6632

ASTRONOMICAL CONSTANTS.

Solar Parallax	8.80	} Paris Conference.
Constant of Nutation	9.21	
Constant of Aberration	20.47	
General Precession	50''.2564+0''.000 222(<i>t</i> -1900)	} Newcomb.
Obliquity of the Ecliptic	23° 27' 8''.26-0''.4684(<i>t</i> -1900)	
Equatorial Horizontal Parallax of the Moon	57' 2''.63* (Newcomb).	
Mean distance Earth to Moon 384 411 kilometers-238 862 statute miles or 60.2678 radii.		
Mean distance Earth to Sun 149 504 201 kilometers-92 897 416 statute miles.		
Velocity of light 299 860 kilometers-186 324 statute miles per second (Newcomb and Michelson).		
Light travels unit distance in 498°.580.		
Gaussian Gravitation Constant, † <i>k</i> =0.017 202 099-3 548''.187 61.		

Acceleration in one second due to gravity, $g=9.8060-0.0280 \cos 2\varphi - \frac{2h}{R} g \cdot \dagger$	} Helmert.
Length of seconds pendulum, $l=0.993 549-0.002 631 \cos 2\varphi - \frac{2h}{R} l \cdot \dagger$	

Length of the year:		
Tropical (ordinary)	$\frac{d}{365.242 198 79-0.000 000 0614 (t-1900)}$	} Newcomb.
Sidereal	$\frac{d}{365.256 360 42+0.000 000 0011 (t-1900)}$	
Anomalistic	$\frac{d}{365.259 641 34+0.000 000 0304 (t-1900)}$	
Eclipse	$\frac{d}{346.620 000 +0.000 000 36 (t-1900)}$	

Length of the month:					
Synodical (ordinary)	$\frac{d}{29.530 588-29 12 44 2.8}$	$\frac{h}{23}$	$\frac{m}{56}$	$\frac{s}{4.091}$	} Hansen.
Tropical	$\frac{d}{27.321 582-27 7 43 4.7}$	$\frac{h}{27}$	$\frac{m}{321}$	$\frac{s}{661-27 7 43 11.5}$	
Sidereal	$\frac{d}{27.321 661-27 7 43 11.5}$	$\frac{h}{27}$	$\frac{m}{321}$	$\frac{s}{661-27 7 43 11.5}$	
Anomalistic	$\frac{d}{27.554 550-27 13 18 33.1}$	$\frac{h}{27}$	$\frac{m}{554}$	$\frac{s}{550-27 13 18 33.1}$	
Nodical	$\frac{d}{27.212 219-27 5 5 35.7}$	$\frac{h}{27}$	$\frac{m}{212}$	$\frac{s}{219-27 5 5 35.7}$	

Length of the day:				
Sidereal	$\frac{h}{23}$	$\frac{m}{56}$	$\frac{s}{4.091}$	of mean solar time.
Mean Solar	$\frac{h}{24}$	$\frac{m}{3}$	$\frac{s}{56.555}$	of sidereal time.

Dimensions of the Earth (Hayford's Spheroid of 1909):

Equatorial Radius, *a*=6378.388 kilometers or 3963.34 statute miles.

Polar Radius, *b*=6356.909 " or 3949.99 " "

Flattening, $\frac{a-b}{a} = \frac{1}{297.0}$

Logarithm of the eccentricity $\frac{\sqrt{a^2-b^2}}{a} = \log e = 8.913 804$

Logarithm radius= $\log \rho = 9.999 2695+0.000 7324 \cos 2\varphi -0.000 0019 \cos 4\varphi$.

Reduction from geographic latitude φ to geocentric latitude φ' ,
 $\varphi' - \varphi = -11' 35''.66 \sin 2\varphi + 1''.17 \sin 4\varphi$.

1 degree of latitude (in statute miles)=69.0569-0.3494 $\cos 2\varphi +0.0007 \cos 4\varphi$.

1 degree of longitude (in statute miles)=69.2316 $\cos \varphi -0.0584 \cos 3\varphi +0.0001 \cos 5\varphi$.

1 meter=3.280 8333 feet. 1 foot=0.304 8006 meters.

1 statute mile=0.868 362 nautical or geographical miles.

1 nautical mile=1.151 594 statute miles.

* Used in the computation of eclipses. The parallax used in the computation of the ephemeris of the Moon contained in this volume is 57' 2".23 (Hansen).

† *k*² is the acceleration due to the Sun's attraction at the mean distance of the Earth from the Sun, which is also the astronomical unit of distance, the unit of time being one mean solar day.

‡ φ =latitude, *h*=elevation above sea level in meters, and $\log R=6.80416$.

NOTE.—The above values of $\log \rho$ and $\varphi' - \varphi$ were computed with the eccentricity that results from assuming that the flattening of the earth is exactly $\frac{1}{297}$.

ASTRONOMICAL CONSTANTS.

SEMIDIAMETERS OF THE SUN, MOON, AND PLANETS.

Name.	At Unit Distance.	At Mean Least Distance.	In Kilometers.	In Statute Miles.	Authority.
...	15 59.63	..	695 553.46	432 196.01	Auwers.
...	15 32.58*	..	1 738.02	1 079.96	Newcomb.
Mercury	3.34	5.45	2 420.89	1 504.27	Le Verrier.
Venus	8.55	30.90	6 197.18	3 850.74	Peirce.
Earth	5.05	9.64	3 660.32	2 274.42	Peirce.
Mars (Equatorial)	1 40.20	23.84	72 626.64	45 128.01	Am. Eph.
Mars (Polar)	1 34.12	22.40	68 219.76	42 389.71	Peirce.
Jupiter (Equatorial)	1 24.88	9.94	61 522.45	38 228.20	Barnard.
Jupiter (Polar)	1 17.47	9.07	56 151.56	34 890.89	Barnard.
Saturn	33.52	1.84	24 295.86	15 096.72	Am. Eph.
Neptune	38.66	1.33	28 021.42	17 411.67	Am. Eph.

ELEMENTS OF THE PLANETARY ORBITS FOR THE EPOCH 1919—January 0^d G. M. T.

Name.	Mean Distance.	Sidereal Period in Tropical Years.	Sidereal Mean Daily Motion.	Synodic Period in Tropical Years.	Eccentricity.
Mercury	0.387 099	0.240 85	14 732.420	0.317 26	0.205 6181
Venus	0.723 331	0.615 21	5 767.670	1.598 72	0.006 8116
Earth	1.000 000	1.000 04	3 548.193	..	0.016 7431
Mars	1.523 688	1.880 89	1 886.519	2.135 39	0.093 3262
Jupiter	5.202 803	11.862 23	299.128	1.092 11	0.048 3686
Saturn	9.538 843	29.457 72	120.455	1.035 18	0.055 8241
Uranus	19.190 978	84.015 29	42.23	1.012 09	0.047 0978
Neptune	30.070 672	164.788 29	21.53	1.006 14	0.008 5454

Name.	Inclination to the Ecliptic.	Mean Longitude of the Node.	Mean Longitude of the Perihelion.	Mean Longitude at the Epoch.	Logarithm of Mass in Unit of Sun's Mass.
Mercury	7 0 11.6	47 22 16.0	76 11 42.8	135 10 59.71	3.221 8487—10
Venus	3 23 37.8	75 57 2.2	130 25 52.7	300 12 56.52	4.389 3398—10
Earth	..	..	101 32 50.9	99 6 12.78	4.482 2896—10
Mars	1 51 0.9	48 55 56.9	334 34 5.4	330 16 38.76	3.509 5499—10
Jupiter	1 18 27.7	99 37 47.9	13 1 3.6	94 53 5.72	6.979 9082—10
Saturn	2 29 29.6	112 56 57.3	91 27 39.2	139 0 24.68	6.455 7335—10
Uranus	0 46 22.0	73 35 8.9	169 21 9.6	325 2 6.33	5.640 7528—10
Neptune	1 46 38.8	130 53 15.8	43 55 18.0	126 47 41.52	5.705 5338—10

The elements of the four inner planets are derived from those given by COMB in Vol. VI of the *Astronomical Papers of the American Ephemeris*, are the same as those used in computing the ephemerides of these planets. The elements of Jupiter, Saturn, Uranus, and Neptune are taken from Vol. VII of *Astronomical Papers* for the epoch of the tables. They are reduced to the epoch of 1919 by applying LE VERRIER's variations, and can not be regarded as being exactly identical with the elements used in computing the ephemerides of those planets in this volume.

At mean distance. See *Ast. Papers Am. Eph.*, Vol. IX, p. 39. For the values of the semidiameter used in this volume see page xi.

SYMBOLS AND ABBREVIATIONS.

SIGNS OF THE PLANETS, ETC.

☉ The Sun.	♂ Mars.
☾ The Moon.	♃ Jupiter.
☿ Mercury.	♄ Saturn.
♀ Venus.	♅ Uranus.
♁ The Earth.	♆ Neptune.

SIGNS OF THE ZODIAC.

Spring Signs.	1. ♈ Aries.	Autumn Signs.	7. ♎ Libra.
	2. ♉ Taurus.		8. ♏ Scorpius.
	3. ♊ Gemini.		9. ♐ Sagittarius.
Summer Signs.	4. ♋ Cancer.	Winter Signs.	10. ♑ Capricorn.
	5. ♌ Leo.		11. ♒ Aquarius.
	6. ♍ Virgo.		12. ♓ Pisces.

ASPECTS.

- ♌ Conjunction, or having the same Longitude or Right Ascension.
- ☐ Quadrature, or differing $\pm 90^\circ$ in Longitude or Right Ascension.
- ♌ Opposition, or differing 180° in Longitude or Right Ascension.

ABBREVIATIONS.

♊ Ascending Node.	° Degrees.
♋ Descending Node.	' Minutes of Arc.
N. North.	" Seconds of Arc.
S. South.	h Hours.
E. East.	m Minutes of Time.
W. West.	s Seconds of Time.

PART I.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ' "	"	' "	"	m s	s	h m s
Jan. 1	We	18 43 40.17	11.052	-23 4 9.2	+11.53	16 17.82	8.95	- 3 19.09	-1.195	18 40 21.08
2	Th	18 48 5.26	11.039	22 59 18.6	12.68	16 17.82	8.95	3 47.62	1.182	18 44 17.63
3	Fr	18 52 30.01	11.024	22 54 0.5	13.83	16 17.83	8.95	4 15.82	1.168	18 48 14.19
4	Sa	18 56 54.40	11.008	22 48 15.0	14.96	16 17.82	8.95	4 43.65	1.152	18 52 10.75
5	Su	19 1 18.39	10.991	22 42 2.4	16.09	16 17.82	8.95	5 11.09	1.134	18 56 7.31
6	Mo	19 5 41.95	10.972	-22 35 22.9	+17.21	16 17.81	8.95	- 5 38.09	-1.115	19 0 3.86
7	Tu	19 10 5.04	10.952	22 28 16.6	18.32	16 17.80	8.95	6 4.62	1.095	19 4 0.42
8	We	19 14 27.64	10.931	22 20 43.7	19.42	16 17.78	8.95	6 30.66	1.074	19 7 56.98
9	Th	19 18 49.71	10.908	22 12 44.6	20.51	16 17.75	8.95	6 56.17	1.052	19 11 53.54
10	Fr	19 23 11.23	10.885	22 4 19.4	21.59	16 17.72	8.95	7 21.13	1.028	19 15 50.09
11	Sa	19 27 32.17	10.860	-21 55 28.3	+22.66	16 17.69	8.95	- 7 45.52	-1.004	19 19 46.65
12	Su	19 31 52.53	10.835	21 46 11.7	23.72	16 17.65	8.95	8 9.32	0.979	19 23 43.21
13	Mo	19 36 12.26	10.809	21 36 29.8	24.77	16 17.60	8.95	8 32.50	0.953	19 27 39.77
14	Tu	19 40 31.36	10.782	21 26 22.9	25.81	16 17.55	8.95	8 55.04	0.926	19 31 36.32
15	We	19 44 49.81	10.755	21 15 51.2	26.83	16 17.49	8.95	9 16.93	0.898	19 35 32.88
16	Th	19 49 7.60	10.727	-21 4 55.0	+27.85	16 17.43	8.95	- 9 38.16	-0.871	19 39 29.44
17	Fr	19 53 24.70	10.698	20 53 34.6	28.85	16 17.36	8.95	9 58.71	0.842	19 43 26.00
18	Sa	19 57 41.12	10.669	20 41 50.4	29.84	16 17.28	8.94	10 18.57	0.813	19 47 22.55
19	Su	20 1 56.83	10.640	20 29 42.5	30.82	16 17.20	8.94	10 37.72	0.783	19 51 19.11
20	Mo	20 6 11.83	10.610	20 17 11.4	31.78	16 17.11	8.94	10 56.16	0.753	19 55 15.67
21	Tu	20 10 26.10	10.579	-20 4 17.3	+32.73	16 17.01	8.94	-11 13.87	-0.723	19 59 12.22
22	We	20 14 39.63	10.548	19 51 0.7	33.66	16 16.91	8.94	11 30.85	0.692	20 3 8.78
23	Th	20 18 52.41	10.517	19 37 21.8	34.58	16 16.81	8.94	11 47.07	0.660	20 7 5.34
24	Fr	20 23 4.43	10.485	19 23 21.0	35.48	16 16.70	8.94	12 2.54	0.629	20 11 1.89
25	Sa	20 27 15.68	10.453	19 8 58.7	36.37	16 16.58	8.94	12 17.24	0.596	20 14 58.45
26	Su	20 31 26.16	10.420	-18 54 15.2	+37.25	16 16.46	8.94	-12 31.16	-0.564	20 18 55.00
27	Mo	20 35 35.85	10.387	18 39 11.0	38.10	16 16.34	8.94	12 44.29	0.531	20 22 51.56
28	Tu	20 39 44.75	10.355	18 23 46.4	38.94	16 16.21	8.93	12 56.64	0.498	20 26 48.12
29	We	20 43 52.85	10.321	18 8 1.8	39.77	16 16.08	8.93	13 8.18	0.464	20 30 44.67
30	Th	20 48 0.15	10.287	17 51 57.7	40.57	16 15.95	8.93	13 18.92	0.431	20 34 41.23
31	Fr	20 52 6.63	10.253	-17 35 34.4	+41.36	16 15.81	8.93	-13 28.85	-0.396	20 38 37.78
Feb. 1	Sa	20 56 12.29	10.219	17 18 52.4	42.14	16 15.67	8.93	13 37.95	0.362	20 42 34.34
2	Su	21 0 17.13	10.185	17 1 52.0	42.89	16 15.53	8.93	13 46.24	0.328	20 46 30.90
3	Mo	21 4 21.15	10.150	16 44 33.8	43.62	16 15.38	8.93	13 53.70	0.293	20 50 27.45
4	Tu	21 8 24.33	10.115	16 26 58.2	44.34	16 15.22	8.93	14 0.32	0.259	20 54 24.01
5	We	21 12 26.68	10.081	-16 9 5.5	+45.04	16 15.07	8.92	-14 6.12	-0.224	20 58 20.56
6	Th	21 16 28.20	10.046	15 50 56.2	45.73	16 14.92	8.92	14 11.08	0.189	21 2 17.12
7	Fr	21 20 28.89	10.011	15 32 30.7	46.39	16 14.76	8.92	14 15.21	0.155	21 6 13.67
8	Sa	21 24 28.75	9.977	15 13 49.5	47.04	16 14.60	8.92	14 18.52	0.121	21 10 10.23
9	Su	21 28 27.80	9.943	14 54 52.9	47.67	16 14.43	8.92	14 21.02	0.087	21 14 6.78
10	Mo	21 32 26.03	9.910	-14 35 41.4	+48.29	16 14.25	8.92	-14 22.70	-0.053	21 18 3.34
11	Tu	21 36 23.47	9.877	14 16 15.3	48.88	16 14.08	8.92	14 23.58	-0.020	21 21 59.89
12	We	21 40 20.12	9.844	13 56 35.1	49.47	16 13.90	8.91	14 23.67	+0.012	21 25 56.44
13	Th	21 44 15.99	9.812	13 36 41.1	50.03	16 13.71	8.91	14 22.99	0.044	21 29 53.00
14	Fr	21 48 11.10	9.781	13 16 33.8	50.58	16 13.52	8.91	14 21.54	0.076	21 33 49.55
15	Sa	21 52 5.46	9.749	-12 56 13.5	+51.11	16 13.33	8.91	-14 19.35	+0.107	21 37 46.11
16	Su	21 55 59.08	9.719	-12 35 40.6	+51.63	16 13.12	8.91	-14 16.42	+0.137	21 41 42.66

SUN, 1919.

3

FOR GREENWICH MEAN NOON.

Data.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aberation.	True Obliquity.	Mean Time of Sidereal Noon.
		" ' "	"	"			"	"	"	23° 28' "	h m s
Jan. 1	1	280 2 26.4	152.95	+0.09	9.992 6918	-1.3	0.01	+16.92	20.81	56.00	5 18 46.56
	2	281 3 37.3	152.95	0.22	9.992 6895	-0.6	0.15	16.96	20.81	56.00	5 14 50.65
	3	282 4 48.3	152.95	0.33	9.992 6889	+0.1	0.29	17.00	20.81	56.00	5 10 54.73
	4	283 5 59.2	152.95	0.41	9.992 6900	0.8	0.42	17.04	20.81	56.00	5 6 58.82
	5	284 7 9.8	152.94	0.47	9.992 6928	1.5	0.56	17.08	20.81	56.00	5 3 2.91
	6	285 8 20.2	152.93	+0.49	9.992 6973	+2.3	0.70	+17.12	20.81	56.00	4 59 7.00
	7	286 9 30.2	152.91	0.48	9.992 7037	3.0	0.84	17.16	20.81	56.00	4 55 11.09
	8	287 10 39.7	152.89	0.44	9.992 7121	4.0	0.97	17.19	20.81	56.00	4 51 15.18
	9	288 11 48.8	152.86	0.38	9.992 7227	4.9	1.11	17.22	20.81	56.00	4 47 19.26
	10	289 12 57.2	152.84	0.29	9.992 7354	5.8	1.25	17.26	20.81	56.00	4 43 23.35
	11	290 14 5.1	152.81	+0.17	9.992 7506	+6.9	1.39	+17.29	20.81	56.00	4 39 27.44
	12	291 15 12.4	152.79	+0.03	9.992 7683	8.0	1.53	17.33	20.81	56.01	4 35 31.53
	13	292 16 19.0	152.76	-0.11	9.992 7887	9.1	1.66	17.36	20.81	56.01	4 31 35.62
	14	293 17 25.1	152.74	0.25	9.992 8118	10.2	1.80	17.39	20.81	56.02	4 27 39.71
	15	294 18 30.6	152.72	0.37	9.992 8377	11.4	1.94	17.42	20.80	56.02	4 23 43.80
	16	295 19 35.5	152.70	-0.48	9.992 8664	+12.6	2.08	+17.44	20.80	56.03	4 19 47.88
	17	296 20 40.0	152.68	0.56	9.992 8980	13.7	2.21	17.47	20.80	56.03	4 15 51.97
	18	297 21 44.0	152.66	0.62	9.992 9323	14.9	2.35	17.49	20.80	56.04	4 11 56.06
	19	298 22 47.5	152.64	0.65	9.992 9694	16.0	2.49	17.52	20.80	56.05	4 8 0.15
	20	299 23 50.6	152.62	0.65	9.993 0091	17.1	2.63	17.54	20.80	56.06	4 4 4.24
	21	300 24 53.2	152.60	-0.63	9.993 0513	+18.1	2.76	+17.56	20.79	56.06	4 0 8.33
	22	301 25 55.4	152.58	0.58	9.993 0958	19.0	2.90	17.58	20.79	56.07	3 56 12.42
	23	302 26 57.1	152.56	0.51	9.993 1427	20.0	3.04	17.60	20.79	56.08	3 52 16.51
	24	303 27 58.3	152.54	0.41	9.993 1917	20.9	3.18	17.61	20.79	56.09	3 48 20.60
	25	304 28 59.0	152.52	0.30	9.993 2428	21.7	3.31	17.63	20.79	56.10	3 44 24.69
	26	305 29 59.1	152.49	-0.18	9.993 2958	+22.5	3.45	+17.64	20.78	56.11	3 40 28.78
	27	306 30 58.6	152.46	-0.05	9.993 3506	23.2	3.59	17.65	20.78	56.11	3 36 32.87
	28	307 31 57.4	152.43	+0.07	9.993 4072	23.9	3.73	17.66	20.78	56.12	3 32 36.96
	29	308 32 55.4	152.40	0.19	9.993 4654	24.5	3.86	17.67	20.77	56.13	3 28 41.05
	30	309 33 52.7	152.37	0.30	9.993 5250	25.1	4.00	17.68	20.77	56.14	3 24 45.14
	31	310 34 49.0	152.33	+0.39	9.993 5860	+25.7	4.14	+17.68	20.77	56.15	3 20 49.23
Feb. 1	32	311 35 44.3	152.28	0.45	9.993 6483	26.2	4.28	17.69	20.77	56.17	3 16 53.32
	2	312 36 38.5	152.23	0.49	9.993 7120	26.8	4.42	17.69	20.76	56.18	3 12 57.41
	3	313 37 31.5	152.18	0.49	9.993 7769	27.3	4.55	17.69	20.76	56.19	3 9 1.50
	4	314 38 23.2	152.12	0.46	9.993 8432	27.9	4.69	17.69	20.76	56.20	3 5 5.59
	5	315 39 13.4	152.06	+0.40	9.993 9109	+28.5	4.83	+17.68	20.75	56.21	3 1 9.68
	6	316 40 2.2	152.00	0.32	9.993 9801	29.2	4.97	17.68	20.75	56.22	2 57 13.77
	7	317 40 49.5	151.94	0.21	9.994 0509	29.9	5.10	17.67	20.75	56.23	2 53 17.86
	8	318 41 35.2	151.87	+0.08	9.994 1235	30.7	5.24	17.66	20.74	56.24	2 49 21.95
	9	319 42 19.3	151.81	-0.05	9.994 1980	31.5	5.38	17.65	20.74	56.25	2 45 26.04
	10	320 43 1.8	151.74	-0.18	9.994 2745	+32.3	5.52	+17.64	20.74	56.26	2 41 30.13
	11	321 43 42.8	151.67	0.30	9.994 3530	33.2	5.65	17.63	20.73	56.27	2 37 34.23
	12	322 44 22.1	151.61	0.41	9.994 4338	34.1	5.79	17.62	20.73	56.28	2 33 38.32
	13	323 44 59.9	151.54	0.49	9.994 5167	35.0	5.93	17.60	20.72	56.29	2 29 42.41
	14	324 45 36.1	151.48	0.55	9.994 6018	35.9	6.07	17.58	20.72	56.30	2 25 46.50
	15	325 46 10.9	151.42	-0.59	9.994 6891	+36.8	6.20	+17.56	20.72	56.31	2 21 50.59
	16	326 46 44.2	151.36	-0.60	9.994 7786	+37.7	6.34	+17.54	20.71	56.32	2 17 54.68

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ' "	"	' "	"	m s	s	h m s
Feb. 16	Su	21 55 59.08	9.719	—12 35 40.6	+51.63	16 13.12	8.91	—14 16.42	+0.137	21 41 42.66
17	Mo	21 59 51.99	9.690	12 14 55.6	52.13	16 12.92	8.90	14 12.78	0.167	21 45 39.21
18	Tu	22 3 44.20	9.661	11 53 58.7	52.61	16 12.71	8.90	14 8.43	0.196	21 49 35.77
19	We	22 7 35.72	9.633	11 32 50.5	53.07	16 12.50	8.90	14 3.40	0.224	21 53 32.32
20	Th	22 11 26.57	9.605	11 11 31.4	53.52	16 12.28	8.90	13 57.70	0.251	21 57 28.88
21	Fr	22 15 16.77	9.578	—10 50 1.6	+53.96	16 12.06	8.90	—13 51.34	+0.278	22 1 25.43
22	Sa	22 19 6.32	9.552	10 28 21.7	54.37	16 11.83	8.89	13 44.34	0.305	22 5 21.98
23	Su	22 22 55.25	9.526	10 6 32.1	54.76	16 11.61	8.89	13 36.71	0.331	22 9 18.54
24	Mo	22 26 43.57	9.501	9 44 33.1	55.15	16 11.37	8.89	13 28.48	0.355	22 13 15.09
25	Tu	22 30 31.30	9.477	9 22 25.1	55.51	16 11.14	8.89	13 19.66	0.380	22 17 11.64
26	We	22 34 18.46	9.453	—9 0 8.7	+55.85	16 10.91	8.89	—13 10.26	+0.403	22 21 8.20
27	Th	22 38 5.05	9.430	8 37 44.2	56.19	16 10.67	8.88	13 0.30	0.426	22 25 4.75
28	Fr	22 41 51.10	9.408	8 15 11.9	56.50	16 10.43	8.88	12 49.80	0.449	22 29 1.90
Mar. 1	Sa	22 45 36.62	9.386	7 52 32.4	56.79	16 10.19	8.88	12 38.76	0.471	22 32 57.86
2	Su	22 49 21.62	9.364	7 29 46.0	57.07	16 9.95	8.88	12 27.21	0.492	22 36 54.41
3	Mo	22 53 6.11	9.343	—7 6 53.3	+57.32	16 9.70	8.88	—12 15.15	+0.513	22 40 50.96
4	Tu	22 56 50.11	9.323	6 43 54.6	57.57	16 9.46	8.87	12 2.60	0.533	22 44 47.52
5	We	23 0 33.64	9.304	6 20 50.3	57.79	16 9.22	8.87	11 49.57	0.553	22 48 44.07
6	Th	23 4 16.70	9.285	5 57 40.8	58.00	16 8.97	8.87	11 36.08	0.571	22 52 40.62
7	Fr	23 7 59.32	9.267	5 34 26.6	58.19	16 8.73	8.87	11 22.15	0.589	22 56 37.17
8	Sa	23 11 41.51	9.249	—5 11 8.0	+58.36	16 8.48	8.86	—11 7.79	+0.607	23 0 33.73
9	Su	23 15 23.30	9.233	4 47 45.4	58.52	16 8.23	8.86	10 53.02	0.624	23 4 30.28
10	Mo	23 19 4.69	9.217	4 24 19.2	58.66	16 7.98	8.86	10 37.85	0.640	23 8 26.83
11	Tu	23 22 45.71	9.202	4 0 49.8	58.79	16 7.72	8.86	10 22.32	0.654	23 12 23.38
12	We	23 26 26.38	9.188	3 37 17.5	58.90	16 7.47	8.85	10 6.45	0.668	23 16 19.94
13	Th	23 30 6.73	9.175	—3 13 42.7	+59.00	16 7.21	8.85	—9 50.25	+0.682	23 20 16.49
14	Fr	23 33 46.78	9.163	2 50 5.8	59.08	16 6.95	8.85	9 33.74	0.694	23 24 13.04
15	Sa	23 37 26.55	9.152	2 26 27.0	59.15	16 6.69	8.85	9 16.96	0.708	23 28 9.59
16	Su	23 41 6.07	9.142	2 2 46.8	59.20	16 6.42	8.85	8 59.92	0.716	23 32 6.15
17	Mo	23 44 45.35	9.132	1 39 5.5	59.24	16 6.15	8.84	8 42.65	0.724	23 36 2.70
18	Tu	23 48 24.43	9.124	—1 15 23.4	+59.27	16 5.88	8.84	—8 25.18	+0.732	23 39 59.25
19	We	23 52 3.33	9.117	0 51 40.9	59.28	16 5.61	8.84	8 7.52	0.739	23 43 55.80
20	Th	23 55 42.06	9.111	0 27 58.3	59.27	16 5.33	8.84	7 49.70	0.746	23 47 52.36
21	Fr	23 59 20.66	9.106	—0 4 16.0	59.25	16 5.06	8.83	7 31.75	0.751	23 51 48.91
22	Sa	0 2 59.14	9.101	+0 19 25.6	59.21	16 4.78	8.83	7 13.68	0.755	23 55 45.46
23	Su	0 6 37.53	9.098	+0 43 6.2	+59.16	16 4.50	8.83	—6 55.52	+0.758	23 59 42.01
24	Mo	0 10 15.85	9.095	1 6 45.4	59.10	16 4.22	8.82	6 37.28	0.761	0 3 38.56
25	Tu	0 13 54.12	9.094	1 30 22.9	59.02	16 3.94	8.82	6 19.00	0.762	0 7 35.12
26	We	0 17 32.36	9.093	1 53 58.3	58.93	16 3.66	8.82	6 0.69	0.763	0 11 31.67
27	Th	0 21 10.59	9.093	2 17 31.3	58.82	16 3.37	8.82	5 42.37	0.763	0 15 28.22
28	Fr	0 24 48.84	9.094	+2 41 1.5	+58.69	16 3.09	8.81	—5 24.06	+0.762	0 19 24.77
29	Sa	0 28 27.11	9.095	3 4 28.5	58.55	16 2.81	8.81	5 5.78	0.761	0 23 21.33
30	Su	0 32 5.43	9.098	3 27 52.0	58.40	16 2.53	8.81	4 47.55	0.758	0 27 17.88
31	Mo	0 35 43.81	9.101	3 51 11.5	58.23	16 2.25	8.81	4 29.38	0.755	0 31 14.43
Apr. 1	Tu	0 39 22.27	9.104	4 14 26.7	58.04	16 1.98	8.80	4 11.29	0.752	0 35 10.98
2	We	0 43 0.82	9.108	+4 37 37.3	+57.84	16 1.70	8.80	—3 53.28	+0.748	0 39 7.54
3	Th	0 46 39.47	9.113	+5 0 42.7	+57.62	16 1.43	8.80	—3 35.38	+0.743	0 43 4.09

FOR GREENWICH MEAN NOON.

Date.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aber. ration.	True Obliquity.	Mean Time of Sidereal Noon.
		" ' "	"	"			"	"	"	23° 26'	h m s
Feb. 16	47	326 46 44.2	151.36	-0.60	9.994 7786	+37.7	6.34	+17.54	20.71	56.32	2 17 54.68
17	48	327 47 16.2	151.30	0.58	9.994 8702	38.6	6.48	17.52	20.71	56.33	2 13 58.78
18	49	328 47 46.7	151.34	0.52	9.994 9638	39.4	6.62	17.50	20.70	56.33	2 10 2.87
19	50	329 48 15.8	151.19	0.45	9.995 0593	40.2	6.75	17.47	20.70	56.34	2 6 6.96
20	51	330 48 43.6	151.13	0.36	9.995 1568	40.9	6.89	17.44	20.69	56.35	2 2 11.05
21	52	331 49 10.0	151.07	-0.25	9.995 2556	+41.6	7.03	+17.42	20.69	56.36	1 58 15.14
22	53	332 49 35.0	151.01	0.13	9.995 3561	42.3	7.17	17.39	20.68	56.36	1 54 19.24
23	54	333 49 58.7	150.96	-0.01	9.995 4590	42.7	7.31	17.36	20.68	56.37	1 50 23.33
24	55	334 50 21.0	150.90	+0.12	9.995 5613	43.3	7.44	17.32	20.67	56.38	1 46 27.42
25	56	335 50 41.8	150.84	0.24	9.995 6657	43.7	7.58	17.29	20.67	56.38	1 42 31.51
26	57	336 51 1.2	150.78	+0.34	9.995 7712	+44.1	7.72	+17.26	20.66	56.39	1 38 35.61
27	58	337 51 19.0	150.71	0.43	9.995 8775	44.4	7.86	17.22	20.66	56.39	1 34 39.70
28	59	338 51 35.4	150.65	0.50	9.995 9845	44.7	7.99	17.18	20.65	56.40	1 30 43.79
Mar. 1	60	339 51 50.0	150.58	0.55	9.996 0921	44.9	8.13	17.15	20.65	56.40	1 26 47.88
2	61	340 52 3.0	150.50	0.56	9.996 2001	45.1	8.27	17.11	20.64	56.40	1 22 51.98
3	62	341 52 14.2	150.43	+0.53	9.996 3086	+45.3	8.41	+17.07	20.64	56.41	1 18 56.07
4	63	342 52 23.4	150.34	0.47	9.996 4175	45.5	8.54	17.03	20.63	56.41	1 15 0.16
5	64	343 52 30.7	150.26	0.38	9.996 5268	45.7	8.68	16.98	20.63	56.41	1 11 4.26
6	65	344 52 35.9	150.17	0.28	9.996 6366	45.9	8.82	16.94	20.62	56.41	1 7 8.35
7	66	345 52 38.9	150.08	0.16	9.996 7470	46.2	8.96	16.90	20.62	56.41	1 3 12.44
8	67	346 52 39.8	149.99	+0.03	9.996 8581	+46.5	9.09	+16.85	20.61	56.41	0 59 16.54
9	68	347 52 38.5	149.90	-0.10	9.996 9700	46.8	9.23	16.81	20.61	56.41	0 55 20.63
10	69	348 52 34.9	149.81	0.22	9.997 0827	47.2	9.37	16.76	20.60	56.41	0 51 24.72
11	70	349 52 29.1	149.71	0.33	9.997 1965	47.6	9.51	16.71	20.60	56.41	0 47 28.82
12	71	350 52 21.2	149.62	0.42	9.997 3113	48.1	9.64	16.67	20.59	56.41	0 43 32.91
13	72	351 52 11.1	149.53	-0.49	9.997 4273	+48.6	9.78	+16.62	20.59	56.40	0 39 37.00
14	73	352 51 58.8	149.45	0.53	9.997 5445	49.1	9.92	16.57	20.58	56.40	0 35 41.10
15	74	353 51 44.5	149.36	0.53	9.997 6628	49.6	10.06	16.53	20.57	56.40	0 31 45.19
16	75	354 51 28.1	149.28	0.51	9.997 7824	50.1	10.19	16.48	20.57	56.39	0 27 49.28
17	76	355 51 9.8	149.20	0.46	9.997 9031	50.5	10.33	16.43	20.56	56.38	0 23 53.38
18	77	356 50 49.5	149.11	-0.39	9.998 0249	+51.0	10.47	+16.38	20.56	56.38	0 19 57.47
19	78	357 50 27.3	149.04	0.29	9.998 1477	51.4	10.61	16.33	20.55	56.37	0 16 1.56
20	79	358 50 3.2	148.96	0.18	9.998 2714	51.7	10.75	16.28	20.55	56.36	0 12 5.66
21	80	359 49 37.3	148.88	-0.06	9.998 3960	52.1	10.88	16.23	20.54	56.35	0 8 9.75
22	81	0 49 9.5	148.81	+0.06	9.998 5213	52.4	11.02	16.18	20.53	56.34	0 4 13.85
23	82	1 48 40.0	148.73	+0.18	9.998 6473	+52.6	11.16	+16.13	20.53	56.33	0 0 17.94
24	83	2 48 8.7	148.66	0.30	9.998 7737	52.7	11.30	16.08	20.52	56.32	23 52 26.13
25	84	3 47 35.6	148.59	0.41	9.998 9004	52.9	11.43	16.03	20.52	56.31	23 48 30.22
26	85	4 47 0.8	148.51	0.51	9.999 0274	52.9	11.57	15.98	20.51	56.30	23 44 34.31
27	86	5 46 24.2	148.44	0.58	9.999 1543	52.9	11.71	15.93	20.50	56.29	23 40 38.41
28	87	6 45 45.9	148.36	+0.62	9.999 2812	+52.8	11.85	+15.88	20.50	56.27	23 36 42.50
29	88	7 45 5.7	148.29	0.63	9.999 4077	52.6	11.98	15.84	20.49	56.26	23 32 46.59
30	89	8 44 23.7	148.21	0.60	9.999 5337	52.4	12.12	15.79	20.49	56.25	23 28 50.69
31	90	9 43 39.7	148.12	0.55	9.999 6592	52.1	12.26	15.74	20.48	56.23	23 24 54.78
Apr. 1	91	10 42 53.7	148.04	0.47	9.999 7840	51.9	12.40	15.69	20.47	56.21	23 20 58.87
2	92	11 42 5.6	147.95	+0.37	9.999 9081	+51.6	12.53	+15.65	20.47	56.20	23 17 2.96
3	93	12 41 15.3	147.86	+0.25	0.000 0316	+51.3	12.67	+15.60	20.46	56.18	23 13 7.06

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ' "	"	' "	"	m s	s	h m s
Apr. 1	Tu	0 39 22.27	9.104	+ 4 14 26.7	+58.04	16 1.98	8.80	-4 11.29	+0.753	0 35 10.96
2	We	0 43 0.82	9.108	4 37 37.3	57.84	16 1.70	8.80	3 53.28	0.748	0 39 7.54
3	Th	0 46 39.47	9.113	5 0 42.7	57.62	16 1.43	8.80	3 35.38	0.743	0 43 4.09
4	Fr	0 50 18.24	9.118	5 23 42.8	57.39	16 1.16	8.80	3 17.60	0.738	0 47 0.64
5	Sa	0 53 57.15	9.124	5 46 37.1	57.14	16 0.89	8.79	2 59.96	0.733	0 50 57.19
6	Su	0 57 36.21	9.131	+ 6 9 25.2	+56.87	16 0.62	8.79	-2 42.46	+0.726	0 54 53.75
7	Mo	1 1 15.43	9.138	6 32 6.9	56.60	16 0.35	8.79	2 25.14	0.718	0 58 50.30
8	Tu	1 4 54.85	9.147	6 54 41.7	56.31	16 0.08	8.79	2 8.00	0.710	1 2 46.85
9	We	1 8 34.47	9.155	7 17 9.5	56.00	15 59.81	8.78	1 51.06	0.701	1 6 43.40
10	Th	1 12 14.31	9.165	7 39 29.7	55.68	15 59.55	8.78	1 34.35	0.691	1 10 39.96
11	Fr	1 15 54.39	9.175	+ 8 1 42.2	+55.35	15 59.28	8.78	-1 17.88	+0.681	1 14 36.51
12	Sa	1 19 34.74	9.187	8 23 46.5	55.01	15 59.01	8.78	1 1.68	0.669	1 18 33.06
13	Su	1 23 15.37	9.199	8 45 42.5	54.65	15 58.74	8.78	0 45.76	0.657	1 22 29.62
14	Mo	1 26 56.30	9.212	9 7 29.6	54.28	15 58.48	8.77	0 30.14	0.644	1 26 26.17
15	Tu	1 30 37.56	9.226	9 29 7.7	53.89	15 58.21	8.77	-0 14.84	0.631	1 30 22.72
16	We	1 34 19.15	9.240	+ 9 50 36.4	+53.50	15 57.94	8.77	+0 0.12	+0.616	1 34 19.28
17	Th	1 38 1.11	9.256	10 11 55.4	53.08	15 57.67	8.77	0 14.72	0.601	1 38 15.83
18	Fr	1 41 43.44	9.272	10 33 4.3	52.66	15 57.41	8.76	0 28.94	0.584	1 42 12.38
19	Sa	1 45 26.16	9.289	10 54 2.9	52.22	15 57.14	8.76	0 42.77	0.568	1 46 8.94
20	Su	1 49 9.30	9.306	11 14 50.8	51.77	15 56.87	8.76	0 56.19	0.550	1 50 5.49
21	Mo	1 52 52.87	9.324	+11 35 27.7	+51.30	15 56.61	8.76	+1 9.18	+0.533	1 54 2.04
22	Tu	1 56 36.87	9.343	11 55 53.2	50.82	15 56.34	8.75	1 21.72	0.513	1 57 58.60
23	We	2 0 21.34	9.363	12 16 7.0	50.33	15 56.08	8.75	1 33.81	0.494	2 1 55.15
24	Th	2 4 6.28	9.382	12 36 8.8	49.82	15 55.82	8.75	1 45.43	0.474	2 5 51.70
25	Fr	2 7 51.70	9.403	12 55 58.3	49.30	15 55.56	8.75	1 56.56	0.454	2 9 48.26
26	Sa	2 11 37.61	9.423	+13 15 35.1	+48.76	15 55.31	8.74	+2 7.20	+0.433	2 13 44.81
27	Su	2 15 24.03	9.445	13 34 58.9	48.22	15 55.05	8.74	2 17.33	0.412	2 17 41.37
28	Mo	2 19 10.96	9.466	13 54 9.4	47.65	15 54.80	8.74	2 26.96	0.390	2 21 37.92
29	Tu	2 22 58.41	9.488	14 13 6.1	47.07	15 54.56	8.74	2 36.07	0.369	2 25 34.47
30	We	2 26 46.37	9.509	14 31 48.8	46.48	15 54.31	8.73	2 44.66	0.347	2 29 31.03
May 1	Th	2 30 34.86	9.531	+14 50 17.1	+45.88	15 54.07	8.73	+2 52.72	+0.325	2 33 27.58
2	Fr	2 34 23.88	9.553	15 8 30.7	45.25	15 53.84	8.73	3 0.26	0.303	2 37 24.14
3	Sa	2 38 13.42	9.575	15 26 29.2	44.62	15 53.61	8.73	3 7.28	0.281	2 41 20.69
4	Su	2 42 3.49	9.597	15 44 12.4	43.98	15 53.38	8.73	3 13.76	0.259	2 45 17.25
5	Mo	2 45 54.10	9.620	16 1 39.9	43.31	15 53.15	8.72	3 19.70	0.236	2 49 13.80
6	Tu	2 49 45.24	9.642	+16 18 51.4	+42.64	15 52.93	8.72	+3 25.11	+0.214	2 53 10.36
7	We	2 53 36.93	9.665	16 35 46.6	41.96	15 52.71	8.72	3 29.98	0.192	2 57 6.91
8	Th	2 57 29.16	9.688	16 52 25.2	41.26	15 52.49	8.72	3 34.30	0.169	3 1 3.47
9	Fr	3 1 21.95	9.711	17 8 46.9	40.55	15 52.28	8.72	3 38.07	0.146	3 5 0.02
10	Sa	3 5 15.29	9.734	17 24 51.5	39.83	15 52.07	8.71	3 41.29	0.123	3 8 56.58
11	Su	3 9 9.19	9.757	+17 40 38.6	+39.09	15 51.86	8.71	+3 43.95	+0.099	3 12 53.13
12	Mo	3 13 3.65	9.781	17 56 7.9	38.35	15 51.65	8.71	3 46.04	0.075	3 16 49.69
13	Tu	3 16 58.68	9.805	18 11 19.2	37.59	15 51.45	8.71	3 47.66	0.052	3 20 46.24
14	We	3 20 54.28	9.829	18 26 12.2	36.82	15 51.24	8.71	3 48.52	0.028	3 24 42.80
15	Th	3 24 50.45	9.852	18 40 46.6	36.04	15 51.04	8.70	3 48.91	+0.004	3 28 39.35
16	Fr	3 28 47.19	9.876	+18 55 2.1	+35.25	15 50.84	8.70	+3 48.73	-0.020	3 32 35.91
17	Sa	3 32 44.50	9.900	+19 8 58.5	+34.45	15 50.64	8.70	+3 47.97	-0.044	3 36 32.47

FOR GREENWICH MEAN NOON.

Data.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aber-ration.	True Obliq-uity.	Mean Time of Sidereal Noon.
		° ' "	"	"			"	"	"	23° 26' "	h m s
pr. 1	91	10 42 53.7	148.04	+0.47	9.999 7840	+51.9	12.40	+15.69	20.47	56.21	23 20 58.87
2	92	11 42 5.6	147.95	0.37	9.999 9081	51.6	12.53	15.65	20.47	56.20	23 17 2.96
3	93	12 41 15.3	147.86	0.25	0.000 0316	51.3	12.67	15.60	20.46	56.18	23 13 7.06
4	94	13 40 22.8	147.76	+0.12	0.000 1544	51.1	12.81	15.55	20.46	56.16	23 9 11.15
5	95	14 39 28.0	147.67	-0.01	0.000 2767	50.9	12.95	15.51	20.45	56.15	23 5 15.24
6	96	15 38 30.8	147.57	-0.14	0.000 3985	+50.7	13.08	+15.46	20.45	56.13	23 1 19.34
7	97	16 37 31.4	147.48	0.26	0.000 5200	50.6	13.22	15.42	20.44	56.11	22 57 23.43
8	98	17 36 29.6	147.38	0.36	0.000 6413	50.5	13.36	15.38	20.43	56.09	22 53 27.52
9	99	18 35 25.5	147.28	0.43	0.000 7625	50.5	13.50	15.34	20.43	56.07	22 49 31.62
10	100	19 34 19.2	147.19	0.47	0.000 8836	50.5	13.64	15.30	20.42	56.05	22 45 35.71
11	101	20 33 10.6	147.10	-0.48	0.001 0047	+50.5	13.77	+15.26	20.42	56.03	22 41 39.80
12	102	21 31 59.8	147.01	0.47	0.001 1258	50.5	13.91	15.22	20.41	56.01	22 37 43.90
13	103	22 30 46.9	146.92	0.42	0.001 2470	50.5	14.05	15.18	20.41	55.98	22 33 47.99
14	104	23 29 32.0	146.83	0.34	0.001 3683	50.6	14.19	15.14	20.40	55.96	22 29 52.08
15	105	24 28 15.0	146.75	0.25	0.001 4897	50.6	14.32	15.10	20.39	55.94	22 25 56.17
16	106	25 26 56.0	146.67	-0.15	0.001 6110	+50.5	14.46	+15.07	20.39	55.91	22 22 0.27
17	107	26 25 35.2	146.59	-0.03	0.001 7323	50.5	14.60	15.04	20.38	55.89	22 18 4.36
18	108	27 24 12.4	146.52	+0.10	0.001 8536	50.5	14.74	15.00	20.38	55.87	22 14 8.45
19	109	28 22 48.0	146.44	0.23	0.001 9747	50.4	14.87	14.97	20.37	55.84	22 10 12.54
20	110	29 21 21.7	146.37	0.36	0.002 0955	50.3	15.01	14.94	20.37	55.82	22 6 16.64
21	111	30 19 53.8	146.30	+0.48	0.002 2159	+50.1	15.15	+14.91	20.36	55.79	22 2 20.73
22	112	31 18 24.2	146.24	0.58	0.002 3359	49.9	15.29	14.88	20.35	55.77	21 58 24.82
23	113	32 16 53.0	146.17	0.65	0.002 4552	49.6	15.42	14.86	20.35	55.74	21 54 28.91
24	114	33 15 20.3	146.10	0.69	0.002 5738	49.2	15.56	14.83	20.34	55.71	21 50 33.01
25	115	34 13 45.9	146.04	0.70	0.002 6914	48.8	15.70	14.81	20.34	55.69	21 46 37.10
26	116	35 12 10.0	145.97	+0.69	0.002 8079	+48.3	15.84	+14.79	20.33	55.66	21 42 41.19
27	117	36 10 32.5	145.90	0.65	0.002 9231	47.7	15.97	14.77	20.33	55.63	21 38 45.28
28	118	37 8 53.4	145.84	0.58	0.003 0369	47.1	16.11	14.75	20.32	55.61	21 34 49.37
29	119	38 7 12.7	145.77	0.48	0.003 1491	46.4	16.25	14.73	20.32	55.58	21 30 53.47
30	120	39 5 30.2	145.69	0.36	0.003 2596	45.7	16.39	14.71	20.31	55.55	21 26 57.56
ay 1	121	40 3 45.9	145.62	+0.23	0.003 3685	+45.0	16.52	+14.69	20.31	55.52	21 23 1.65
2	122	41 1 59.8	145.54	+0.09	0.003 4756	44.3	16.66	14.68	20.30	55.50	21 19 5.74
3	123	42 0 11.7	145.46	-0.05	0.003 5812	43.7	16.80	14.67	20.30	55.47	21 15 9.83
4	124	42 58 21.7	145.38	0.17	0.003 6852	43.0	16.94	14.65	20.29	55.44	21 11 13.92
5	125	43 56 29.8	145.30	0.27	0.003 7877	42.4	17.08	14.64	20.29	55.41	21 7 18.01
6	126	44 54 35.9	145.21	-0.35	0.003 8889	+41.9	17.21	+14.64	20.28	55.38	21 3 22.10
7	127	45 52 40.0	145.13	0.40	0.003 9889	41.4	17.35	14.63	20.28	55.36	20 59 26.20
8	128	46 50 42.2	145.05	0.42	0.004 0877	41.0	17.49	14.62	20.27	55.33	20 55 30.29
9	129	47 48 42.6	144.98	0.41	0.004 1855	40.5	17.63	14.62	20.27	55.30	20 51 34.38
10	130	48 46 41.1	144.90	0.37	0.004 2823	40.1	17.76	14.62	20.26	55.27	20 47 38.47
11	131	49 44 37.8	144.83	-0.30	0.004 3782	+39.8	17.90	+14.61	20.26	55.25	20 43 42.56
12	132	50 42 32.8	144.76	0.21	0.004 4732	39.4	18.04	14.61	20.25	55.22	20 39 46.65
13	133	51 40 26.2	144.69	-0.10	0.004 5674	39.0	18.18	14.61	20.25	55.19	20 35 50.74
14	134	52 38 18.0	144.63	+0.02	0.004 6606	38.7	18.31	14.62	20.25	55.17	20 31 54.83
15	135	53 36 8.3	144.56	0.15	0.004 7530	38.3	18.45	14.62	20.24	55.14	20 27 58.92
16	136	54 33 57.1	144.51	+0.28	0.004 8445	+37.9	18.59	+14.62	20.24	55.11	20 24 3.01
17	137	55 31 44.5	144.45	+0.40	0.004 9351	+37.5	18.73	+14.63	20.23	55.09	20 20 7.15

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidereal Time, or Right Ascension of Mean Sun.		
		h	m	s	s	°	'	"	"	'	"	m	s	h	m	s
May 17	Sa	3	32	44.50	9.900	+19	8	58.5	+34.45	15 50.64	8.70	+3 47.97	-0.044	3	36	32.47
18	Su	3	36	42.38	9.924	19	22	35.5	33.64	15 50.44	8.70	3 46.64	0.067	3	40	29.02
19	Mo	3	40	40.84	9.948	19	35	52.9	32.81	15 50.25	8.70	3 44.74	0.091	3	44	25.58
20	Tu	3	44	39.87	9.971	19	48	50.3	31.97	15 50.06	8.70	3 42.27	0.115	3	48	22.13
21	We	3	48	39.46	9.995	20	1	27.5	31.13	15 49.87	8.69	3 39.23	0.138	3	52	18.69
22	Th	3	52	39.61	10.018	+20	13	44.3	+30.27	15 49.68	8.69	+3 35.63	-0.161	3	56	15.24
23	Fr	3	56	40.32	10.041	20	25	40.4	29.40	15 49.50	8.69	3 31.48	0.184	4	0	11.80
24	Sa	4	0	41.57	10.064	20	37	15.5	28.52	15 49.32	8.69	3 26.78	0.207	4	4	8.36
25	Su	4	4	43.37	10.086	20	48	29.4	27.63	15 49.15	8.69	3 21.54	0.229	4	8	4.91
26	Mo	4	8	45.69	10.107	20	59	21.9	26.74	15 48.98	8.69	3 15.78	0.251	4	12	1.47
27	Tu	4	12	48.52	10.128	+21	9	52.8	+25.83	15 48.81	8.68	+3 9.51	-0.272	4	15	58.03
28	We	4	16	51.84	10.148	21	20	1.7	24.91	15 48.65	8.68	3 2.74	0.292	4	19	54.58
29	Th	4	20	55.64	10.168	21	29	48.5	23.99	15 48.50	8.68	2 55.50	0.312	4	23	51.14
30	Fr	4	24	59.90	10.187	21	39	13.0	23.05	15 48.35	8.68	2 47.79	0.330	4	27	47.70
31	Sa	4	29	4.60	10.205	21	48	15.0	22.11	15 48.21	8.68	2 39.65	0.348	4	31	44.25
June 1	Su	4	33	9.72	10.222	+21	56	54.2	+21.16	15 48.07	8.68	+2 31.09	-0.365	4	35	40.81
2	Mo	4	37	15.24	10.238	22	5	10.5	20.20	15 47.93	8.68	2 22.13	0.381	4	39	37.37
3	Tu	4	41	21.13	10.253	22	13	3.7	19.23	15 47.80	8.68	2 12.79	0.397	4	43	33.92
4	We	4	45	27.39	10.268	22	20	33.7	18.26	15 47.68	8.67	2 3.09	0.412	4	47	30.48
5	Th	4	49	33.99	10.282	22	27	40.2	17.28	15 47.55	8.67	1 53.04	0.426	4	51	27.04
6	Fr	4	53	40.92	10.295	+22	34	23.2	+16.30	15 47.44	8.67	+1 42.67	-0.438	4	55	23.59
7	Sa	4	57	48.15	10.308	22	40	42.5	15.31	15 47.32	8.67	1 32.00	0.451	4	59	20.15
8	Su	5	1	55.68	10.319	22	46	37.9	14.31	15 47.21	8.67	1 21.03	0.463	5	3	16.71
9	Mo	5	6	3.47	10.330	22	52	9.4	13.31	15 47.11	8.67	1 9.79	0.474	5	7	13.26
10	Tu	5	10	11.52	10.341	22	57	16.8	12.30	15 47.00	8.67	0 58.30	0.484	5	11	9.82
11	We	5	14	19.81	10.350	+23	1	59.9	+11.29	15 46.90	8.67	+0 46.57	-0.493	5	15	6.38
12	Th	5	18	28.31	10.358	23	6	18.8	10.28	15 46.81	8.67	0 34.63	0.502	5	19	2.94
13	Fr	5	22	37.01	10.366	23	10	13.3	9.26	15 46.71	8.67	0 22.49	0.510	5	22	59.49
14	Sa	5	26	45.89	10.373	23	13	43.4	8.24	15 46.62	8.66	+0 10.16	0.517	5	26	56.05
15	Su	5	30	54.93	10.380	23	16	48.9	7.21	15 46.53	8.66	-0 2.32	0.523	5	30	52.61
16	Mo	5	35	4.11	10.385	+23	19	29.7	+6.19	15 46.45	8.66	-0 14.94	-0.529	5	34	49.17
17	Tu	5	39	13.42	10.390	23	21	45.9	5.16	15 46.37	8.66	0 27.69	0.534	5	38	45.72
18	We	5	43	22.83	10.394	23	23	37.3	4.13	15 46.29	8.66	0 40.55	0.538	5	42	42.28
19	Th	5	47	32.32	10.397	23	25	4.0	3.09	15 46.22	8.66	0 53.49	0.541	5	46	38.84
20	Fr	5	51	41.88	10.399	23	26	5.8	2.06	15 46.15	8.66	1 6.49	0.543	5	50	35.40
21	Sa	5	55	51.48	10.401	+23	26	42.9	+1.03	15 46.08	8.66	-1 19.53	-0.544	5	54	31.95
22	Su	6	0	1.10	10.401	23	26	55.1	-0.01	15 46.02	8.66	1 32.59	0.544	5	58	28.51
23	Mo	6	4	10.71	10.400	23	26	42.5	1.04	15 45.96	8.66	1 45.64	0.543	6	2	25.07
24	Tu	6	8	20.28	10.398	23	26	5.0	2.08	15 45.91	8.66	1 58.66	0.541	6	6	21.63
25	We	6	12	29.80	10.395	23	25	2.7	3.11	15 45.86	8.66	2 11.62	0.538	6	10	18.18
26	Th	6	16	39.23	10.391	+23	23	35.7	-4.14	15 45.82	8.66	-2 24.49	-0.534	6	14	14.74
27	Fr	6	20	48.55	10.385	23	21	44.0	5.17	15 45.79	8.66	2 37.25	0.529	6	18	11.30
28	Sa	6	24	57.72	10.379	23	19	27.7	6.19	15 45.76	8.66	2 49.87	0.522	6	22	7.86
29	Su	6	29	6.72	10.371	23	16	46.7	7.22	15 45.73	8.66	3 2.31	0.514	6	26	4.41
30	Mo	6	33	15.52	10.362	23	13	41.3	8.23	15 45.71	8.66	3 14.55	0.506	6	30	0.97
July 1	Tu	6	37	24.09	10.352	+23	10	11.5	-9.25	15 45.70	8.66	-3 26.57	-0.496	6	33	57.53
2	We	6	41	32.41	10.341	+23	6	17.3	-10.26	15 45.69	8.66	-3 38.33	-0.485	6	37	54.08

FOR GREENWICH MEAN NOON.

Data	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aber. ration.	True Obliquity.	Mean Time of Sidereal Noon.
		" ' "	"	"			"	"	"	23° 26'	h m s
May 17	137	55 31 44.5	144.45	+0.40	0.004 9351	+37.5	18.73	+14.63	20.23	55.09	20 20 7.10
18	138	56 29 30.7	144.40	0.52	0.005 0248	37.1	18.86	14.64	20.23	55.06	20 16 11.19
19	139	57 27 15.6	144.35	0.63	0.005 1134	36.7	19.00	14.65	20.22	55.03	20 12 15.28
20	140	58 24 59.4	144.30	0.72	0.005 2008	36.2	19.14	14.66	20.22	55.01	20 8 19.37
21	141	59 22 42.1	144.26	0.78	0.005 2870	35.6	19.28	14.67	20.22	54.98	20 4 23.46
22	142	60 20 23.7	144.21	+0.80	0.005 3719	+35.0	19.41	+14.68	20.21	54.96	20 0 27.55
23	143	61 18 4.3	144.17	0.79	0.005 4552	34.4	19.55	14.69	20.21	54.93	19 56 31.64
24	144	62 15 44.0	144.13	0.75	0.005 5369	33.6	19.69	14.71	20.21	54.91	19 52 35.73
25	145	63 13 22.7	144.09	0.68	0.005 6167	32.8	19.83	14.72	20.20	54.88	19 48 39.82
26	146	64 11 0.4	144.05	0.59	0.005 6945	32.0	19.97	14.74	20.20	54.86	19 44 43.91
27	147	65 8 37.2	144.01	+0.47	0.005 7702	+31.1	20.10	+14.76	20.19	54.84	19 40 48.00
28	148	66 6 13.0	143.97	0.34	0.005 8436	30.1	20.24	14.78	20.19	54.81	19 36 52.09
29	149	67 3 47.8	143.92	0.21	0.005 9146	29.1	20.38	14.80	20.19	54.79	19 32 56.18
30	150	68 1 21.4	143.88	+0.07	0.005 9833	28.1	20.52	14.82	20.18	54.77	19 29 0.27
31	151	68 58 53.9	143.83	-0.07	0.006 0495	27.1	20.65	14.84	20.18	54.75	19 25 4.36
June 1	152	69 56 25.2	143.78	-0.18	0.006 1134	+26.2	20.79	+14.87	20.18	54.73	19 21 8.45
2	153	70 53 55.2	143.73	0.26	0.006 1751	25.2	20.93	14.89	20.18	54.71	19 17 12.54
3	154	71 51 24.0	143.68	0.32	0.006 2346	24.4	21.07	14.91	20.17	54.69	19 13 16.62
4	155	72 48 51.6	143.62	0.35	0.006 2921	23.5	21.20	14.94	20.17	54.67	19 9 20.71
5	156	73 46 18.0	143.57	0.35	0.006 3476	22.8	21.34	14.97	20.17	54.65	19 5 24.80
6	157	74 43 43.1	143.52	-0.32	0.006 4014	+22.0	21.48	+14.99	20.16	54.63	19 1 28.89
7	158	75 41 7.1	143.48	0.26	0.006 4534	21.3	21.62	15.02	20.16	54.61	18 57 32.98
8	159	76 38 30.1	143.44	0.18	0.006 5038	20.7	21.75	15.05	20.16	54.59	18 53 37.07
9	160	77 35 52.0	143.39	-0.07	0.006 5526	20.0	21.89	15.08	20.16	54.57	18 49 41.16
10	161	78 33 12.9	143.35	+0.05	0.006 5999	19.4	22.03	15.11	20.16	54.56	18 45 45.25
11	162	79 30 32.9	143.32	+0.17	0.006 6457	+18.8	22.17	+15.14	20.15	54.54	18 41 49.33
12	163	80 27 52.1	143.29	0.30	0.006 6901	18.2	22.30	15.17	20.15	54.53	18 37 53.42
13	164	81 25 10.5	143.25	0.43	0.006 7332	17.6	22.44	15.20	20.15	54.51	18 33 57.51
14	165	82 22 28.2	143.22	0.56	0.006 7748	17.0	22.58	15.23	20.15	54.50	18 30 1.60
15	166	83 19 45.4	143.20	0.67	0.006 8150	16.5	22.72	15.26	20.15	54.48	18 26 5.69
16	167	84 17 2.0	143.18	+0.76	0.006 8538	+15.9	22.85	+15.29	20.14	54.47	18 22 9.78
17	168	85 14 18.2	143.17	0.82	0.006 8912	15.2	22.99	15.32	20.14	54.46	18 18 13.86
18	169	86 11 34.0	143.16	0.85	0.006 9270	14.6	23.13	15.35	20.14	54.45	18 14 17.95
19	170	87 8 49.6	143.14	0.86	0.006 9611	13.9	23.27	15.39	20.14	54.43	18 10 22.04
20	171	88 6 5.0	143.14	0.83	0.006 9935	13.1	23.41	15.42	20.14	54.42	18 6 26.13
21	172	89 3 20.2	143.13	+0.77	0.007 0240	+12.3	23.54	+15.45	20.14	54.41	18 2 30.22
22	173	90 0 35.3	143.13	0.69	0.007 0525	11.4	23.68	15.48	20.13	54.40	17 58 34.31
23	174	90 57 50.3	143.12	0.58	0.007 0788	10.5	23.82	15.52	20.13	54.40	17 54 38.40
24	175	91 55 5.2	143.12	0.45	0.007 1028	9.5	23.96	15.55	20.13	54.39	17 50 42.48
25	176	92 52 20.0	143.11	0.32	0.007 1242	8.4	24.09	15.58	20.13	54.38	17 46 46.57
26	177	93 49 34.7	143.11	+0.18	0.007 1431	+ 7.3	24.23	+15.61	20.13	54.37	17 42 50.66
27	178	94 46 49.2	143.10	+0.04	0.007 1594	6.2	24.37	15.65	20.13	54.37	17 38 54.75
28	179	95 44 3.6	143.09	-0.08	0.007 1729	5.1	24.51	15.68	20.13	54.36	17 34 58.84
29	180	96 41 17.7	143.08	0.17	0.007 1838	4.0	24.64	15.71	20.13	54.36	17 31 2.93
30	181	97 38 31.5	143.07	0.24	0.007 1920	2.9	24.78	15.74	20.13	54.35	17 27 7.02
July 1	182	98 35 45.0	143.06	-0.28	0.007 1977	+ 1.9	24.92	+15.77	20.13	54.35	17 23 11.10
2	183	99 32 58.2	143.04	-0.30	0.007 2009	+ 0.9	25.06	+15.80	20.13	54.34	17 19 15.19

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ' "	"	' "	"	m s	s	h m s
Aug. 16	Sa	9 39 39.12	9.365	+13 59 59.9	-46.95	15 49.65	8.69	- 4 20.02	+0.491	9 35 19.10
17	Su	9 43 23.64	9.345	13 41 6.4	47.50	15 49.82	8.69	4 7.99	0.512	9 39 15.65
18	Mo	9 47 7.67	9.324	13 21 59.8	48.04	15 49.99	8.70	3 55.46	0.532	9 43 12.21
19	Tu	9 50 51.20	9.304	13 2 40.4	48.57	15 50.17	8.70	3 42.44	0.552	9 47 8.76
20	We	9 54 34.26	9.284	12 43 8.5	49.09	15 50.36	8.70	3 28.95	0.572	9 51 5.31
21	Th	9 58 16.85	9.265	+12 23 24.3	-49.59	15 50.54	8.70	- 3 14.99	+0.591	9 55 1.87
22	Fr	10 1 58.99	9.246	12 3 28.3	50.08	15 50.73	8.70	3 0.57	0.610	9 58 58.42
23	Sa	10 5 40.68	9.228	11 43 20.8	50.55	15 50.93	8.70	2 45.70	0.629	10 2 54.97
24	Su	10 9 21.93	9.210	11 23 2.1	51.01	15 51.13	8.71	2 30.40	0.647	10 6 51.53
25	Mo	10 13 2.75	9.192	11 2 32.6	51.45	15 51.33	8.71	2 14.67	0.664	10 10 48.08
26	Tu	10 16 43.15	9.175	+10 41 52.6	-51.88	15 51.54	8.71	- 1 58.52	+0.682	10 14 44.63
27	We	10 20 23.14	9.158	10 21 2.4	52.30	15 51.75	8.71	1 41.96	0.698	10 18 41.19
28	Th	10 24 2.74	9.142	10 0 2.5	52.70	15 51.96	8.71	1 25.00	0.715	10 22 37.74
29	Fr	10 27 41.95	9.126	9 38 53.1	53.09	15 52.18	8.72	1 7.66	0.730	10 26 34.29
30	Sa	10 31 20.79	9.111	9 17 34.5	53.46	15 52.41	8.72	0 49.95	0.745	10 30 30.85
31	Su	10 34 59.28	9.096	+ 8 56 7.1	-53.82	15 52.64	8.72	- 0 31.88	+0.760	10 34 27.40
Sept. 1	Mo	10 38 37.42	9.082	8 34 31.2	54.17	15 52.87	8.72	- 0 13.46	0.774	10 38 23.95
2	Tu	10 42 15.23	9.069	8 12 47.1	54.50	15 53.10	8.72	+ 0 5.28	0.787	10 42 20.51
3	We	10 45 52.73	9.056	7 50 55.2	54.82	15 53.34	8.73	0 24.33	0.800	10 46 17.06
4	Th	10 49 29.94	9.045	7 28 55.8	55.13	15 53.57	8.73	0 43.67	0.812	10 50 13.61
5	Fr	10 53 6.88	9.034	+ 7 6 49.2	-55.42	15 53.81	8.73	+ 1 3.29	+0.823	10 54 10.16
6	Sa	10 56 43.56	9.023	6 44 35.7	55.70	15 54.06	8.73	1 23.16	0.833	10 58 6.72
7	Su	11 0 20.00	9.014	6 22 15.7	55.97	15 54.30	8.73	1 43.27	0.843	11 2 3.27
8	Mo	11 3 56.22	9.005	5 59 49.3	56.23	15 54.54	8.74	2 3.60	0.851	11 5 59.82
9	Tu	11 7 32.25	8.998	5 37 17.0	56.47	15 54.79	8.74	2 24.13	0.859	11 9 56.38
10	We	11 11 8.11	8.991	+ 5 14 39.0	-56.70	15 55.04	8.74	+ 2 44.82	+0.865	11 13 52.93
11	Th	11 14 43.82	8.985	4 51 55.7	56.91	15 55.28	8.74	3 5.66	0.871	11 17 49.48
12	Fr	11 18 19.40	8.980	4 29 7.3	57.12	15 55.53	8.75	3 26.63	0.876	11 21 46.03
13	Sa	11 21 54.88	8.976	4 6 14.1	57.31	15 55.78	8.75	3 47.70	0.880	11 25 42.58
14	Su	11 25 30.28	8.974	3 43 16.5	57.49	15 56.03	8.75	4 8.85	0.883	11 29 39.14
15	Mo	11 29 5.63	8.972	+ 3 20 14.8	-57.65	15 56.28	8.75	+ 4 30.06	+0.885	11 33 35.69
16	Tu	11 32 40.95	8.971	2 57 9.3	57.80	15 56.53	8.75	4 51.30	0.885	11 37 32.24
17	We	11 36 16.25	8.971	2 34 0.3	57.94	15 56.78	8.76	5 12.55	0.886	11 41 28.79
18	Th	11 39 51.55	8.971	2 10 48.2	58.06	15 57.04	8.76	5 33.80	0.885	11 45 25.35
19	Fr	11 43 26.88	8.973	1 47 33.3	58.17	15 57.29	8.76	5 55.02	0.883	11 49 21.90
20	Sa	11 47 2.26	8.975	+ 1 24 16.0	-58.27	15 57.55	8.76	+ 6 16.20	+0.881	11 53 18.45
21	Su	11 50 37.70	8.978	1 0 56.6	58.35	15 57.81	8.77	6 37.31	0.878	11 57 15.00
22	Mo	11 54 13.21	8.982	0 37 35.5	58.41	15 58.08	8.77	6 58.35	0.875	12 1 11.56
23	Tu	11 57 48.82	8.986	+ 0 14 13.1	-58.46	15 58.34	8.77	7 19.29	0.870	12 5 8.11
24	We	12 1 24.54	8.991	- 0 9 10.3	58.49	15 58.61	8.77	7 40.12	0.865	12 9 4.66
25	Th	12 5 0.39	8.997	- 0 32 34.4	-58.51	15 58.88	8.78	+ 8 0.82	+0.860	12 13 1.21
26	Fr	12 8 36.38	9.003	0 55 58.7	58.51	15 59.15	8.78	8 21.38	0.854	12 16 57.76
27	Sa	12 12 12.54	9.010	1 19 22.9	58.50	15 59.43	8.78	8 41.78	0.846	12 20 54.32
28	Su	12 15 48.88	9.018	1 42 46.7	58.48	15 59.71	8.78	9 1.99	0.838	12 24 50.87
29	Mo	12 19 25.42	9.027	2 6 9.6	58.43	15 59.99	8.79	9 22.00	0.830	12 28 47.42
30	Tu	12 23 2.18	9.036	- 2 29 31.4	-58.38	16 0.27	8.79	+ 9 41.80	+0.820	12 32 43.97
Oct. 1	We	12 26 39.17	9.046	- 2 52 51.7	-58.31	16 0.55	8.79	+10 1.36	+0.810	12 36 40.53

FOR GREENWICH MEAN NOON.

Data.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Pre. in Long.	Nut. in Long.	Aber. ration.	True Obliquity.	Mean Time of Sidereal Noon.
		" " "	" "	" "			" "	" "	" "	23° 26'	h m s
July 1	182	98 35 45.0	143.06	-0.28	0.007 1977	+ 1.9	24.92	+15.77	20.13	54.35	17 23 11.10
2	183	99 32 58.2	143.04	0.30	0.007 2009	+ 0.9	25.06	15.80	20.13	54.34	17 19 15.19
3	184	100 30 11.1	143.03	0.28	0.007 2018	- 0.1	25.19	15.83	20.13	54.34	17 15 19.28
4	185	101 27 23.7	143.02	0.23	0.007 2005	1.0	25.33	15.86	20.13	54.34	17 11 23.37
5	186	102 24 36.0	143.01	0.16	0.007 1970	1.9	25.47	15.89	20.13	54.34	17 7 27.46
6	187	103 21 48.1	143.00	-0.07	0.007 1916	- 2.6	25.61	+15.92	20.13	54.33	17 3 31.55
7	188	104 18 59.9	142.99	+0.04	0.007 1843	3.4	25.74	15.95	20.13	54.33	16 59 35.64
8	189	105 16 11.7	142.99	0.16	0.007 1752	4.1	25.88	15.97	20.13	54.33	16 55 39.73
9	190	106 13 23.3	142.99	0.28	0.007 1644	4.9	26.02	16.00	20.13	54.33	16 51 43.82
10	191	107 10 35.0	142.99	0.40	0.007 1519	5.5	26.16	16.02	20.13	54.34	16 47 47.90
11	192	108 7 46.6	142.99	+0.52	0.007 1378	- 6.2	26.30	+16.05	20.13	54.34	16 43 51.99
12	193	109 4 58.5	143.00	0.64	0.007 1222	6.8	26.43	16.07	20.13	54.34	16 39 56.08
13	194	110 2 10.5	143.01	0.74	0.007 1052	7.4	26.57	16.10	20.13	54.34	16 36 0.17
14	195	110 59 22.8	143.02	0.80	0.007 0867	8.0	26.71	16.12	20.13	54.34	16 32 4.26
15	196	111 56 35.5	143.04	0.84	0.007 0668	8.6	26.85	16.14	20.13	54.35	16 28 8.35
16	197	112 53 48.7	143.06	+0.85	0.007 0454	- 9.2	26.98	+16.16	20.14	54.35	16 24 12.44
17	198	113 51 2.4	143.09	0.83	0.007 0224	9.9	27.12	16.18	20.14	54.35	16 20 16.53
18	199	114 48 16.8	143.11	0.78	0.006 9978	10.6	27.26	16.20	20.14	54.36	16 16 20.62
19	200	115 45 31.9	143.14	0.70	0.006 9715	11.3	27.40	16.21	20.14	54.37	16 12 24.71
20	201	116 42 47.8	143.18	0.60	0.006 9434	12.1	27.53	16.23	20.14	54.37	16 8 28.80
21	202	117 40 4.5	143.21	+0.48	0.006 9133	-13.0	27.67	+16.25	20.14	54.38	16 4 32.89
22	203	118 37 22.0	143.25	0.34	0.006 8810	13.9	27.81	16.26	20.14	54.38	16 0 36.98
23	204	119 34 40.4	143.28	0.20	0.006 8465	14.9	27.95	16.27	20.14	54.39	15 56 41.07
24	205	120 31 59.6	143.32	+0.06	0.006 8097	15.9	28.08	16.28	20.15	54.39	15 52 45.16
25	206	121 29 19.7	143.35	-0.07	0.006 7704	16.9	28.22	16.29	20.15	54.40	15 48 49.25
26	207	122 26 40.5	143.39	-0.17	0.006 7285	-18.0	28.36	+16.30	20.15	54.41	15 44 53.34
27	208	123 24 2.1	143.41	0.25	0.006 6841	19.0	28.50	16.31	20.15	54.41	15 40 57.43
28	209	124 21 24.4	143.44	0.30	0.006 6371	20.1	28.63	16.32	20.16	54.42	15 37 1.52
29	210	125 18 47.3	143.47	0.32	0.006 5877	21.1	28.77	16.32	20.16	54.43	15 33 5.61
30	211	126 16 10.9	143.49	0.30	0.006 5358	22.1	28.91	16.33	20.16	54.44	15 29 9.70
31	212	127 13 35.1	143.52	-0.26	0.006 4816	-23.0	29.05	+16.33	20.16	54.45	15 25 13.79
Aug. 1	213	128 10 59.9	143.55	0.19	0.006 4253	23.9	29.18	16.33	20.16	54.46	15 21 17.88
2	214	129 8 25.4	143.57	-0.10	0.006 3668	24.8	29.32	16.33	20.17	54.47	15 17 21.97
3	215	130 5 51.5	143.60	0.00	0.006 3064	25.5	29.46	16.33	20.17	54.48	15 13 26.06
4	216	131 3 18.2	143.63	+0.11	0.006 2442	26.3	29.60	16.33	20.17	54.49	15 9 30.15
5	217	132 0 45.7	143.66	+0.22	0.006 1803	-27.0	29.74	+16.33	20.18	54.50	15 5 34.24
6	218	132 58 13.9	143.69	0.34	0.006 1147	27.6	29.87	16.32	20.18	54.50	15 1 38.33
7	219	133 55 42.9	143.72	0.46	0.006 0476	28.2	30.01	16.31	20.18	54.51	14 57 42.42
8	220	134 53 12.8	143.76	0.56	0.005 9791	28.8	30.15	16.30	20.19	54.52	14 53 46.51
9	221	135 50 43.5	143.80	0.65	0.005 9093	29.3	30.29	16.29	20.19	54.53	14 49 50.60
10	222	136 48 15.2	143.84	+0.72	0.005 8383	-29.8	30.42	+16.28	20.19	54.54	14 45 54.70
11	223	137 45 48.0	143.89	0.76	0.005 7662	30.3	30.56	16.27	20.19	54.55	14 41 58.79
12	224	138 43 21.8	143.94	0.77	0.005 6930	30.7	30.70	16.26	20.20	54.56	14 38 2.88
13	225	139 40 57.0	143.99	0.75	0.005 6187	31.2	30.84	16.24	20.20	54.57	14 34 6.97
14	226	140 38 33.4	144.05	0.71	0.005 5434	31.6	30.97	16.23	20.20	54.58	14 30 11.06
15	227	141 36 11.3	144.11	+0.64	0.005 4670	-32.1	31.11	+16.21	20.21	54.59	14 26 15.15
16	228	142 33 50.6	144.17	+0.53	0.005 3894	-32.6	31.25	+16.19	20.21	54.60	14 22 19.24

SUN, 1919.

13

FOR GREENWICH MEAN NOON.

Data.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aber-ration.	True Obliquity.	Mean Time of Sidereal Noon.
		" ' "	"	"			"	"	"	23° 26'	h m s
Aug. 16	228	142 33 50.6	144.17	+0.53	0.005 3894	-32.6	31.25	+16.19	20.21	54.60	14 22 19.24
17	229	143 31 31.5	144.24	0.41	0.005 3106	33.2	31.39	16.17	20.22	54.61	14 18 23.34
18	230	144 29 14.0	144.30	0.27	0.005 2303	33.8	31.52	16.15	20.22	54.62	14 14 27.43
19	231	145 26 58.2	144.38	+0.13	0.005 1485	34.4	31.66	16.12	20.22	54.62	14 10 31.52
20	232	146 24 44.0	144.45	0.00	0.005 0651	35.1	31.80	16.10	20.23	54.63	14 6 35.61
21	233	147 22 31.5	144.51	-0.13	0.004 9800	-35.9	31.94	+16.07	20.23	54.64	14 2 39.70
22	234	148 20 20.7	144.58	0.23	0.004 8930	36.6	32.07	16.04	20.23	54.65	13 58 43.80
23	235	149 18 11.5	144.66	0.30	0.004 8041	37.4	32.21	16.02	20.24	54.66	13 54 47.89
24	236	150 16 3.8	144.71	0.35	0.004 7133	38.2	32.35	15.99	20.24	54.67	13 50 51.98
25	237	151 13 57.8	144.78	0.38	0.004 6204	39.1	32.49	15.95	20.25	54.67	13 46 56.07
26	238	152 11 53.2	144.84	-0.37	0.004 5255	-39.9	32.63	+15.92	20.25	54.68	13 43 0.17
27	239	153 9 50.2	144.90	0.33	0.004 4287	40.7	32.76	15.89	20.26	54.68	13 39 4.26
28	240	154 7 48.5	144.96	0.26	0.004 3301	41.5	32.90	15.85	20.26	54.69	13 35 8.35
29	241	155 5 48.3	145.02	0.18	0.004 2297	42.3	33.04	15.82	20.27	54.70	13 31 12.44
30	242	156 3 49.5	145.08	-0.08	0.004 1276	42.8	33.18	15.78	20.27	54.70	13 27 16.54
31	243	157 1 52.0	145.14	+0.03	0.004 0241	-43.4	33.31	+15.74	20.28	54.71	13 23 20.63
Sept. 1	244	157 59 56.0	145.19	0.15	0.003 9191	44.0	33.45	15.70	20.28	54.71	13 19 24.72
2	245	158 58 1.3	145.26	0.27	0.003 8128	44.5	33.59	15.66	20.29	54.72	13 15 28.82
3	246	159 56 8.1	145.31	0.38	0.003 7053	45.0	33.73	15.62	20.29	54.72	13 11 32.91
4	247	160 54 16.3	145.37	0.49	0.003 5968	45.4	33.86	15.58	20.30	54.72	13 7 37.00
5	248	161 52 25.9	145.43	+0.58	0.003 4874	-45.7	34.00	+15.54	20.30	54.73	13 3 41.10
6	249	162 50 37.1	145.50	0.65	0.003 3772	46.0	34.14	15.49	20.31	54.73	12 59 45.19
7	250	163 48 49.8	145.56	0.70	0.003 2664	46.3	34.28	15.45	20.31	54.73	12 55 49.28
8	251	164 47 4.0	145.63	0.72	0.003 1551	46.5	34.41	15.40	20.32	54.73	12 51 53.38
9	252	165 45 20.0	145.70	0.70	0.003 0433	46.6	34.55	15.36	20.32	54.73	12 47 57.47
10	253	166 43 37.7	145.78	+0.65	0.002 9312	-46.7	34.69	+15.31	20.33	54.73	12 44 1.56
11	254	167 41 57.2	145.85	0.58	0.002 8189	46.8	34.83	15.26	20.33	54.73	12 40 5.66
12	255	168 40 18.7	145.94	0.49	0.002 7064	47.0	34.96	15.21	20.34	54.73	12 36 9.75
13	256	169 38 42.1	146.02	0.37	0.002 5935	47.1	35.10	15.16	20.34	54.73	12 32 13.84
14	257	170 37 7.7	146.11	0.24	0.002 4802	47.3	35.24	15.11	20.35	54.73	12 28 17.94
15	258	171 35 35.4	146.20	+0.10	0.002 3666	-47.5	35.38	+15.06	20.35	54.73	12 24 22.03
16	259	172 34 5.2	146.29	-0.03	0.002 2523	47.7	35.51	15.01	20.36	54.72	12 20 26.12
17	260	173 32 37.3	146.38	0.15	0.002 1374	48.0	35.65	14.96	20.36	54.72	12 16 30.22
18	261	174 31 11.6	146.48	0.26	0.002 0218	48.4	35.79	14.91	20.37	54.71	12 12 34.31
19	262	175 29 48.2	146.57	0.34	0.001 9052	48.8	35.93	14.86	20.37	54.71	12 8 38.40
20	263	176 28 26.9	146.66	-0.39	0.001 7877	-49.2	36.07	+14.81	20.38	54.70	12 4 42.50
21	264	177 27 7.7	146.75	0.41	0.001 6692	49.6	36.20	14.76	20.39	54.70	12 0 46.59
22	265	178 25 50.7	146.83	0.41	0.001 5495	50.1	36.34	14.70	20.39	54.69	11 56 50.68
23	266	179 24 35.7	146.92	0.38	0.001 4288	50.5	36.48	14.65	20.40	54.68	11 52 54.78
24	267	180 23 22.8	147.00	0.31	0.001 3071	51.0	36.62	14.60	20.40	54.67	11 48 58.87
25	268	181 22 11.8	147.08	-0.22	0.001 1843	-51.4	36.75	+14.55	20.41	54.66	11 45 2.96
26	269	182 21 2.7	147.16	-0.12	0.001 0606	51.7	36.89	14.49	20.41	54.65	11 41 7.06
27	270	183 19 55.5	147.24	0.00	0.000 9360	52.1	37.03	14.44	20.42	54.64	11 37 11.15
28	271	184 18 50.2	147.31	+0.13	0.000 8105	52.4	37.17	14.39	20.43	54.63	11 33 15.25
29	272	185 17 46.6	147.39	0.26	0.000 6845	52.6	37.30	14.34	20.43	54.62	11 29 19.34
30	273	186 16 44.9	147.46	+0.38	0.000 5580	-52.8	37.44	+14.29	20.44	54.61	11 25 23.44
Oct. 1	274	187 15 45.0	147.54	+0.49	0.000 4309	-53.0	37.58	+14.23	20.44	54.60	11 21 27.53

FOR GREENWICH MEAN NOON.

Data.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ' "	"	' "	"	m s	s	h m s
Oct. 1	We	12 26 39.17	9.046	— 2 52 51.7	—58.31	16 0.55	8.79	+10 1.36	+0.810	12 36 40.53
2	Th	12 30 16.42	9.058	3 16 10.2	58.23	16 0.83	8.79	10 20.66	0.798	12 40 37.06
3	Fr	12 33 53.95	9.070	3 39 26.4	58.12	16 1.11	8.80	10 39.68	0.787	12 44 33.63
4	Sa	12 37 31.77	9.082	4 2 40.0	58.01	16 1.39	8.80	10 58.41	0.774	12 48 30.18
5	Su	12 41 9.91	9.096	4 25 50.7	57.88	16 1.68	8.80	11 16.82	0.760	12 52 26.73
6	Mo	12 44 48.39	9.111	— 4 48 58.1	—57.74	16 1.96	8.80	+11 34.90	+0.746	12 56 23.29
7	Tu	12 48 27.23	9.126	5 12 1.9	57.58	16 2.24	8.81	11 52.61	0.730	13 0 19.84
8	We	12 52 6.45	9.143	5 35 1.8	57.41	16 2.51	8.81	12 9.94	0.714	13 4 16.39
9	Th	12 55 46.08	9.160	5 57 57.3	57.22	16 2.79	8.81	12 26.87	0.696	13 8 12.94
10	Fr	12 59 26.14	9.179	6 20 48.2	57.02	16 3.07	8.81	12 43.36	0.678	13 12 9.50
11	Sa	13 3 6.66	9.198	— 6 43 34.1	—56.80	16 3.34	8.82	+12 59.40	+0.658	13 16 6.05
12	Su	13 6 47.65	9.218	7 6 14.7	56.58	16 3.62	8.82	13 14.95	0.638	13 20 2.60
13	Mo	13 10 29.15	9.240	7 28 49.6	56.33	16 3.89	8.82	13 30.00	0.616	13 23 59.16
14	Tu	13 14 11.18	9.262	7 51 18.5	56.07	16 4.16	8.82	13 44.53	0.594	13 27 55.71
15	We	13 17 53.75	9.285	8 13 40.9	55.79	16 4.42	8.83	13 58.51	0.571	13 31 52.26
16	Th	13 21 36.88	9.309	— 8 35 56.5	—55.80	16 4.69	8.83	+14 11.93	+0.547	13 35 48.81
17	Fr	13 25 20.60	9.334	8 58 4.8	55.19	16 4.96	8.83	14 24.76	0.522	13 39 45.37
18	Sa	13 29 4.92	9.359	9 20 5.6	54.87	16 5.23	8.83	14 37.00	0.497	13 43 41.92
19	Su	13 32 49.85	9.385	9 41 58.4	54.53	16 5.49	8.84	14 48.62	0.471	13 47 38.47
20	Mo	13 36 35.42	9.412	10 3 42.7	54.17	16 5.76	8.84	14 59.61	0.444	13 51 35.03
21	Tu	13 40 21.63	9.439	—10 25 18.3	—53.80	16 6.03	8.84	+15 9.95	+0.417	13 55 31.58
22	We	13 44 8.49	9.467	10 46 44.7	53.40	16 6.29	8.84	15 19.64	0.390	13 59 28.13
23	Th	13 47 56.03	9.495	11 8 1.4	52.99	16 6.56	8.85	15 28.66	0.362	14 3 24.69
24	Fr	13 51 44.24	9.523	11 29 8.0	52.56	16 6.82	8.85	15 37.00	0.333	14 7 21.24
25	Sa	13 55 33.14	9.552	11 50 4.3	52.12	16 7.09	8.85	15 44.65	0.304	14 11 17.79
26	Su	13 59 22.75	9.582	—12 10 49.6	—51.66	16 7.36	8.85	+15 51.60	+0.275	14 15 14.35
27	Mo	14 3 13.07	9.612	12 31 23.7	51.18	16 7.62	8.86	15 57.83	0.245	14 19 10.90
28	Tu	14 7 4.11	9.642	12 51 46.2	50.69	16 7.89	8.86	16 3.34	0.214	14 23 7.45
29	We	14 10 55.89	9.673	13 11 56.5	50.17	16 8.15	8.86	16 8.11	0.183	14 27 4.01
30	Th	14 14 48.42	9.704	13 31 54.4	49.65	16 8.41	8.86	16 12.14	0.152	14 31 0.56
31	Fr	14 18 41.69	9.736	—13 51 39.4	—49.10	16 8.67	8.87	+16 15.42	+0.121	14 34 57.12
Nov. 1	Sa	14 22 35.73	9.768	14 11 11.1	48.54	16 8.93	8.87	16 17.94	0.089	14 38 53.67
2	Su	14 26 30.54	9.800	14 30 29.0	47.96	16 9.19	8.87	16 19.68	0.056	14 42 50.22
3	Mo	14 30 26.14	9.833	14 49 32.9	47.36	16 9.45	8.87	16 20.64	+0.024	14 46 46.78
4	Tu	14 34 22.52	9.866	15 8 22.3	46.75	16 9.69	8.88	16 20.81	—0.010	14 50 43.33
5	We	14 38 19.70	9.900	—15 26 56.8	—46.12	16 9.94	8.88	+16 20.18	—0.043	14 54 39.89
6	Th	14 42 17.70	9.934	15 45 15.9	45.47	16 10.19	8.88	16 18.74	0.077	14 58 36.44
7	Fr	14 46 16.52	9.968	16 3 19.4	44.82	16 10.43	8.88	16 16.48	0.112	15 2 33.00
8	Sa	14 50 16.17	10.003	16 21 6.9	44.14	16 10.66	8.88	16 13.38	0.147	15 6 29.55
9	Su	14 54 16.66	10.038	16 38 37.9	43.44	16 10.90	8.89	16 9.44	0.182	15 10 26.11
10	Mo	14 58 18.01	10.074	—16 55 52.0	—42.73	16 11.13	8.89	+16 4.66	—0.217	15 14 22.66
11	Tu	15 2 20.21	10.110	17 12 48.9	42.00	16 11.35	8.89	15 59.01	0.254	15 18 19.22
12	We	15 6 23.28	10.146	17 29 28.1	41.26	16 11.57	8.89	15 52.49	0.290	15 22 15.77
13	Th	15 10 27.22	10.182	17 45 49.4	40.51	16 11.79	8.89	15 45.11	0.326	15 26 12.33
14	Fr	15 14 32.03	10.219	18 1 52.2	39.73	16 12.00	8.90	15 36.86	0.362	15 30 8.88
15	Sa	15 18 37.71	10.255	—18 17 36.1	—38.93	16 12.21	8.90	+15 27.73	—0.396	15 34 5.44
16	Su	15 22 44.25	10.291	—18 33 0.9	—38.13	16 12.42	8.90	+15 17.74	—0.434	15 38 1.90

FOR GREENWICH MEAN NOON.

Data.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aber-ration.	True Obliquity.	Mean Time of Sidereal Noon.
		" ' "	"	"			"	"	"	23° 26'	h m s
Oct. 1	274	187 15 45.0	147.54	+0.49	0.000 4309	-53.0	37.58	+14.23	20.44	54.60	11 21 27.53
2	275	188 14 46.8	147.61	0.59	0.000 3036	53.1	37.72	14.18	20.45	54.58	11 17 31.62
3	276	189 13 50.4	147.69	0.67	0.000 1762	53.1	37.85	14.13	20.46	54.57	11 13 35.72
4	277	190 12 55.8	147.76	0.72	0.000 0487	53.1	37.99	14.08	20.46	54.56	11 9 39.81
5	278	191 12 2.9	147.84	0.75	9.999 9213	53.0	38.13	14.03	20.47	54.54	11 5 43.90
6	279	192 11 11.9	147.91	+0.74	9.999 7943	-52.8	38.27	+13.98	20.47	54.52	11 1 48.00
7	280	193 10 22.6	147.98	0.71	9.999 6677	52.6	38.40	13.93	20.48	54.51	10 57 52.09
8	281	194 9 35.3	148.07	0.65	9.999 5417	52.4	38.54	13.88	20.49	54.49	10 53 56.18
9	282	195 8 50.0	148.15	0.56	9.999 4164	52.0	38.68	13.84	20.49	54.47	10 50 0.28
10	283	196 8 6.7	148.24	0.44	9.999 2919	51.7	38.82	13.79	20.50	54.45	10 46 4.37
11	284	197 7 25.5	148.33	+0.31	9.999 1682	-51.4	38.96	+13.75	20.50	54.43	10 42 8.46
12	285	198 6 46.5	148.42	0.17	9.999 0453	51.1	39.09	13.70	20.51	54.41	10 38 12.56
13	286	199 6 9.7	148.52	+0.03	9.998 9231	50.8	39.23	13.66	20.52	54.39	10 34 16.65
14	287	200 5 35.3	148.61	-0.10	9.998 8015	50.5	39.37	13.62	20.52	54.37	10 30 20.74
15	288	201 5 3.2	148.71	0.21	9.998 6805	50.3	39.51	13.57	20.53	54.35	10 26 24.84
16	289	202 4 33.4	148.81	-0.30	9.998 5599	-50.2	39.64	+13.53	20.53	54.33	10 22 28.93
17	290	203 4 6.0	148.91	0.36	9.998 4396	50.1	39.78	13.49	20.54	54.31	10 18 33.02
18	291	204 3 40.9	149.00	0.39	9.998 3195	50.0	39.92	13.45	20.54	54.29	10 14 37.12
19	292	205 3 18.1	149.09	0.38	9.998 1996	50.0	40.06	13.42	20.55	54.26	10 10 41.21
20	293	206 2 57.5	149.19	0.34	9.998 0797	49.9	40.19	13.38	20.55	54.24	10 6 45.30
21	294	207 2 39.1	149.28	-0.28	9.997 9599	-49.9	40.33	+13.35	20.56	54.22	10 2 49.39
22	295	208 2 22.8	149.36	0.20	9.997 8402	49.9	40.47	13.31	20.57	54.19	9 58 53.49
23	296	209 2 8.5	149.45	-0.09	9.997 7205	49.9	40.61	13.28	20.57	54.17	9 54 57.58
24	297	210 1 56.3	149.53	+0.03	9.997 6008	49.8	40.74	13.25	20.58	54.14	9 51 1.67
25	298	211 1 46.0	149.61	0.16	9.997 4813	49.8	40.88	13.22	20.58	54.12	9 47 5.76
26	299	212 1 37.6	149.69	+0.29	9.997 3619	-49.7	41.02	+13.19	20.59	54.09	9 43 9.86
27	300	213 1 31.0	149.76	0.42	9.997 2428	49.5	41.16	13.16	20.59	54.06	9 39 13.95
28	301	214 1 26.2	149.83	0.54	9.997 1241	49.4	41.29	13.14	20.60	54.04	9 35 18.04
29	302	215 1 23.1	149.91	0.65	9.997 0059	49.1	41.43	13.11	20.61	54.01	9 31 22.13
30	303	216 1 21.7	149.98	0.73	9.996 8882	48.9	41.57	13.09	20.61	53.98	9 27 26.22
31	304	217 1 21.9	150.04	+0.79	9.996 7712	-48.6	41.71	+13.07	20.62	53.96	9 23 30.32
Nov. 1	305	218 1 23.8	150.11	0.82	9.996 6550	48.2	41.84	13.05	20.62	53.93	9 19 34.41
2	306	219 1 27.2	150.18	0.82	9.996 5399	47.7	41.98	13.03	20.63	53.90	9 15 38.50
3	307	220 1 32.2	150.24	0.79	9.996 4258	47.2	42.12	13.01	20.63	53.88	9 11 42.59
4	308	221 1 38.8	150.31	0.73	9.996 3131	46.6	42.26	13.00	20.64	53.85	9 7 46.68
5	309	222 1 47.0	150.37	+0.64	9.996 2019	-46.0	42.40	+12.98	20.64	53.82	9 3 50.77
6	310	223 1 56.8	150.44	0.53	9.996 0924	45.3	42.53	12.97	20.65	53.79	8 59 54.86
7	311	224 2 8.3	150.51	0.41	9.995 9846	44.5	42.67	12.96	20.65	53.76	8 55 58.96
8	312	225 2 21.6	150.59	0.27	9.995 8786	43.7	42.81	12.95	20.66	53.74	8 52 3.05
9	313	226 2 36.6	150.66	+0.13	9.995 7746	43.0	42.95	12.95	20.66	53.71	8 48 7.14
10	314	227 2 53.5	150.74	-0.01	9.995 6724	-42.3	43.08	+12.94	20.67	53.68	8 44 11.23
11	315	228 3 12.2	150.82	0.14	9.995 5720	41.5	43.22	12.94	20.67	53.65	8 40 15.32
12	316	229 3 33.0	150.90	0.24	9.995 4734	40.7	43.36	12.93	20.68	53.62	8 36 19.41
13	317	230 3 55.6	150.99	0.31	9.995 3764	40.1	43.50	12.93	20.68	53.59	8 32 23.50
14	318	231 4 20.3	151.07	0.35	9.995 2809	39.5	43.63	12.93	20.69	53.57	8 28 27.59
15	319	232 4 46.9	151.15	-0.36	9.995 1869	-38.9	43.77	+12.94	20.69	53.54	8 24 31.68
16	320	233 5 15.4	151.23	-0.34	9.995 0941	-38.4	43.91	+12.94	20.70	53.51	8 20 35.77

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		h m s	s	° ' "	"	' "	"	m s	s	h m s
Nov. 16	Su	15 22 44.25	10.291	−18 33 0.9	−38.13	16 12.42	8.90	+15 17.74	−0.434	15 38 1.99
17	Mo	15 26 51.66	10.327	18 48 6.0	37.30	16 12.62	8.90	15 6.89	0.470	15 41 58.55
18	Tu	15 30 59.92	10.362	19 2 51.1	36.45	16 12.83	8.90	14 55.18	0.506	15 45 55.11
19	We	15 35 9.03	10.397	19 17 15.7	35.60	16 13.03	8.91	14 42.63	0.540	15 49 51.66
20	Th	15 39 18.98	10.432	19 31 19.6	34.72	16 13.22	8.91	14 29.24	0.575	15 53 48.22
21	Fr	15 43 29.75	10.466	−19 45 2.3	−33.83	16 13.42	8.91	+14 15.02	−0.609	15 57 44.77
22	Sa	15 47 41.34	10.500	19 58 23.4	32.93	16 13.61	8.91	13 59.99	0.643	16 1 41.33
23	Su	15 51 53.73	10.533	20 11 22.6	32.00	16 13.80	8.91	13 44.16	0.676	16 5 37.89
24	Mo	15 56 6.91	10.565	20 23 59.5	31.07	16 13.99	8.91	13 27.54	0.709	16 9 34.44
25	Tu	16 0 20.85	10.597	20 36 13.8	30.12	16 14.18	8.92	13 10.15	0.741	16 13 31.00
26	We	16 4 35.56	10.628	−20 48 5.1	−29.15	16 14.36	8.92	+12 52.00	−0.772	16 17 27.55
27	Th	16 8 51.00	10.658	20 59 33.1	28.18	16 14.54	8.92	12 33.11	0.802	16 21 24.11
28	Fr	16 13 7.16	10.688	21 10 37.5	27.19	16 14.71	8.92	12 13.51	0.831	16 25 20.67
29	Sa	16 17 24.02	10.717	21 21 17.9	26.18	16 14.89	8.92	11 53.21	0.860	16 29 17.22
30	Su	16 21 41.55	10.744	21 31 34.0	25.16	16 15.06	8.92	11 32.23	0.888	16 33 13.78
Dec. 1	Mo	16 25 59.75	10.772	−21 41 25.5	−24.13	16 15.22	8.93	+11 10.58	−0.915	16 37 10.34
2	Tu	16 30 18.59	10.798	21 50 52.1	23.09	16 15.39	8.93	10 48.30	0.941	16 41 6.90
3	We	16 34 38.05	10.823	21 59 53.6	22.04	16 15.55	8.93	10 25.41	0.967	16 45 3.45
4	Th	16 38 58.10	10.848	22 8 29.7	20.97	16 15.70	8.93	10 1.91	0.991	16 49 0.01
5	Fr	16 43 18.73	10.871	22 16 40.1	19.90	16 15.84	8.93	9 37.83	1.015	16 52 56.57
6	Sa	16 47 39.92	10.894	−22 24 24.6	−18.81	16 15.98	8.93	+ 9 13.20	−1.038	16 56 53.12
7	Su	16 52 1.65	10.916	22 31 42.9	17.71	16 16.12	8.93	8 48.03	1.060	17 0 49.68
8	Mo	16 56 23.90	10.938	22 38 34.8	16.61	16 16.25	8.93	8 22.33	1.081	17 4 46.24
9	Tu	17 0 46.65	10.958	22 45 0.1	15.50	16 16.37	8.94	7 56.14	1.101	17 8 42.79
10	We	17 5 9.87	10.977	22 50 58.6	14.37	16 16.48	8.94	7 29.48	1.121	17 12 39.35
11	Th	17 9 33.55	10.995	−22 56 30.0	−13.24	16 16.59	8.94	+ 7 2.36	−1.139	17 16 35.91
12	Fr	17 13 57.64	11.012	23 1 34.3	12.11	16 16.70	8.94	6 34.82	1.156	17 20 32.47
13	Sa	17 18 22.13	11.028	23 6 11.2	10.97	16 16.80	8.94	6 6.89	1.172	17 24 29.02
14	Su	17 22 46.99	11.043	23 10 20.6	9.81	16 16.89	8.94	5 38.59	1.187	17 28 25.58
15	Mo	17 27 12.19	11.056	23 14 2.2	8.66	16 16.98	8.94	5 9.95	1.200	17 32 22.14
16	Tu	17 31 37.68	11.068	−23 17 16.1	−7.50	16 17.07	8.94	+ 4 41.02	−1.211	17 36 18.70
17	We	17 36 3.44	11.078	23 20 2.1	6.33	16 17.15	8.94	4 11.82	1.222	17 40 15.26
18	Th	17 40 29.43	11.087	23 22 20.0	5.16	16 17.22	8.94	3 42.39	1.231	17 44 11.81
19	Fr	17 44 55.61	11.094	23 24 9.8	3.99	16 17.30	8.95	3 12.76	1.238	17 48 8.37
20	Sa	17 49 21.95	11.100	23 25 31.5	2.82	16 17.37	8.95	2 42.98	1.244	17 52 4.93
21	Su	17 53 48.41	11.104	−23 26 25.0	−1.64	16 17.43	8.95	+ 2 13.06	−1.248	17 56 1.49
22	Mo	17 58 14.95	11.107	23 26 50.1	−0.46	16 17.49	8.95	1 43.09	1.251	17 59 58.04
23	Tu	18 2 41.54	11.108	23 26 47.0	+ 0.72	16 17.55	8.95	1 13.06	1.251	18 3 54.60
24	We	18 7 8.13	11.108	23 26 15.6	1.90	16 17.61	8.95	0 43.03	1.251	18 7 51.16
25	Th	18 11 34.70	11.106	23 25 16.0	3.07	16 17.66	8.95	+ 0 13.02	1.249	18 11 47.72
26	Fr	18 16 1.19	11.102	−23 23 48.1	+ 4.25	16 17.70	8.95	− 0 16.92	−1.245	18 15 44.28
27	Sa	18 20 27.58	11.097	23 21 52.0	5.42	16 17.74	8.95	0 46.74	1.240	18 19 40.83
28	Su	18 24 53.82	11.090	23 19 27.8	6.59	16 17.78	8.95	1 16.43	1.234	18 23 37.39
29	Mo	18 29 19.89	11.082	23 16 35.5	7.76	16 17.82	8.95	1 45.94	1.225	18 27 33.95
30	Tu	18 33 45.74	11.072	23 13 15.3	8.92	16 17.85	8.95	2 15.23	1.215	18 31 30.51
31	We	18 38 11.34	11.061	−23 9 27.2	+10.08	16 17.87	8.95	− 2 44.27	−1.204	18 35 27.06
32	Th	18 42 36.66	11.049	−23 5 11.3	+11.24	16 17.89	8.95	− 3 13.03	−1.192	18 39 23.62

FOR GREENWICH MEAN NOON.

Date.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aber-ration.	True Obliquity.	Mean Time of Sidereal Noon.
		" ' "	"	"			"	"	"	23° 26'	h m s
Nov. 16	320	233 5 15.4	151.22	-0.34	9.995 0941	-38.4	43.91	+12.94	20.70	53.51	8 20 35.77
17	321	234 5 45.7	151.30	0.29	9.995 0026	37.9	44.05	12.95	20.70	53.48	8 16 39.86
18	322	235 6 17.8	151.37	0.21	9.994 9123	37.4	44.18	12.95	20.71	53.46	8 12 43.95
19	323	236 6 51.7	151.44	-0.11	9.994 8230	37.0	44.32	12.96	20.71	53.43	8 8 48.04
20	324	237 7 27.2	151.51	0.00	9.994 7349	36.5	44.46	12.97	20.71	53.40	8 4 52.13
21	325	238 8 4.3	151.58	+0.12	9.994 6478	-36.1	44.60	+12.98	20.72	53.38	8 0 56.22
22	326	239 8 42.9	151.64	0.25	9.994 5618	35.6	44.73	13.00	20.72	53.35	7 57 0.31
23	327	240 9 23.0	151.70	0.38	9.994 4768	35.2	44.87	13.01	20.73	53.32	7 53 4.40
24	328	241 10 4.4	151.75	0.50	9.994 3930	34.7	45.01	13.03	20.73	53.30	7 49 8.49
25	329	242 10 47.1	151.80	0.60	9.994 3104	34.2	45.15	13.05	20.73	53.27	7 45 12.58
26	330	243 11 31.1	151.85	+0.69	9.994 2290	-33.6	45.29	+13.07	20.74	53.25	7 41 16.67
27	331	244 12 16.1	151.90	0.76	9.994 1490	33.0	45.42	13.09	20.74	53.22	7 37 20.76
28	332	245 13 2.3	151.94	0.79	9.994 0704	32.4	45.56	13.11	20.75	53.20	7 33 24.85
29	333	246 13 49.5	151.99	0.80	9.993 9933	31.8	45.70	13.13	20.75	53.18	7 29 28.94
30	334	247 14 37.6	152.02	0.78	9.993 9179	31.0	45.84	13.15	20.75	53.16	7 25 33.03
Dec. 1	335	248 15 26.7	152.06	+0.73	9.993 8443	-30.3	45.97	+13.18	20.76	53.13	7 21 37.12
2	336	249 16 16.6	152.10	0.65	9.993 7726	29.4	46.11	13.21	20.76	53.11	7 17 41.20
3	337	250 17 7.4	152.13	0.55	9.993 7031	28.5	46.25	13.23	20.76	53.09	7 13 45.29
4	338	251 17 59.0	152.17	0.42	9.993 6359	27.5	46.39	13.26	20.77	53.07	7 9 49.38
5	339	252 18 51.5	152.21	0.28	9.993 5711	26.5	46.52	13.29	20.77	53.05	7 5 53.47
6	340	253 19 44.9	152.24	+0.13	9.993 5089	-25.4	46.66	+13.32	20.77	53.03	7 1 57.56
7	341	254 20 39.3	152.28	-0.01	9.993 4494	24.3	46.80	13.35	20.78	53.01	6 58 1.65
8	342	255 21 34.6	152.33	0.14	9.993 3925	23.1	46.94	13.38	20.78	52.99	6 54 5.74
9	343	256 22 30.9	152.37	0.25	9.993 3384	22.0	47.07	13.42	20.78	52.97	6 50 9.83
10	344	257 23 28.4	152.41	0.33	9.993 2869	20.9	47.21	13.45	20.78	52.96	6 46 13.91
11	345	258 24 26.9	152.46	-0.39	9.993 2379	-19.9	47.35	+13.49	20.79	52.94	6 42 18.00
12	346	259 25 26.5	152.51	0.41	9.993 1913	18.9	47.49	13.52	20.79	52.92	6 38 22.09
13	347	260 26 27.3	152.55	0.40	9.993 1471	18.0	47.62	13.56	20.79	52.91	6 34 26.18
14	348	261 27 29.1	152.60	0.36	9.993 1051	17.1	47.76	13.59	20.79	52.89	6 30 30.27
15	349	262 28 31.9	152.64	0.30	9.993 0651	16.2	47.90	13.63	20.79	52.88	6 26 34.36
16	350	263 29 35.7	152.68	-0.21	9.993 0271	-15.4	48.04	+13.67	20.80	52.86	6 22 38.44
17	351	264 30 40.4	152.71	-0.10	9.992 9910	14.7	48.18	13.70	20.80	52.85	6 18 42.53
18	352	265 31 46.0	152.75	+0.02	9.992 9567	13.9	48.31	13.74	20.80	52.84	6 14 46.62
19	353	266 32 52.3	152.78	0.14	9.992 9242	13.2	48.45	13.78	20.80	52.83	6 10 50.71
20	354	267 33 59.4	152.81	0.26	9.992 8935	12.5	48.59	13.82	20.80	52.82	6 6 54.80
21	355	268 35 7.0	152.83	+0.38	9.992 8644	-11.8	48.73	+13.86	20.80	52.81	6 2 58.88
22	356	269 36 15.2	152.85	0.49	9.992 8370	11.1	48.86	13.90	20.80	52.80	5 59 2.97
23	357	270 37 23.8	152.87	0.58	9.992 8112	10.4	49.00	13.94	20.81	52.79	5 55 7.06
24	358	271 38 32.8	152.88	0.66	9.992 7872	9.7	49.14	13.97	20.81	52.79	5 51 11.15
25	359	272 39 42.1	152.89	0.71	9.992 7648	9.0	49.28	14.01	20.81	52.78	5 47 15.24
26	360	273 40 51.5	152.89	+0.73	9.992 7442	-8.2	49.41	+14.05	20.81	52.77	5 43 19.33
27	361	274 42 1.0	152.90	0.71	9.992 7255	7.4	49.55	14.09	20.81	52.77	5 39 23.41
28	362	275 43 10.6	152.90	0.67	9.992 7087	6.6	49.69	14.13	20.81	52.76	5 35 27.50
29	363	276 44 20.1	152.89	0.60	9.992 6939	5.7	49.83	14.17	20.81	52.76	5 31 31.59
30	364	277 45 29.5	152.89	0.49	9.992 6812	4.8	49.96	14.20	20.81	52.76	5 27 35.68
31	365	278 46 38.7	152.88	+0.37	9.992 6709	-3.8	50.10	+14.24	20.81	52.75	5 23 39.77
32	366	279 47 47.8	152.87	+0.23	9.992 6630	-2.9	50.24	+14.28	20.81	52.75	5 19 43.86

GREENWICH MEAN TIME.

Date.	X True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Y True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Z True Equinox.		Reduc. to Mean Eq'x of 1919.0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Jan. 1	+0.171 4378	+0.180 0464	-795	-0.888 2902	-0.886 8528	- 66	-0.385 2973	-0.384 6735	-201
2	0.188 6410	0.197 2207	801	0.885 3461	0.883 7702	81	0.384 0196	0.383 3358	206
3	0.205 7850	0.214 3331	806	0.882 1251	0.880 4109	96	0.382 6220	0.381 8782	212
4	0.222 8644	0.231 3780	811	0.878 6279	0.876 7763	111	0.381 1046	0.380 3013	218
5	0.239 8732	0.248 3494	816	0.874 8562	0.872 8677	127	0.379 4683	0.378 6057	224
6	+0.256 8060	+0.265 2422	-820	-0.870 8111	-0.868 6866	-142	-0.377 7136	-0.376 7921	-230
7	0.273 6573	0.282 0506	824	0.866 4944	0.864 2347	158	0.375 8413	0.374 8613	236
8	0.290 4216	0.298 7696	828	0.861 9078	0.859 5138	174	0.373 8521	0.372 8138	242
9	0.307 0939	0.315 3939	831	0.857 0530	0.854 5256	190	0.371 7466	0.370 6505	248
10	0.323 6690	0.331 9185	834	0.851 9319	0.849 2722	206	0.369 5257	0.368 3723	254
11	+0.340 1419	+0.348 3385	-836	-0.846 5466	-0.843 7555	-223	-0.367 1904	-0.365 9801	-260
12	0.356 5077	0.364 6490	838	0.840 8990	0.837 9775	240	0.364 7415	0.363 4747	265
13	0.372 7618	0.380 8455	839	0.834 9912	0.831 9404	257	0.362 1798	0.360 8569	271
14	0.388 8995	0.396 9233	840	0.828 8253	0.825 6462	274	0.359 5061	0.358 1275	277
15	0.404 9162	0.412 8778	841	0.822 4033	0.819 0969	291	0.356 7212	0.355 2873	283
16	+0.420 8074	+0.428 7045	-841	-0.815 7272	-0.812 2944	-308	-0.353 8260	-0.352 3373	-289
17	0.436 5685	0.444 3989	841	0.808 7988	0.805 2407	326	0.350 8213	0.349 2781	295
18	0.452 1950	0.459 9563	841	0.801 6203	0.797 9379	343	0.347 7079	0.346 1107	301
19	0.467 6823	0.475 3723	840	0.794 1937	0.790 3880	361	0.344 4867	0.342 8360	307
20	0.483 0257	0.490 6420	838	0.786 5210	0.782 5930	379	0.341 1587	0.339 4549	313
21	+0.498 2206	+0.505 7609	-836	-0.778 6043	-0.774 5552	-397	-0.337 7248	-0.335 9684	-319
22	0.513 2623	0.520 7243	834	0.770 4459	0.766 2767	415	0.334 1858	0.332 3772	325
23	0.528 1462	0.535 5276	831	0.762 0480	0.757 7601	433	0.330 5428	0.328 6827	331
24	0.542 8677	0.550 1660	828	0.753 4132	0.749 0077	451	0.326 7971	0.324 8860	336
25	0.557 4219	0.564 6347	824	0.744 5439	0.740 0221	469	0.322 9495	0.320 9879	342
26	+0.571 8040	+0.578 9292	-820	-0.735 4427	-0.730 8060	-487	-0.319 0012	-0.316 9897	-348
27	0.586 0097	0.593 0450	815	0.726 1124	0.721 3622	505	0.314 9536	0.312 8929	353
28	0.600 0345	0.606 9775	810	0.716 5559	0.711 6937	523	0.310 8078	0.308 6985	359
29	0.613 8735	0.620 7219	804	0.706 7760	0.701 8033	541	0.306 5651	0.304 4078	364
30	0.627 5222	0.634 2737	798	0.696 7758	0.691 6941	559	0.302 2269	0.300 0225	369
31	+0.640 9760	+0.647 6285	-792	-0.686 5585	-0.681 3695	-576	-0.297 7947	-0.295 5438	-375
Feb. 1	0.654 2307	0.660 7819	785	0.676 1275	0.670 8329	594	0.293 2699	0.290 9733	380
2	0.667 2817	0.673 7295	777	0.665 4863	0.660 0881	612	0.288 6541	0.286 3126	386
3	0.680 1248	0.686 4672	769	0.654 6386	0.649 1385	630	0.283 9490	0.281 5634	392
4	0.692 7561	0.698 9912	761	0.643 5883	0.637 9884	647	0.279 1561	0.276 7273	397
5	+0.705 1719	+0.711 2977	-752	-0.632 3392	-0.626 6413	-665	-0.274 2771	-0.271 8059	-402
6	0.717 3682	0.723 3830	743	0.620 8953	0.615 1016	682	0.269 3138	0.266 8011	407
7	0.729 3416	0.735 2437	733	0.609 2607	0.603 3731	699	0.264 2679	0.261 7145	412
8	0.741 0889	0.746 8768	723	0.597 4394	0.591 4600	716	0.259 1410	0.256 5478	417
9	0.752 6069	0.758 2789	712	0.585 4353	0.579 3659	733	0.253 9349	0.251 3026	422
10	+0.763 8925	+0.769 4473	-701	-0.573 2523	-0.567 0950	-750	-0.248 6512	-0.245 9808	-427
11	0.774 9429	0.780 3790	690	0.560 8945	0.554 6513	767	0.243 2916	0.240 5839	432
12	0.785 7551	0.791 0710	678	0.548 3658	0.542 0385	783	0.237 8578	0.235 1135	436
13	0.796 3262	0.801 5205	666	0.535 6698	0.529 2602	799	0.232 3513	0.229 5713	441
14	0.806 6535	0.811 7249	653	0.522 8103	0.516 3205	815	0.226 7738	0.223 9590	445
15	+0.816 7342	+0.821 6812	-640	-0.509 7913	-0.503 2232	-831	-0.221 1270	-0.218 2781	-449
16	+0.826 5656	+0.831 3869	-627	-0.496 6167	-0.489 9722	-847	-0.215 4125	-0.212 5304	-453

SUN, 1919.

19

GREENWICH MEAN TIME.

Date.	X True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Y True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Z True Equinox.		Reduc. to Mean Eq'x of 1919.0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
eb. 16	+0.826 5656	+0.831 3869	-627	-0.496 6167	-0.489 9722	-847	-0.215 4125	-0.212 5304	-453
17	0.836 1449	0.840 8392	613	0.483 2901	0.476 5710	862	0.209 6320	0.206 7175	457
18	0.845 4695	0.850 0354	599	0.469 8154	0.463 0238	877	0.203 7871	0.200 8410	461
19	0.854 5365	0.858 9725	584	0.456 1966	0.449 3344	892	0.197 8795	0.194 9028	465
20	0.863 3431	0.867 6479	569	0.442 4377	0.435 5070	907	0.191 9111	0.188 9046	469
21	+0.871 8867	+0.876 0591	-554	-0.428 5428	-0.421 5456	-921	-0.185 8835	-0.182 8481	-473
22	0.880 1648	0.884 2035	538	0.414 5159	0.407 4542	935	0.179 7987	0.176 7354	476
23	0.888 1749	0.892 0786	522	0.400 3611	0.393 2372	949	0.173 6584	0.170 5680	480
24	0.895 9143	0.899 6817	505	0.386 0829	0.378 8988	963	0.167 4645	0.164 3480	483
25	0.903 3805	0.907 0104	488	0.371 6855	0.364 4434	977	0.161 2189	0.158 0773	486
26	+0.910 5712	+0.914 0625	-471	-0.357 1732	-0.349 8754	-990	-0.154 9236	-0.151 7579	-489
27	0.917 4841	0.920 8356	454	0.342 5506	0.335 1994	1003	0.148 5806	0.145 3918	492
28	0.924 1168	0.927 3273	436	0.327 8224	0.320 4201	1015	0.142 1918	0.138 9809	495
far. 1	0.930 4670	0.933 5356	418	0.312 9932	0.305 5423	1027	0.135 7593	0.132 5273	498
2	0.936 5328	0.939 4586	400	0.298 0679	0.290 5707	1039	0.129 2852	0.126 0333	500
3	+0.942 3127	+0.945 0947	-381	-0.283 0514	-0.275 5106	-1051	-0.122 7719	-0.119 5012	-503
4	0.947 8045	0.950 4419	362	0.267 9489	0.260 3670	1062	0.116 2215	0.112 9330	505
5	0.953 0068	0.955 4992	343	0.252 7654	0.245 1449	1073	0.109 6361	0.106 3309	507
6	0.957 9188	0.960 2656	323	0.237 5060	0.229 8494	1083	0.103 0178	0.099 6970	509
7	0.962 5394	0.964 7401	303	0.222 1757	0.214 4855	1093	0.096 3688	0.093 0335	511
8	+0.966 8676	+0.968 9218	-283	-0.206 7794	-0.199 0580	-1103	-0.089 6913	-0.086 3425	-513
9	0.970 9027	0.972 8102	263	0.191 3220	0.183 5719	1113	0.082 9873	0.079 6260	515
10	0.974 6442	0.976 4047	242	0.175 8084	0.168 0321	1122	0.076 2589	0.072 8861	516
11	0.978 0916	0.979 7048	222	0.160 2434	0.152 4430	1131	0.069 5080	0.066 1248	518
12	0.981 2443	0.982 7101	201	0.144 6315	0.136 8094	1139	0.062 7367	0.059 3440	519
13	+0.984 1021	+0.985 4203	-180	-0.128 9773	-0.121 1357	-1147	-0.055 9470	-0.052 5458	-520
14	0.986 6647	0.987 8351	158	0.113 2853	0.105 4265	1155	0.049 1407	0.045 7320	521
15	0.988 9316	0.989 9541	137	0.097 5600	0.089 6863	1163	0.042 3198	0.038 9045	522
16	0.990 9026	0.991 7771	115	0.081 8059	0.073 9194	1170	0.035 4863	0.032 0654	522
17	0.992 5775	0.993 3037	93	0.066 0274	0.058 1305	1177	0.028 6421	0.025 2166	522
18	+0.993 9558	+0.994 5336	-71	-0.050 2291	-0.042 3238	-1184	-0.021 7891	-0.018 3599	-522
19	0.995 0372	0.995 4665	49	0.034 4153	0.026 5040	1190	0.014 9293	0.011 4974	522
20	0.995 8216	0.996 1024	27	0.018 5905	-0.010 6754	1196	0.008 0646	-0.004 6311	522
21	0.996 3089	0.996 4411	-4	-0.002 7593	+0.005 1573	1202	-0.001 1972	+0.002 2370	522
22	0.996 4991	0.996 4828	+19	+0.013 0737	0.020 9895	1207	+0.005 6711	0.009 1049	521
23	+0.996 3922	+0.996 2272	+42	+0.028 9040	+0.036 8167	-1212	+0.012 5382	+0.015 9707	-521
24	0.995 9879	0.995 6742	65	0.044 7271	0.052 6344	1216	0.019 4021	0.022 8322	520
25	0.995 2862	0.994 8240	88	0.060 5382	0.068 4379	1220	0.026 2608	0.029 6876	519
26	0.994 2876	0.993 6769	111	0.076 3328	0.084 2224	1223	0.033 1124	0.036 5348	518
27	0.992 9921	0.992 2331	134	0.092 1061	0.099 9833	1226	0.039 9545	0.043 3714	517
28	+0.991 4000	+0.990 4928	+158	+0.107 8534	+0.115 7157	-1229	+0.046 7851	+0.050 1954	-515
29	0.989 5116	0.988 4565	181	0.123 5696	0.131 4145	1232	0.053 6021	0.057 0048	514
30	0.987 3276	0.986 1250	205	0.139 2498	0.147 0748	1234	0.060 4033	0.063 7973	512
31	0.984 8487	0.983 4989	229	0.154 8890	0.162 6917	1236	0.067 1865	0.070 5707	510
pr. 1	-0.982 0758	0.980 5795	253	0.170 4822	0.178 2599	1238	0.073 9496	0.077 3230	508
2	+0.979 0101	+0.977 3679	+277	+0.186 0243	+0.193 7747	-1239	+0.080 6905	+0.084 0520	-506
31	+0.975 6531	+0.973 8658	+301	+0.201 5104	+0.209 2309	-1240	+0.087 4071	+0.090 7556	-503

SUN, 1919.
GREENWICH MEAN TIME.

Date.	X		Reduc. to Mean Eq'x of 1919.0.	Y		Reduc. to Mean Eq'x of 1919.0.	Z		Reduc. to Mean Eq'x of 1919.0.
	True Equinox.	True Equinox.		True Equinox.	True Equinox.		True Equinox.	True Equinox.	
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
Apr. 1	+0.982 0758	+0.980 5795	+ 253	+0.170 4822	+0.178 2599	-1238	+0.073 9496	+0.077 3230	-508
2	0.979 0101	0.977 3679	277	0.186 0243	0.193 7747	1239	0.080 6905	0.084 0520	506
3	0.975 6531	0.973 8658	301	0.201 5104	0.209 2309	1240	0.087 4071	0.090 7556	503
4	0.972 0062	0.970 0746	325	0.216 9356	0.224 6239	1240	0.094 0972	0.097 4316	500
5	0.968 0711	0.965 9961	349	0.232 2952	0.239 9490	1240	0.100 7587	0.104 0782	497
6	+0.963 8497	+0.961 6322	+ 373	+0.247 5847	+0.255 2017	-1240	+0.107 3898	+0.110 6934	-494
7	0.959 3439	0.956 9850	398	0.262 7995	0.270 3775	1239	0.113 9886	0.117 2753	491
8	0.954 5557	0.952 0563	422	0.277 9352	0.285 4721	1238	0.120 5532	0.123 8222	488
9	0.949 4871	0.946 8483	447	0.292 9877	0.300 4815	1237	0.127 0819	0.130 3322	484
10	0.944 1402	0.941 3629	472	0.307 9529	0.315 4014	1235	0.133 5728	0.136 8036	480
11	+0.938 5168	+0.935 6020	+ 496	+0.322 8266	+0.330 2279	-1233	+0.140 0241	+0.143 2344	-476
12	0.932 6189	0.929 5678	520	0.337 6048	0.344 9568	1231	0.146 4342	0.149 6233	472
13	0.926 4488	0.923 2623	544	0.352 2835	0.359 5844	1228	0.152 8014	0.155 9683	468
14	0.920 0084	0.916 6874	569	0.366 8589	0.374 1067	1225	0.159 1239	0.162 2679	464
15	0.913 2996	0.909 8452	593	0.381 3272	0.388 5198	1222	0.165 4000	0.168 5201	459
16	+0.906 3246	+0.902 7380	+ 618	+0.395 6842	+0.402 8198	-1218	+0.171 6279	+0.174 7233	-454
17	0.899 0856	0.895 3678	642	0.409 9262	0.417 0029	1214	0.177 8060	0.180 8758	449
18	0.891 5847	0.887 7367	667	0.424 0495	0.431 0654	1209	0.183 9326	0.186 9761	444
19	0.883 8240	0.879 8469	691	0.438 0501	0.445 0032	1204	0.190 0060	0.193 0222	438
20	0.875 8058	0.871 7008	716	0.451 9241	0.458 8124	1199	0.196 0244	0.199 0125	433
21	+0.867 5322	+0.863 3004	+ 740	+0.465 6676	+0.472 4893	-1193	+0.201 9862	+0.204 9453	-427
22	0.859 0056	0.854 6481	765	0.479 2769	0.486 0300	1187	0.207 8897	0.210 8191	421
23	0.850 2283	0.845 7464	789	0.492 7481	0.499 4307	1181	0.213 7332	0.216 6319	415
24	0.841 2028	0.836 5977	813	0.506 0773	0.512 6874	1174	0.219 5150	0.222 3822	409
25	0.831 9315	0.827 2045	837	0.519 2606	0.525 7963	1167	0.225 2332	0.228 0680	402
26	+0.822 4170	+0.817 5694	+ 862	+0.532 2939	+0.538 7530	-1160	+0.230 8862	+0.233 6877	-395
27	0.812 6621	0.807 6954	886	0.545 1731	0.551 5537	1152	0.236 4722	0.239 2396	388
28	0.802 6697	0.797 5854	910	0.557 8943	0.564 1944	1144	0.241 9896	0.244 7220	381
29	0.792 4428	0.787 2424	934	0.570 4536	0.576 6712	1135	0.247 4366	0.250 1332	374
30	0.781 9847	0.776 6701	958	0.582 8469	0.588 9802	1126	0.252 8115	0.255 4714	367
May 1	+0.771 2991	+0.765 8721	+ 982	+0.595 0705	+0.601 1175	-1117	+0.258 1127	+0.260 7352	-359
2	0.760 3895	0.754 8519	1006	0.607 1206	0.613 0794	1107	0.263 3386	0.265 9228	351
3	0.749 2597	0.743 6134	1029	0.618 9936	0.624 8627	1097	0.268 4877	0.271 0330	343
4	0.737 9135	0.732 1604	1053	0.630 6863	0.636 4640	1087	0.273 5586	0.276 0643	335
5	0.726 3547	0.720 4968	1076	0.642 1954	0.647 8802	1076	0.278 5500	0.281 0155	327
6	+0.714 5873	+0.708 6266	+1100	+0.653 5179	+0.659 1082	-1065	+0.283 4606	+0.285 8852	-319
7	0.702 6151	0.696 5534	1123	0.664 6508	0.670 1454	1053	0.288 2891	0.290 6722	310
8	0.690 4418	0.684 2809	1146	0.675 5915	0.680 9889	1041	0.293 0344	0.295 3755	302
9	0.678 0712	0.671 8131	1169	0.686 3373	0.691 6363	1028	0.297 6953	0.299 9937	293
10	0.665 5072	0.659 1539	1192	0.696 8854	0.702 0844	1015	0.302 2706	0.304 5258	284
11	+0.652 7536	+0.646 3069	+1215	+0.707 2331	+0.712 3311	-1002	+0.306 7592	+0.308 9707	-275
12	0.639 8141	0.633 2757	1238	0.717 3780	0.722 3736	989	0.311 1600	0.313 3271	266
13	0.626 6922	0.620 0640	1260	0.727 3176	0.732 2096	975	0.315 4717	0.317 5938	256
14	0.613 3917	0.606 6757	1283	0.737 0494	0.741 8366	961	0.319 6933	0.321 7700	247
15	0.599 9165	0.593 1145	1305	0.746 5709	0.751 2520	946	0.323 8237	0.325 8544	237
16	+0.586 2703	+0.579 3842	+1327	+0.755 8797	+0.760 4537	- 931	+0.327 8620	+0.329 8462	-227
17	+0.572 4568	+0.565 4885	+1349	+0.764 9736	+0.769 4392	- 915	+0.331 8070	+0.333 7442	-217

SUN, 1919.

21

GREENWICH MEAN TIME.

Date.	X True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Y True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Z True Equinox.		Reduc. to Mean Eq'x of 1919.0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
May 17	+0.572 4568	+0.565 4885	+1349	+0.764 9736	+0.769 4392	-915	+0.331 8070	+0.333 7442	-217
18	0.558 4798	0.551 4311	1371	0.773 8502	0.778 2062	899	0.335 6577	0.337 5473	207
19	0.544 3430	0.537 2158	1392	0.782 5069	0.786 7520	883	0.339 4130	0.341 2545	197
20	0.530 0502	0.522 8466	1413	0.790 9414	0.795 0747	866	0.343 0718	0.344 8647	187
21	0.515 6054	0.508 3272	1434	0.799 1515	0.803 1716	849	0.346 6331	0.348 3768	176
22	+0.501 0124	+0.493 6615	+1455	+0.807 1347	+0.811 0405	-831	+0.350 0958	+0.351 7899	-165
23	0.486 2751	0.478 8537	1475	0.814 8887	0.818 6790	813	0.353 4589	0.355 1028	154
24	0.471 3977	0.463 9077	1495	0.822 4112	0.826 0849	795	0.356 7214	0.358 3146	143
25	0.456 3842	0.448 8277	1515	0.829 6997	0.833 2554	776	0.359 8823	0.361 4243	132
26	0.441 2389	0.433 6183	1535	0.836 7518	0.840 1885	757	0.362 9405	0.364 4308	121
27	+0.425 9664	+0.418 2838	+1554	+0.843 5652	+0.846 8817	-737	+0.365 8950	+0.367 3332	-110
28	0.410 5712	0.402 8291	1573	0.850 1378	0.853 3332	717	0.368 7451	0.370 1306	99
29	0.395 0562	0.387 2590	1592	0.856 4675	0.859 5406	696	0.371 4897	0.372 8222	87
30	0.379 4322	0.371 5784	1611	0.862 5523	0.865 5023	675	0.374 1281	0.375 4072	75
31	0.363 6982	0.355 7923	1629	0.868 3905	0.871 2166	654	0.376 6595	0.377 8850	63
June 1	+0.347 8611	+0.339 9064	+1647	+0.873 9805	+0.876 6819	-633	+0.379 0835	+0.380 2549	- 51
2	0.331 9259	0.323 9231	1664	0.879 3208	0.881 8970	611	0.381 3993	0.382 5166	39
3	0.315 8976	0.307 8500	1681	0.884 4105	0.886 8611	589	0.383 6066	0.384 6693	27
4	0.299 7810	0.291 6911	1698	0.889 2485	0.891 5727	566	0.385 7047	0.386 7128	15
5	0.283 5808	0.275 4509	1715	0.893 8337	0.896 0313	543	0.387 6934	0.388 6466	- 3
6	+0.267 3018	+0.259 1342	+1731	+0.898 1655	+0.900 2360	-519	+0.389 5723	+0.390 4705	+ 9
7	0.250 9487	0.242 7458	1747	0.902 2428	0.904 1857	495	0.391 3410	0.392 1839	21
8	0.234 5261	0.226 2902	1762	0.906 0647	0.907 8797	471	0.392 9991	0.393 7866	34
9	0.218 0385	0.209 7717	1777	0.909 6307	0.911 3176	446	0.394 5464	0.395 2784	46
10	0.201 4904	0.193 1951	1791	0.912 9402	0.914 4985	421	0.395 9825	0.396 6587	59
11	+0.184 8863	+0.176 5647	+1805	+0.915 9925	+0.917 4220	-396	+0.397 3069	+0.397 9272	+ 71
12	0.168 2308	0.159 8852	1819	0.918 7870	0.920 0874	370	0.398 5195	0.399 0839	84
13	0.151 5284	0.143 1610	1832	0.921 3231	0.922 4941	344	0.399 6202	0.400 1284	97
14	0.134 7835	0.126 3965	1845	0.923 6002	0.924 6415	317	0.400 6085	0.401 0604	110
15	0.118 0005	0.109 5961	1857	0.925 6178	0.926 5292	290	0.401 4841	0.401 8797	123
16	+0.101 1838	+0.092 7041	+1869	+0.927 3756	+0.928 1569	-263	+0.402 2470	+0.402 5861	+136
17	0.084 3377	0.075 9051	1880	0.928 8730	0.929 5239	236	0.402 8968	0.403 1792	149
18	0.067 4669	0.059 0236	1891	0.930 1095	0.930 6298	208	0.403 4332	0.403 6589	162
19	0.050 5758	0.042 1240	1902	0.931 0847	0.931 4741	180	0.403 8561	0.404 0249	175
20	0.033 6689	0.025 2110	1912	0.931 7980	0.932 0562	151	0.404 1653	0.404 2772	188
21	+0.016 7508	+0.008 2890	+1921	+0.932 2488	+0.932 3756	-122	+0.404 3605	+0.404 4153	+201
22	-0.000 1738	-0.008 6370	1930	0.932 4367	0.932 4320	93	0.404 4415	0.404 4391	214
23	0.017 1000	0.025 5622	1938	0.932 3615	0.932 2251	63	0.404 4082	0.404 3487	227
24	0.034 0229	0.042 4816	1946	0.932 0227	0.931 7543	33	0.404 2605	0.404 1437	240
25	0.050 9375	0.059 3901	1953	0.931 4200	0.931 0197	- 3	0.403 9983	0.403 8243	253
26	-0.067 8387	-0.076 2827	+1960	+0.930 5534	+0.930 0212	+ 28	+0.403 6217	+0.403 3905	+266
27	0.084 7213	0.093 1540	1966	0.929 4232	0.928 7593	58	0.403 1307	0.402 8424	279
28	0.101 5800	0.109 9988	1971	0.928 0295	0.927 2340	89	0.402 5255	0.402 1802	293
29	0.118 4097	0.126 8120	1976	0.926 3728	0.925 4460	120	0.401 8064	0.401 4042	306
30	0.135 2052	0.143 5886	1980	0.924 4537	0.923 3960	151	0.400 9736	0.400 5147	320
July 1	-0.151 9615	-0.160 3233	+1983	+0.922 2730	+0.921 0849	+182	+0.400 0276	+0.399 5122	+333
2	-0.168 6735	-0.177 0115	+1986	+0.919 8317	+0.918 5136	+214	+0.398 9686	+0.398 3963	+346

GREENWICH MEAN TIME.

Date.	X True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Y True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Z True Equinox.		Reduc. to Mean Eq'x of 1919.0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
July 1	-0.151 9615	-0.160 3233	+1983	+0.922 2730	+0.921 0849	+ 182	+0.400 0276	+0.399 5122	+333
2	0.168 6735	0.177 0115	1986	0.919 8317	0.918 5136	214	0.398 9686	0.398 3969	346
3	0.185 3366	0.193 6483	1988	0.917 1308	0.915 6834	246	0.397 7971	0.397 1694	359
4	0.201 9459	0.210 2289	1990	0.914 1716	0.912 5955	278	0.396 5138	0.395 8303	372
5	0.218 4968	0.226 7489	1991	0.910 9551	0.909 2506	310	0.395 1190	0.394 3799	386
6	-0.234 9847	-0.243 2037	+1992	+0.907 4822	+0.905 6501	+ 343	+0.393 6132	+0.392 8188	+399
7	0.251 4052	0.259 5888	1991	0.903 7544	0.901 7954	375	0.391 9969	0.391 1475	412
8	0.267 7538	0.275 8998	1990	0.899 7732	0.897 6878	408	0.390 2707	0.389 3665	425
9	0.284 0261	0.292 1322	1988	0.895 5395	0.893 3283	441	0.388 4350	0.387 4763	438
10	0.300 2176	0.308 2818	1986	0.891 0546	0.888 7185	474	0.386 4904	0.385 4775	451
11	-0.316 3243	-0.324 3445	+1983	+0.886 3201	+0.883 8597	+ 507	+0.384 4376	+0.383 3708	+464
12	0.332 3418	0.340 3158	1980	0.881 3375	0.878 7536	540	0.382 2771	0.381 1566	477
13	0.348 2659	0.356 1916	1976	0.876 1081	0.873 4013	573	0.380 0093	0.378 8354	490
14	0.364 0925	0.371 9680	1971	0.870 6333	0.867 8042	606	0.377 6350	0.376 4080	502
15	0.379 8175	0.387 6406	1965	0.864 9143	0.861 9637	639	0.375 1546	0.373 8748	515
16	-0.395 4367	-0.403 2053	+1959	+0.858 9525	+0.855 8810	+ 673	+0.372 5688	+0.371 2366	+528
17	0.410 9458	0.418 6578	1952	0.852 7494	0.849 5578	706	0.369 8782	0.368 4937	541
18	0.426 3407	0.433 9940	1944	0.846 3064	0.842 9953	740	0.367 0833	0.365 6470	553
19	0.441 6172	0.449 2096	1935	0.839 6248	0.836 1950	774	0.364 1848	0.362 6969	566
20	0.456 7708	0.464 3001	1926	0.832 7060	0.829 1581	807	0.361 1833	0.359 6441	578
21	-0.471 7970	-0.479 2610	+1916	+0.825 5516	+0.821 8866	+ 840	+0.358 0795	+0.356 4895	+590
22	0.486 6915	0.494 0879	1905	0.818 1633	0.814 3820	873	0.354 8742	0.353 2337	602
23	0.501 4497	0.508 7762	1894	0.810 5429	0.806 6462	906	0.351 5682	0.349 8777	614
24	0.516 0669	0.523 3212	1882	0.802 6922	0.798 6811	939	0.348 1623	0.346 4222	626
25	0.530 5386	0.537 7184	1869	0.794 6131	0.790 4886	972	0.344 6574	0.342 8682	638
26	-0.544 8602	-0.551 9633	+1856	+0.786 3079	+0.782 0713	+1005	+0.341 0546	+0.339 2168	+649
27	0.559 0273	0.566 0515	1842	0.777 7791	0.773 4316	1038	0.337 3549	0.335 4691	661
28	0.573 0353	0.579 9783	1827	0.769 0291	0.764 5720	1070	0.333 5594	0.331 6261	672
29	0.586 8800	0.593 7398	1811	0.760 0607	0.755 4954	1103	0.329 6693	0.327 6892	683
30	0.600 5572	0.607 3318	1795	0.750 8766	0.746 2047	1135	0.325 6859	0.323 6596	694
31	-0.614 0630	-0.620 7504	+1778	+0.741 4799	+0.736 7027	+1167	+0.321 6104	+0.319 5385	+705
Aug. 1	0.627 3934	0.633 9917	1760	0.731 8733	0.726 9922	1199	0.317 4440	0.315 3271	716
2	0.640 5447	0.647 0520	1742	0.722 0597	0.717 0762	1231	0.313 1880	0.311 0288	727
3	0.653 5132	0.659 9278	1723	0.712 0422	0.706 9580	1262	0.308 8436	0.306 6387	737
4	0.666 2954	0.672 6156	1703	0.701 8239	0.696 6403	1293	0.304 4121	0.302 1640	748
5	-0.678 8879	-0.685 1119	+1683	+0.691 4076	+0.686 1262	+1324	+0.299 8947	+0.297 6042	+758
6	0.691 2871	0.697 4131	1662	0.680 7964	0.675 4187	1355	0.295 2928	0.292 9606	768
7	0.703 4896	0.709 5161	1640	0.669 9935	0.664 5211	1385	0.290 6077	0.288 2344	778
8	0.715 4922	0.721 4176	1618	0.659 0018	0.653 4361	1415	0.285 8407	0.283 4269	788
9	0.727 2919	0.733 1147	1595	0.647 8243	0.642 1669	1445	0.280 9931	0.278 5395	797
10	-0.738 8856	-0.744 6042	+1571	+0.636 4642	+0.630 7167	+1474	+0.276 0662	+0.273 5734	+807
11	0.750 2701	0.755 8829	1547	0.624 9246	0.619 0883	1503	0.271 0612	0.268 5299	816
12	0.761 4423	0.766 9479	1522	0.613 2083	0.607 2849	1532	0.265 9795	0.263 4103	825
13	0.772 3993	0.777 7961	1496	0.601 3184	0.595 3093	1560	0.260 8223	0.258 2157	834
14	0.783 1380	0.788 4246	1470	0.589 2580	0.583 1648	1588	0.255 5908	0.252 9478	843
15	-0.793 6555	-0.798 8303	+1443	+0.577 0300	+0.570 8541	+1616	+0.250 2867	+0.247 6076	+851
16	-0.803 9485	-0.809 0098	+1415	+0.564 6373	+0.558 3801	+1643	+0.244 9108	+0.242 1965	+859

SUN, 1919.

23

GREENWICH MEAN TIME.

Data.	X True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Y True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Z True Equinox.		Reduc. to Mean Eq'x of 1919.0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Aug. 16	-0.803 9485	-0.809 0098	+1415	+0.564 6373	+0.558 3801	+1643	+0.244 9108	+0.242 1965	+859
17	0.814 0138	0.818 9601	1387	0.552 0829	0.545 7461	1670	0.239 4649	0.236 7160	867
18	0.823 8483	0.828 6780	1358	0.539 3701	0.532 9553	1696	0.233 9501	0.231 1673	875
19	0.833 4488	0.838 1603	1329	0.526 5021	0.520 0109	1722	0.228 3679	0.225 5520	883
20	0.842 8120	0.847 4035	1299	0.513 4822	0.506 9164	1747	0.222 7199	0.219 8717	890
21	-0.851 9345	-0.856 4046	+1269	+0.500 3140	+0.493 6754	+1772	+0.217 0076	+0.214 1279	+897
22	0.860 8133	0.865 1604	1238	0.487 0012	0.480 2917	1797	0.211 2327	0.208 3223	904
23	0.869 4454	0.873 6680	1207	0.473 5475	0.466 7690	1821	0.205 3969	0.202 4567	911
24	0.877 8277	0.881 9243	1175	0.459 9568	0.453 1114	1845	0.199 5018	0.196 5325	918
25	0.885 9573	0.889 9264	1142	0.446 2332	0.439 3229	1868	0.193 5491	0.190 5518	924
26	-0.893 8314	-0.897 6719	+1109	+0.432 3809	+0.425 4078	+1890	+0.187 5408	+0.184 5164	+930
27	0.901 4476	0.905 1582	1076	0.418 4041	0.411 3703	1912	0.181 4787	0.178 4280	936
28	0.908 8035	0.912 3831	1042	0.404 3070	0.397 2148	1933	0.175 3646	0.172 2886	942
29	0.915 8969	0.919 3445	1007	0.390 0941	0.382 9455	1954	0.169 2003	0.166 0999	947
30	0.922 7256	0.926 0401	972	0.375 7695	0.368 5667	1974	0.162 9876	0.159 8637	952
31	-0.929 2877	-0.932 4682	+ 937	+0.361 3376	+0.354 0827	+1994	+0.156 7284	+0.153 5820	+957
Sept. 1	0.935 5814	0.938 6269	901	0.346 8026	0.339 4978	2013	0.150 4246	0.147 2565	962
2	0.941 6046	0.944 5142	865	0.332 1688	0.324 8162	2032	0.144 0779	0.140 8891	966
3	0.947 3557	0.950 1288	828	0.317 4406	0.310 0424	2050	0.137 6902	0.134 4815	970
4	0.952 8334	0.955 4693	791	0.302 6222	0.295 1805	2067	0.131 2633	0.128 0358	974
5	-0.958 0362	-0.960 5340	+ 753	+0.287 7178	+0.280 2347	+2084	+0.124 7991	+0.121 5536	+978
6	0.962 9626	0.965 3217	715	0.272 7317	0.265 2094	2100	0.118 2994	0.115 0367	981
7	0.967 6112	0.969 8310	677	0.257 6682	0.250 1087	2116	0.111 7659	0.108 4871	984
8	0.971 9809	0.974 0608	638	0.242 5313	0.234 9367	2131	0.105 2005	0.101 9064	986
9	0.976 0706	0.978 0101	599	0.227 3253	0.219 6976	2145	0.098 6049	0.095 2963	989
10	-0.979 8791	-0.981 6775	+ 560	+0.212 0540	+0.204 3951	+2159	+0.091 9808	+0.088 6586	+991
11	0.983 4052	0.985 0619	521	0.196 7215	0.189 0336	2172	0.085 3300	0.081 9952	993
12	0.986 6476	0.988 1620	481	0.181 3319	0.173 6169	2185	0.078 6543	0.075 3077	994
13	0.989 6051	0.990 9766	441	0.165 8891	0.158 1490	2197	0.071 9555	0.068 5980	995
14	0.992 2764	0.993 5043	401	0.150 3971	0.142 6340	2208	0.065 2353	0.061 8677	996
15	-0.994 6602	-0.995 7439	+ 360	+0.134 8602	+0.127 0762	+2218	+0.058 4955	+0.055 1189	+997
16	0.996 7553	0.997 6942	319	0.119 2826	0.111 4799	2228	0.051 7381	0.048 3533	998
17	0.998 5604	0.999 3538	278	0.103 6686	0.095 8493	2237	0.044 9649	0.041 5730	998
18	1.000 0743	1.000 7217	236	0.088 0227	0.080 1893	2246	0.038 1780	0.034 7801	998
19	1.001 2959	1.001 7968	194	0.072 3496	0.064 5043	2254	0.031 3795	0.027 9765	998
20	-1.002 2242	-1.002 5782	+ 152	+0.056 6539	+0.048 7991	+2262	+0.024 5713	+0.021 1643	+997
21	1.002 8585	1.003 0651	110	0.040 9405	0.033 0787	2269	0.017 7556	0.014 3456	996
22	1.003 1980	1.003 2571	68	0.025 2142	0.017 3477	2275	0.010 9344	0.007 5224	995
23	1.003 2423	1.003 1537	+ 26	+0.009 4799	+0.001 6113	2280	+0.004 1099	+0.000 6971	993
24	1.002 9911	1.002 7546	- 17	-0.006 2574	-0.014 1257	2285	-0.002 7158	-0.006 1284	991
25	-1.002 4441	-1.002 0597	- 59	-0.021 9929	-0.029 8584	+2289	-0.009 5405	-0.012 9518	+989
26	1.001 6014	1.001 0692	102	0.037 7215	0.045 5817	2292	0.016 3621	0.019 7711	987
27	1.000 4632	0.999 7833	145	0.053 4383	0.061 2908	2295	0.023 1785	0.026 5842	984
28	0.999 0297	0.998 2023	188	0.069 1386	0.076 9810	2297	0.029 9879	0.033 3891	981
29	0.997 3013	0.996 3267	231	0.084 8175	0.092 6474	2298	0.036 7877	0.040 1835	978
30	-0.995 2786	-0.994 1571	- 274	-0.100 4701	-0.108 2851	+2299	-0.043 5763	-0.046 9657	+974
Oct. 1	-0.992 9622	-0.991 6941	- 317	-0.116 0918	-0.123 8896	+2299	-0.050 3515	-0.053 7335	+970

GREENWICH MEAN TIME.

Date.	X True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Y True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Z True Equinox.		Reduc. to Mean Eq'x of 1919.0.
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
Oct. 1	-0.992 9622	-0.991 6941	317	-0.116 0918	-0.123 8896	+2299	-0.060 3515	-0.053 7335	+870
2	0.990 3528	0.988 9384	361	0.131 6779	0.139 4561	2298	0.057 1114	0.060 4849	965
3	0.987 4511	0.985 8910	404	0.147 2237	0.154 9801	2296	0.063 8538	0.067 2179	960
4	0.984 2581	0.982 5527	448	0.162 7246	0.170 4568	2294	0.070 5770	0.073 9307	955
5	0.980 7748	0.978 9246	492	0.178 1760	0.185 8818	2291	0.077 2788	0.080 6211	950
6	-0.977 0023	-0.975 0079	535	-0.193 5737	-0.201 2510	+2288	-0.083 9574	-0.087 2874	+944
7	0.972 9416	0.970 8037	579	0.208 9132	0.216 5598	2284	0.090 6109	0.093 9277	938
8	0.968 5942	0.966 3134	622	0.224 1903	0.231 8041	2279	0.097 2376	0.100 5403	932
9	0.963 9613	0.961 5390	665	0.239 4008	0.246 9797	2274	0.103 8355	0.107 1231	926
10	0.959 0437	0.956 4785	708	0.254 5404	0.262 0824	2268	0.110 4028	0.113 6744	919
11	-0.953 8425	-0.951 1359	751	-0.269 6052	-0.277 1082	+2261	-0.116 9377	-0.120 1925	+912
12	0.948 3587	0.945 5111	794	0.284 5909	0.292 0528	2254	0.123 4384	0.126 6753	905
13	0.942 5933	0.939 6053	837	0.299 4933	0.306 9118	2246	0.129 9029	0.133 1210	897
14	0.936 5473	0.933 4195	880	0.314 3079	0.321 6810	2237	0.136 3292	0.139 5275	889
15	0.930 2220	0.926 9550	923	0.329 0305	0.336 3559	2227	0.142 7156	0.145 8932	881
16	-0.923 6186	-0.920 2130	966	-0.343 6565	-0.350 9318	+2217	-0.149 0600	-0.152 2157	+872
17	0.916 7384	0.913 1950	1009	0.358 1812	0.365 4041	2206	0.155 3602	0.158 4932	863
18	0.909 5829	0.905 9024	1051	0.372 6000	0.379 7682	2195	0.161 6144	0.164 7236	853
19	0.902 1538	0.898 3372	1094	0.386 9082	0.394 0194	2183	0.167 8204	0.170 9047	844
20	0.894 4528	0.890 5010	1136	0.401 1012	0.408 1531	2170	0.173 9762	0.177 0347	834
21	-0.886 4821	-0.882 3963	1178	-0.415 1744	-0.422 1646	+2157	-0.180 0800	-0.183 1117	+824
22	0.878 2438	0.874 0250	1220	0.429 1230	0.436 0491	2143	0.186 1296	0.189 1334	813
23	0.869 7402	0.865 3897	1262	0.442 9424	0.449 8022	2128	0.192 1230	0.195 0980	802
24	0.860 9738	0.856 4929	1303	0.456 6280	0.463 4193	2113	0.198 0583	0.201 0036	791
25	0.851 9472	0.847 3371	1344	0.470 1755	0.476 8960	2097	0.203 9337	0.206 8483	780
26	-0.842 6630	-0.837 9252	1385	-0.483 5803	-0.490 2279	+2081	-0.209 7471	-0.212 6300	+768
27	0.833 1242	0.828 2603	1426	0.496 8382	0.503 4107	2064	0.215 4968	0.218 3472	756
28	0.823 3338	0.818 3451	1466	0.509 9450	0.516 4405	2046	0.221 1811	0.223 9981	744
29	0.813 2946	0.808 1827	1507	0.522 8966	0.529 3128	2027	0.226 7980	0.229 5807	732
30	0.803 0098	0.797 7763	1547	0.535 6887	0.542 0238	2008	0.232 3460	0.235 0936	719
31	-0.792 4827	-0.787 1293	1587	-0.548 3175	-0.554 5695	+1988	-0.237 8233	-0.240 5349	+706
Nov. 1	0.781 7166	0.776 2449	1627	0.560 7792	0.566 9461	1967	0.243 2282	0.245 9030	693
2	0.770 7148	0.765 1266	1666	0.573 0698	0.579 1498	1946	0.248 5590	0.251 1962	679
3	0.759 4808	0.753 7777	1705	0.585 1858	0.591 1773	1924	0.253 8143	0.256 4131	665
4	0.748 0179	0.742 2018	1744	0.597 1238	0.603 0249	1902	0.258 9925	0.261 5522	651
5	-0.736 3298	-0.730 4023	1782	-0.608 8802	-0.614 6893	+1879	-0.264 0921	-0.266 6119	+637
6	0.724 4198	0.718 3826	1820	0.620 4519	0.626 1675	1855	0.269 1116	0.271 5909	622
7	0.712 2912	0.706 1460	1858	0.631 8356	0.637 4559	1831	0.274 0497	0.276 4878	607
8	0.699 9473	0.693 6956	1895	0.643 0281	0.648 5517	1806	0.278 9050	0.281 3011	592
9	0.687 3914	0.681 0350	1932	0.654 0262	0.659 4513	1781	0.283 6759	0.286 0293	576
10	-0.674 6269	-0.668 1674	1969	-0.664 8266	-0.670 1515	+1755	-0.288 3610	-0.290 6710	+560
11	0.661 6570	0.655 0961	2005	0.675 4258	0.680 6490	1728	0.292 9589	0.295 2246	545
12	0.648 4850	0.641 8243	2041	0.685 8207	0.690 9404	1700	0.297 4680	0.299 6888	529
13	0.635 1143	0.628 3555	2076	0.696 0077	0.701 0223	1672	0.301 8868	0.304 0619	513
14	0.621 5485	0.614 6937	2111	0.705 9836	0.710 8913	1643	0.306 2138	0.308 3424	496
15	-0.607 7915	-0.600 8425	2145	-0.715 7448	-0.720 5437	+1614	-0.310 4475	-0.312 5289	+479
16	-0.593 8471	-0.586 8058	2179	-0.725 2876	-0.729 9762	+1584	-0.314 5864	-0.316 6198	+462

SUN, 1919.

25

GREENWICH MEAN TIME.

Date.	X True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Y True Equinox.		Reduc. to Mean Eq'x of 1919.0.	Z True Equinox.		Reduc. to Mean Eq'x of 1919.0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
ov. 16	-0.593 8471	-0.586 8058	-2179	-0.725 2876	-0.729 9762	+1584	-0.314 5864	-0.316 6198	+462
17	0.579 7192	0.572 5879	2212	0.734 6089	0.739 1854	1553	0.318 6290	0.320 6138	444
18	0.565 4123	0.558 1930	2245	0.743 7053	0.748 1681	1522	0.322 5739	0.324 5093	426
19	0.550 9305	0.543 6255	2278	0.752 5735	0.756 9211	1490	0.326 4197	0.328 3051	409
20	0.536 2784	0.528 8899	2310	0.761 2104	0.765 4411	1458	0.330 1652	0.331 9999	391
21	-0.521 4605	-0.513 9908	-2342	-0.769 6129	-0.773 7254	+1425	-0.333 8090	-0.335 5923	+373
22	0.506 4813	0.498 9327	2373	0.777 7782	0.781 7710	1391	0.337 3497	0.339 0811	355
23	0.491 3457	0.483 7207	2404	0.785 7034	0.789 5750	1357	0.340 7863	0.342 4652	336
24	0.476 0585	0.468 3596	2434	0.793 3856	0.797 1348	1322	0.344 1177	0.345 7436	317
25	0.460 6247	0.452 8544	2463	0.800 8224	0.804 4480	1287	0.347 3427	0.348 9149	298
26	-0.445 0493	-0.437 2100	-2492	-0.808 0114	-0.811 5122	+1251	-0.350 4602	-0.351 9784	+279
27	0.429 3372	0.421 4315	2520	0.814 9502	0.818 3251	1215	0.353 4694	0.354 9330	260
28	0.413 4935	0.405 5239	2547	0.821 6366	0.824 8845	1178	0.356 3692	0.357 7779	241
29	0.397 5232	0.389 4922	2574	0.828 0686	0.831 1885	1140	0.359 1589	0.360 5121	221
30	0.381 4315	0.373 3418	2600	0.834 2441	0.837 2351	1102	0.361 8375	0.363 1348	202
ec. 1	-0.365 2236	-0.357 0777	-2626	-0.840 1614	-0.843 0227	+1063	-0.364 4041	-0.365 6453	+182
2	0.348 9046	0.340 7050	2651	0.845 8189	0.848 5498	1024	0.366 8583	0.368 0430	162
3	0.332 4795	0.324 2287	2675	0.851 2152	0.853 8149	984	0.369 1993	0.370 3272	142
4	0.315 9533	0.307 6538	2699	0.856 3488	0.858 8167	944	0.371 4265	0.372 4972	122
5	0.299 3309	0.290 9852	2722	0.861 2184	0.863 5538	903	0.373 5392	0.374 5525	101
6	-0.282 6173	-0.274 2277	-2744	-0.865 8228	-0.868 0252	+ 862	-0.375 5369	-0.376 4924	+ 81
7	0.265 8171	0.257 3860	2766	0.870 1608	0.872 2294	820	0.377 4190	0.378 3166	60
8	0.248 9351	0.240 4649	2787	0.874 2310	0.876 1653	777	0.379 1850	0.380 0242	39
9	0.231 9760	0.223 4690	2807	0.878 0322	0.879 8315	734	0.380 8342	0.381 6148	+ 18
10	0.214 9445	0.206 4031	2827	0.881 5629	0.883 2264	690	0.382 3660	0.383 0876	- 3
11	-0.197 8454	-0.189 2721	-2845	-0.884 8217	-0.886 3488	+ 646	-0.383 7797	-0.384 4421	- 24
12	0.180 6839	0.172 0813	2862	0.887 8075	0.889 1976	602	0.385 0748	0.385 6776	45
13	0.163 4649	0.154 8354	2879	0.890 5189	0.891 7712	557	0.386 2506	0.386 7937	66
14	0.146 1935	0.137 5398	2895	0.892 9544	0.894 0683	512	0.387 3067	0.387 7897	87
15	0.128 8751	0.120 2000	2910	0.895 1129	0.896 0880	466	0.388 2425	0.388 6652	108
16	-0.111 5152	-0.102 8214	-2924	-0.896 9935	-0.897 8292	+ 420	-0.389 0577	-0.389 4199	-129
17	0.094 1192	0.085 4094	2938	0.898 5950	0.899 2909	373	0.389 7517	0.390 0532	151
18	0.076 6928	0.067 9699	2950	0.899 9167	0.900 4723	326	0.390 3243	0.390 5650	172
19	0.059 2414	0.050 5081	2962	0.900 9578	0.901 3730	279	0.390 7752	0.390 9549	194
20	0.041 7707	0.033 0299	2973	0.901 7180	0.901 9926	231	0.391 1042	0.391 2230	215
21	-0.024 2865	-0.015 5411	-2984	-0.902 1967	-0.902 3304	+ 183	-0.391 3112	-0.391 3689	-237
22	-0.006 7945	+0.001 9527	2993	0.902 3936	0.902 3863	135	0.391 3960	0.391 3925	258
23	+0.010 6997	0.019 4458	3001	0.902 3085	0.902 1602	86	0.391 3585	0.391 2939	280
24	0.028 1902	0.036 9323	3008	0.901 9414	0.901 6521	+ 37	0.391 1988	0.391 0731	301
25	0.045 6713	0.054 4065	3015	0.901 2924	0.900 8623	- 13	0.390 9170	0.390 7304	323
26	+0.063 1373	+0.071 8629	-3020	-0.900 3618	-0.899 7910	- 63	-0.390 5133	-0.390 2658	-344
27	0.080 5825	0.089 2955	3024	0.899 1500	0.898 4389	113	0.389 9878	0.389 6795	366
28	0.098 0012	0.106 6989	3027	0.897 6577	0.896 8065	163	0.389 3408	0.388 9718	387
29	0.115 3878	0.124 0673	3030	0.895 8855	0.894 8947	213	0.388 5725	0.388 1430	409
30	0.132 7368	0.141 3956	3031	0.893 8344	0.892 7046	263	0.387 6834	0.387 1936	430
31	+0.150 0429	+0.158 6782	-3031	-0.891 5055	-0.890 2371	- 314	-0.386 6738	-0.386 1240	-452
32	+0.167 3007	+0.175 9079	-3031	-0.888 8996	-0.887 4932	- 365	-0.385 5442	-0.384 9346	-473

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JANUARY 1.					JANUARY 3.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	17 59 55.83	2.2857	-21 54 52.0	+2.779	0	19 49 5.87	2.2449	-17 27 14.9	+ 8.205
1	18 2 12.98	2.2861	21 52 1.6	2.899	1	19 51 20.51	2.2431	17 18 59.6	8.305
2	18 4 30.16	2.2864	21 49 4.1	3.019	2	19 53 35.04	2.2413	17 10 38.3	8.404
3	18 6 47.35	2.2867	21 45 59.3	3.141	3	19 55 49.47	2.2395	17 2 11.1	8.502
4	18 9 4.56	2.2869	21 42 47.2	3.261	4	19 58 3.78	2.2376	16 53 38.1	8.598
5	18 11 21.78	2.2871	21 39 28.0	3.380	5	20 0 17.98	2.2358	16 44 59.3	8.695
6	18 13 39.01	2.2872	21 36 1.6	3.500	6	20 2 32.07	2.2339	16 36 14.7	8.791
7	18 15 56.24	2.2872	21 32 28.0	3.620	7	20 4 46.05	2.2320	16 27 24.4	8.886
8	18 18 13.47	2.2872	21 28 47.2	3.740	8	20 6 59.91	2.2301	16 18 28.4	8.980
9	18 20 30.70	2.2871	21 24 59.2	3.859	9	20 9 13.66	2.2282	16 9 26.8	9.073
10	18 22 47.92	2.2870	21 21 4.1	3.978	10	20 11 27.29	2.2263	16 0 19.7	9.165
11	18 25 5.14	2.2868	21 17 1.8	4.098	11	20 13 40.81	2.2243	15 51 7.0	9.257
12	18 27 22.33	2.2864	21 12 52.4	4.216	12	20 15 54.21	2.2224	15 41 48.9	9.347
13	18 29 39.51	2.2861	21 8 35.9	4.335	13	20 18 7.50	2.2205	15 32 25.4	9.437
14	18 31 56.66	2.2857	21 4 12.2	4.453	14	20 20 20.67	2.2185	15 22 56.5	9.526
15	18 34 13.79	2.2853	20 59 41.5	4.571	15	20 22 33.72	2.2165	15 13 22.3	9.613
16	18 36 30.90	2.2848	20 55 3.7	4.688	16	20 24 46.65	2.2146	15 3 42.9	9.700
17	18 38 47.97	2.2842	20 50 18.9	4.806	17	20 26 59.47	2.2128	14 53 58.3	9.786
18	18 41 5.00	2.2836	20 45 27.0	4.923	18	20 29 12.18	2.2108	14 44 8.6	9.871
19	18 43 22.00	2.2830	20 40 28.1	5.039	19	20 31 24.76	2.2088	14 34 13.8	9.956
20	18 45 38.96	2.2823	20 35 22.3	5.156	20	20 33 37.23	2.2068	14 24 13.9	10.039
21	18 47 55.87	2.2814	20 30 9.4	5.272	21	20 35 49.58	2.2049	14 14 9.1	10.121
22	18 50 12.73	2.2807	20 24 49.7	5.387	22	20 38 1.82	2.2030	14 3 59.4	10.203
23	18 52 29.55	2.2798	-20 19 23.0	+5.503	23	20 40 13.94	2.2010	-13 53 44.8	+10.283
JANUARY 2.					JANUARY 4.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 54 46.31	2.2789	-20 13 49.4	+5.618	0	20 42 25.94	2.1991	-13 43 25.4	+10.363
1	18 57 3.02	2.2779	20 8 8.9	5.732	1	20 44 37.83	2.1972	13 33 1.3	10.441
2	18 59 19.66	2.2768	20 2 21.6	5.845	2	20 46 49.60	2.1953	13 22 32.5	10.518
3	19 1 36.24	2.2758	19 56 27.5	5.958	3	20 49 1.27	2.1935	13 11 59.1	10.594
4	19 3 52.76	2.2748	19 50 26.6	6.072	4	20 51 12.82	2.1916	13 1 21.2	10.670
5	19 6 9.22	2.2737	19 44 18.9	6.184	5	20 53 24.26	2.1897	12 50 38.7	10.745
6	19 8 25.60	2.2723	19 38 4.5	6.296	6	20 55 35.58	2.1878	12 39 51.8	10.818
7	19 10 41.90	2.2712	19 31 43.4	6.408	7	20 57 46.80	2.1861	12 29 0.5	10.891
8	19 12 58.14	2.2699	19 25 15.6	6.518	8	20 59 57.91	2.1843	12 18 4.9	10.963
9	19 15 14.29	2.2686	19 18 41.3	6.628	9	21 2 8.91	2.1824	12 7 5.0	11.033
10	19 17 30.37	2.2673	19 12 0.3	6.738	10	21 4 19.80	2.1807	11 56 0.9	11.103
11	19 19 46.36	2.2658	19 5 12.8	6.847	11	21 6 30.59	2.1790	11 44 52.7	11.171
12	19 22 2.27	2.2644	18 58 18.7	6.956	12	21 8 41.28	2.1773	11 33 40.4	11.238
13	19 24 18.09	2.2630	18 51 18.1	7.063	13	21 10 51.86	2.1755	11 22 24.1	11.304
14	19 26 33.83	2.2615	18 44 11.1	7.170	14	21 13 2.34	2.1738	11 11 3.9	11.370
15	19 28 49.47	2.2599	18 36 57.7	7.277	15	21 15 12.72	2.1722	10 59 39.7	11.434
16	19 31 5.02	2.2583	18 29 37.9	7.383	16	21 17 23.00	2.1706	10 48 11.8	11.497
17	19 33 20.47	2.2568	18 22 11.8	7.488	17	21 19 33.19	2.1690	10 36 40.1	11.560
18	19 35 35.83	2.2552	18 14 39.3	7.593	18	21 21 43.28	2.1674	10 25 4.6	11.621
19	19 37 51.09	2.2535	18 7 0.7	7.696	19	21 23 53.28	2.1659	10 13 25.6	11.680
20	19 40 6.25	2.2518	17 59 15.8	7.800	20	21 26 3.19	2.1644	10 1 43.0	11.740
21	19 42 21.31	2.2502	17 51 24.7	7.903	21	21 28 13.01	2.1629	9 49 56.8	11.798
22	19 44 36.27	2.2484	17 43 27.5	8.004	22	21 30 22.74	2.1614	9 38 7.2	11.854
23	19 46 51.12	2.2467	17 35 24.2	8.105	23	21 32 32.38	2.1600	9 26 14.3	11.910
24	19 49 5.87	2.2449	-17 27 14.9	+8.205	24	21 34 41.94	2.1587	- 9 14 18.0	+11.965

MOON, 1919.

27

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JANUARY 5.					JANUARY 7.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	21 34 41.94	2.1587	-9 14 18.0	+11.965	0	23 17 32.80	2.1461	+ 1 1 40.7	+13.259
1	21 36 51.42	2.1573	9 2 18.5	12.018	1	23 19 41.60	2.1472	1 14 56.2	13.258
2	21 39 0.82	2.1560	8 50 15.8	12.071	2	23 21 50.46	2.1482	1 28 11.6	13.256
3	21 41 10.14	2.1548	8 38 10.0	12.123	3	23 23 59.38	2.1494	1 41 26.9	13.252
4	21 43 19.39	2.1535	8 26 1.1	12.173	4	23 26 8.39	2.1507	1 54 41.8	13.246
5	21 45 28.56	2.1523	8 13 49.3	12.222	5	23 28 17.46	2.1519	2 7 56.4	13.239
6	21 47 37.66	2.1512	8 1 34.5	12.270	6	23 30 26.62	2.1533	2 21 10.5	13.232
7	21 49 46.70	2.1500	7 49 16.9	12.317	7	23 32 35.86	2.1548	2 34 24.2	13.223
8	21 51 55.66	2.1489	7 36 56.5	12.363	8	23 34 45.19	2.1563	2 47 37.3	13.213
9	21 54 4.57	2.1479	7 24 33.4	12.408	9	23 36 54.61	2.1578	3 0 49.8	13.202
10	21 56 13.41	2.1469	7 12 7.6	12.451	10	23 39 4.12	2.1593	3 14 1.5	13.189
11	21 58 22.20	2.1460	6 59 39.3	12.493	11	23 41 13.73	2.1610	3 27 12.5	13.176
12	22 0 30.93	2.1451	6 47 8.4	12.535	12	23 43 23.44	2.1628	3 40 22.6	13.161
13	22 2 39.61	2.1442	6 34 35.1	12.575	13	23 45 33.26	2.1645	3 53 31.8	13.144
14	22 4 48.23	2.1433	6 21 59.4	12.614	14	23 47 43.18	2.1663	4 6 39.9	13.127
15	22 6 56.81	2.1426	6 9 21.4	12.652	15	23 49 53.21	2.1682	4 19 47.0	13.108
16	22 9 5.34	2.1418	5 56 41.2	12.688	16	23 52 3.36	2.1702	4 32 52.9	13.088
17	22 11 13.83	2.1413	5 43 58.8	12.725	17	23 54 13.63	2.1722	4 45 57.6	13.068
18	22 13 22.29	2.1406	5 31 14.2	12.760	18	23 56 24.02	2.1742	4 59 1.0	13.045
19	22 15 30.70	2.1399	5 18 27.6	12.793	19	23 58 34.53	2.1763	5 12 3.0	13.022
20	22 17 39.08	2.1394	5 5 39.1	12.824	20	0 0 45.18	2.1785	5 25 3.6	12.997
21	22 19 47.43	2.1389	4 52 48.7	12.856	21	0 2 55.95	2.1807	5 38 2.6	12.970
22	22 21 55.75	2.1385	4 39 56.4	12.887	22	0 5 6.86	2.1830	5 51 0.0	12.943
23	22 24 4.05	2.1382	-4 27 2.3	+12.916	23	0 7 17.91	2.1853	+ 6 3 55.8	+12.915
JANUARY 6.					JANUARY 8.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	22 26 12.33	2.1378	-4 14 6.5	+12.943	0	0 9 29.10	2.1878	+ 6 16 49.8	+12.885
1	22 28 20.59	2.1375	4 1 9.1	12.969	1	0 11 40.44	2.1902	6 29 42.0	12.853
2	22 30 28.83	2.1373	3 48 10.2	12.995	2	0 13 51.92	2.1927	6 42 32.2	12.821
3	22 32 37.06	2.1371	3 35 9.7	13.019	3	0 16 3.56	2.1953	6 55 20.5	12.788
4	22 34 45.28	2.1369	3 22 7.9	13.042	4	0 18 15.35	2.1979	7 8 6.8	12.753
5	22 36 53.49	2.1368	3 9 4.7	13.064	5	0 20 27.31	2.2006	7 20 50.9	12.717
6	22 39 1.70	2.1368	2 56 0.2	13.086	6	0 22 39.42	2.2033	7 33 32.8	12.679
7	22 41 9.91	2.1369	2 42 54.4	13.105	7	0 24 51.70	2.2061	7 46 12.4	12.641
8	22 43 18.13	2.1370	2 29 47.6	13.123	8	0 27 4.15	2.2089	7 58 49.7	12.601
9	22 45 26.35	2.1371	2 16 39.6	13.141	9	0 29 16.77	2.2118	8 11 24.5	12.559
10	22 47 34.58	2.1373	2 3 30.7	13.157	10	0 31 29.57	2.2148	8 23 56.8	12.517
11	22 49 42.83	2.1376	1 50 20.8	13.173	11	0 33 42.54	2.2178	8 36 26.5	12.473
12	22 51 51.09	2.1378	1 37 10.0	13.186	12	0 35 55.70	2.2208	8 48 53.6	12.428
13	22 53 59.37	2.1383	1 23 58.5	13.198	13	0 38 9.04	2.2238	9 1 17.9	12.382
14	22 56 7.68	2.1387	1 10 46.2	13.210	14	0 40 22.56	2.2270	9 13 39.4	12.334
15	22 58 16.01	2.1392	0 57 33.3	13.220	15	0 42 36.28	2.2303	9 25 58.0	12.285
16	23 0 24.38	2.1398	0 44 19.8	13.229	16	0 44 50.19	2.2334	9 38 13.6	12.235
17	23 2 32.78	2.1403	0 31 5.8	13.238	17	0 47 4.29	2.2367	9 50 26.2	12.184
18	23 4 41.21	2.1409	0 17 51.3	13.244	18	0 49 18.59	2.2400	10 2 35.7	12.131
19	23 6 49.69	2.1417	-0 4 36.5	13.249	19	0 51 33.09	2.2434	10 14 41.9	12.077
20	23 8 58.21	2.1423	+0 8 38.6	13.254	20	0 53 47.80	2.2468	10 26 44.9	12.022
21	23 11 6.77	2.1432	0 21 54.0	13.258	21	0 56 2.71	2.2503	10 38 44.5	11.964
22	23 13 15.39	2.1442	0 35 9.5	13.260	22	0 58 17.83	2.2538	10 50 40.6	11.907
23	23 15 24.07	2.1451	0 48 25.1	13.260	23	1 0 33.16	2.2573	11 2 33.3	11.848
24	23 17 32.80	2.1461	+1 1 40.7	+13.259	24	1 2 48.71	2.2609	+11 14 22.3	+11.789

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JANUARY 9.					JANUARY 11.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	1 2 48.71	2.2609	+11 14 22.3	+11.787	0	2 55 54.67	2.4533	+19 5 40.4	+7.366
1	1 5 4.47	2.2645	11 26 7.7	11.725	1	2 58 21.98	2.4570	19 12 58.7	7.344
2	1 7 20.45	2.2682	11 37 49.3	11.662	2	3 0 49.51	2.4608	19 20 9.7	7.122
3	1 9 36.65	2.2718	11 49 27.1	11.598	3	3 3 17.27	2.4644	19 27 13.3	6.968
4	1 11 53.07	2.2756	12 1 1.0	11.532	4	3 5 45.24	2.4680	19 34 9.4	6.873
5	1 14 9.72	2.2793	12 12 30.9	11.464	5	3 8 13.43	2.4716	19 40 58.0	6.746
6	1 16 26.59	2.2831	12 23 56.7	11.395	6	3 10 41.83	2.4751	19 47 38.9	6.619
7	1 18 43.69	2.2869	12 35 18.3	11.326	7	3 13 10.44	2.4785	19 54 12.3	6.492
8	1 21 1.02	2.2908	12 46 35.8	11.255	8	3 15 39.25	2.4818	20 0 37.9	6.363
9	1 23 18.59	2.2947	12 57 48.9	11.183	9	3 18 8.26	2.4852	20 6 55.8	6.233
10	1 25 36.38	2.2986	13 8 57.7	11.109	10	3 20 37.47	2.4885	20 13 5.9	6.103
11	1 27 54.42	2.3026	13 20 2.0	11.034	11	3 23 6.88	2.4918	20 19 8.1	5.970
12	1 30 12.69	2.3065	13 31 1.8	10.958	12	3 25 36.48	2.4949	20 25 2.3	5.838
13	1 32 31.20	2.3106	13 41 57.0	10.880	13	3 28 6.27	2.4979	20 30 48.6	5.704
14	1 34 49.96	2.3146	13 52 47.4	10.801	14	3 30 36.23	2.5009	20 36 26.8	5.569
15	1 37 8.95	2.3186	14 3 33.1	10.721	15	3 33 6.38	2.5040	20 41 56.9	5.434
16	1 39 28.19	2.3227	14 14 13.9	10.639	16	3 35 36.71	2.5068	20 47 18.9	5.298
17	1 41 47.67	2.3268	14 24 49.8	10.556	17	3 38 7.20	2.5095	20 52 32.7	5.161
18	1 44 7.40	2.3309	14 35 20.6	10.472	18	3 40 37.85	2.5123	20 57 38.2	5.023
19	1 46 27.38	2.3350	14 45 46.4	10.388	19	3 43 8.67	2.5150	21 2 35.5	4.885
20	1 48 47.60	2.3391	14 56 7.1	10.301	20	3 45 39.65	2.5175	21 7 24.4	4.746
21	1 51 8.07	2.3433	15 6 22.5	10.212	21	3 48 10.77	2.5199	21 12 5.0	4.606
22	1 53 28.79	2.3474	15 16 32.5	10.123	22	3 50 42.04	2.5223	21 16 37.1	4.465
23	1 55 49.76	2.3516	+15 26 37.2	+10.033	23	3 53 13.45	2.5247	+21 21 0.8	+4.324
JANUARY 10.					JANUARY 12.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	1 58 10.98	2.3558	+15 36 36.4	+ 9.941	0	3 55 45.00	2.5269	+21 25 16.0	+4.182
1	2 0 32.45	2.3599	15 46 30.1	9.848	1	3 58 16.68	2.5290	21 29 22.6	4.039
2	2 2 54.17	2.3642	15 56 18.1	9.753	2	4 0 48.48	2.5310	21 33 20.7	3.897
3	2 5 16.15	2.3683	16 6 0.4	9.658	3	4 3 20.40	2.5329	21 37 10.2	3.753
4	2 7 38.37	2.3724	16 15 37.0	9.560	4	4 5 52.43	2.5348	21 40 51.0	3.608
5	2 10 0.84	2.3767	16 25 7.6	9.462	5	4 8 24.58	2.5366	21 44 23.1	3.463
6	2 12 23.57	2.3808	16 34 32.4	9.363	6	4 10 56.82	2.5383	21 47 46.5	3.318
7	2 14 46.54	2.3850	16 43 51.1	9.262	7	4 13 29.17	2.5398	21 51 1.2	3.172
8	2 17 9.77	2.3893	16 53 3.8	9.160	8	4 16 1.60	2.5412	21 54 7.1	3.026
9	2 19 33.25	2.3933	17 2 10.3	9.057	9	4 18 34.11	2.5426	21 57 4.3	2.879
10	2 21 56.97	2.3974	17 11 10.6	8.953	10	4 21 6.71	2.5439	21 59 52.6	2.732
11	2 24 20.94	2.4016	17 20 4.6	8.847	11	4 23 39.38	2.5450	22 2 32.1	2.584
12	2 26 45.16	2.4058	17 28 52.2	8.740	12	4 26 12.11	2.5461	22 5 2.7	2.436
13	2 29 9.63	2.4098	17 37 33.4	8.632	13	4 28 44.91	2.5470	22 7 24.4	2.288
14	2 31 34.34	2.4139	17 46 8.0	8.523	14	4 31 17.75	2.5478	22 9 37.3	2.140
15	2 33 59.30	2.4180	17 54 36.1	8.413	15	4 33 50.65	2.5486	22 11 41.2	1.991
16	2 36 24.50	2.4220	18 2 57.5	8.300	16	4 36 23.58	2.5492	22 13 36.2	1.843
17	2 38 49.94	2.4261	18 11 12.1	8.188	17	4 38 56.55	2.5498	22 15 22.3	1.693
18	2 41 15.63	2.4301	18 19 20.0	8.074	18	4 41 29.55	2.5502	22 16 59.4	1.543
19	2 43 41.55	2.4340	18 27 21.0	7.958	19	4 44 2.57	2.5504	22 18 27.5	1.394
20	2 46 7.71	2.4379	18 35 15.0	7.842	20	4 46 35.60	2.5506	22 19 46.7	1.244
21	2 48 34.10	2.4418	18 43 2.0	7.725	21	4 49 8.64	2.5507	22 20 56.8	1.094
22	2 51 0.73	2.4457	18 50 42.0	7.607	22	4 51 41.68	2.5507	22 21 58.0	0.945
23	2 53 27.58	2.4495	18 58 14.8	7.487	23	4 54 14.72	2.5505	22 22 50.2	0.795
24	2 55 54.67	2.4533	+19 5 40.4	+ 7.366	24	4 56 47.74	2.5502	+22 23 33.4	+0.645

GREENWICH MEAN TIME.

Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JANUARY 13.					JANUARY 15.			
m s	s	° ' "	"		h m s	s	° ' "	"
56 47.74	2.5502	+22 23 33.4	+0.045	0	6 56 51.79	2.4160	+20 8 22.7	-6.026
59 20.74	2.5498	22 24 7.6	0.495	1	6 59 16.61	2.4113	20 2 17.6	6.143
1 53.72	2.5494	22 24 32.8	0.346	2	7 1 41.14	2.4063	19 56 5.5	6.261
4 26.67	2.5488	22 24 49.1	0.196	3	7 4 5.37	2.4014	19 49 46.3	6.377
6 59.57	2.5480	22 24 56.3	+0.046	4	7 6 29.31	2.3965	19 43 20.3	6.492
9 32.43	2.5473	22 24 54.6	-0.103	5	7 8 52.95	2.3915	19 36 47.3	6.606
12 5.24	2.5463	22 24 44.0	0.253	6	7 11 16.29	2.3864	19 30 7.6	6.718
14 37.99	2.5453	22 24 24.3	0.402	7	7 13 39.32	2.3813	19 23 21.2	6.829
17 10.67	2.5441	22 23 55.8	0.550	8	7 16 2.04	2.3761	19 16 28.1	6.940
19 43.28	2.5428	22 23 18.3	0.699	9	7 18 24.45	2.3710	19 9 28.4	7.048
22 15.81	2.5414	22 22 31.9	0.848	10	7 20 46.56	2.3658	19 2 22.3	7.156
24 48.25	2.5399	22 21 36.6	0.996	11	7 23 8.35	2.3605	18 55 9.7	7.263
27 20.60	2.5383	22 20 32.4	1.143	12	7 25 29.82	2.3553	18 47 50.7	7.368
29 52.85	2.5366	22 19 19.4	1.291	13	7 27 50.98	2.3499	18 40 25.5	7.472
32 24.99	2.5348	22 17 57.5	1.438	14	7 30 11.81	2.3445	18 32 54.1	7.574
34 57.02	2.5328	22 16 26.8	1.585	15	7 32 32.32	2.3392	18 25 16.6	7.676
37 28.93	2.5308	22 14 47.3	1.731	16	7 34 52.51	2.3338	18 17 33.0	7.776
40 0.71	2.5287	22 12 59.1	1.876	17	7 37 12.38	2.3284	18 9 43.5	7.875
42 32.37	2.5264	22 11 2.2	2.021	18	7 39 31.92	2.3229	18 1 48.0	7.973
45 3.88	2.5240	22 8 56.6	2.166	19	7 41 51.13	2.3174	17 53 46.8	8.068
47 35.25	2.5215	22 6 42.3	2.310	20	7 44 10.01	2.3120	17 45 39.8	8.164
50 6.46	2.5189	22 4 19.4	2.453	21	7 46 28.57	2.3065	17 37 27.1	8.258
52 37.52	2.5163	22 1 47.9	2.597	22	7 48 46.79	2.3010	17 29 8.9	8.349
55 8.42	2.5136	+21 59 7.8	-2.739	23	7 51 4.69	2.2955	+17 20 45.2	-8.441
JANUARY 14.					JANUARY 16.			
57 39.15	2.5107	+21 56 19.2	-2.881	0	7 53 22.25	2.2899	+17 12 16.0	-8.531
0 9.70	2.5077	21 53 22.1	3.021	1	7 55 39.48	2.2844	17 3 41.5	8.619
2 40.07	2.5046	21 50 16.7	3.161	2	7 57 56.38	2.2789	16 55 1.7	8.707
5 10.25	2.5015	21 47 2.8	3.302	3	8 0 12.95	2.2733	16 46 16.7	8.793
7 40.25	2.4983	21 43 40.5	3.440	4	8 2 29.18	2.2678	16 37 26.6	8.877
10 10.04	2.4948	21 40 10.0	3.578	5	8 4 45.08	2.2623	16 28 31.5	8.959
12 39.63	2.4914	21 36 31.2	3.715	6	8 7 0.65	2.2568	16 19 31.5	9.042
15 9.01	2.4879	21 32 44.2	3.851	7	8 9 15.89	2.2513	16 10 26.5	9.123
17 38.18	2.4843	21 28 49.1	3.986	8	8 11 30.80	2.2457	16 1 16.8	9.202
20 7.12	2.4806	21 24 45.9	4.122	9	8 13 45.37	2.2402	15 52 2.3	9.280
22 35.85	2.4768	21 20 34.5	4.256	10	8 15 59.62	2.2347	15 42 43.2	9.357
25 4.34	2.4729	21 16 15.2	4.388	11	8 18 13.53	2.2291	15 33 19.5	9.433
27 32.60	2.4690	21 11 48.0	4.519	12	8 20 27.11	2.2236	15 23 51.3	9.507
30 0.62	2.4649	21 7 12.9	4.651	13	8 22 40.36	2.2182	15 14 18.7	9.579
32 28.39	2.4608	21 2 29.9	4.781	14	8 24 53.29	2.2127	15 4 41.8	9.650
34 55.92	2.4567	20 57 39.2	4.910	15	8 27 5.88	2.2072	14 55 0.7	9.721
37 23.19	2.4524	20 52 40.7	5.038	16	8 29 18.15	2.2018	14 45 15.3	9.790
39 50.21	2.4482	20 47 34.6	5.165	17	8 31 30.10	2.1963	14 35 25.9	9.858
42 16.97	2.4437	20 42 20.9	5.291	18	8 33 41.71	2.1909	14 25 32.4	9.924
44 43.45	2.4393	20 36 59.7	5.416	19	8 35 53.01	2.1856	14 15 35.0	9.988
47 9.68	2.4348	20 31 31.0	5.540	20	8 38 3.98	2.1803	14 5 33.8	10.053
49 35.62	2.4302	20 25 54.9	5.663	21	8 40 14.64	2.1749	13 55 28.7	10.116
52 1.30	2.4256	20 20 11.4	5.785	22	8 42 24.97	2.1695	13 45 19.9	10.177
54 26.69	2.4208	20 14 20.7	5.906	23	8 44 34.98	2.1643	13 35 7.5	10.237
56 51.79	2.4160	+20 8 22.7	-6.026	24	8 46 44.68	2.1590	+13 24 51.5	-10.296

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JANUARY 17.					JANUARY 19.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	8 46 44.68	2.1590	+13 24 51.5	-10.296	0	10 25 3.41	1.9555	+4 25 0.9	-11.787
1	8 48 54.06	2.1538	13 14 32.0	10.353	1	10 27 0.65	1.9525	4 13 13.5	11.793
2	8 51 3.14	2.1487	13 4 9.1	10.409	2	10 28 57.71	1.9496	4 1 25.7	11.799
3	8 53 11.90	2.1434	12 53 42.9	10.465	3	10 30 54.60	1.9468	3 49 37.6	11.804
4	8 55 20.35	2.1383	12 43 13.3	10.519	4	10 32 51.32	1.9439	3 37 49.2	11.808
5	8 57 28.49	2.1332	12 32 40.6	10.571	5	10 34 47.87	1.9411	3 26 0.6	11.811
6	8 59 36.33	2.1282	12 22 4.8	10.623	6	10 36 44.25	1.9384	3 14 11.9	11.813
7	9 1 43.87	2.1231	12 11 25.9	10.673	7	10 38 40.48	1.9358	3 2 23.0	11.815
8	9 3 51.10	2.1180	12 0 44.0	10.723	8	10 40 36.55	1.9332	2 50 34.1	11.816
9	9 5 58.03	2.1131	11 49 59.2	10.770	9	10 42 32.46	1.9307	2 38 45.1	11.816
10	9 8 4.67	2.1082	11 39 11.6	10.817	10	10 44 28.23	1.9283	2 26 56.2	11.814
11	9 10 11.01	2.1033	11 28 21.2	10.863	11	10 46 23.85	1.9258	2 15 7.4	11.813
12	9 12 17.06	2.0984	11 17 28.1	10.907	12	10 48 19.32	1.9234	2 3 18.7	11.810
13	9 14 22.82	2.0937	11 6 32.4	10.949	13	10 50 14.66	1.9212	1 51 30.2	11.807
14	9 16 28.30	2.0888	10 55 34.2	10.992	14	10 52 9.86	1.9189	1 39 41.9	11.803
15	9 18 33.48	2.0841	10 44 33.4	11.033	15	10 54 4.93	1.9167	1 27 53.9	11.798
16	9 20 38.39	2.0794	10 33 30.3	11.072	16	10 55 59.86	1.9146	1 16 6.2	11.793
17	9 22 43.01	2.0748	10 22 24.8	11.111	17	10 57 54.68	1.9126	1 4 18.8	11.786
18	9 24 47.36	2.0703	10 11 17.0	11.148	18	10 59 49.37	1.9105	0 52 31.9	11.778
19	9 26 51.44	2.0657	10 0 7.0	11.184	19	11 1 43.94	1.9086	0 40 45.4	11.770
20	9 28 55.24	2.0611	9 48 54.9	11.219	20	11 3 38.40	1.9067	0 28 59.5	11.761
21	9 30 58.77	2.0567	9 37 40.7	11.253	21	11 5 32.74	1.9048	0 17 14.1	11.753
22	9 33 2.04	2.0523	9 26 24.5	11.287	22	11 7 26.98	1.9031	+0 5 29.2	11.743
23	9 35 5.05	2.0479	+ 9 15 6.3	-11.318	23	11 9 21.11	1.9013	-0 6 15.0	-11.731
JANUARY 18.					JANUARY 20.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	9 37 7.79	2.0436	+ 9 3 46.3	-11.349	0	11 11 15.14	1.8997	-0 17 58.5	-11.719
1	9 39 10.28	2.0393	8 52 24.4	11.379	1	11 13 9.07	1.8981	0 29 41.3	11.708
2	9 41 12.51	2.0351	8 41 0.8	11.408	2	11 15 2.91	1.8967	0 41 23.4	11.695
3	9 43 14.49	2.0309	8 29 35.5	11.435	3	11 16 56.67	1.8952	0 53 4.7	11.681
4	9 45 16.22	2.0268	8 18 8.6	11.462	4	11 18 50.33	1.8937	1 4 45.1	11.666
5	9 47 17.71	2.0228	8 6 40.1	11.488	5	11 20 43.91	1.8923	1 16 24.6	11.651
6	9 49 18.95	2.0188	7 55 10.1	11.513	6	11 22 37.41	1.8910	1 28 3.2	11.636
7	9 51 19.96	2.0148	7 43 38.6	11.536	7	11 24 30.83	1.8898	1 39 40.9	11.619
8	9 53 20.73	2.0108	7 32 5.8	11.558	8	11 26 24.18	1.8885	1 51 17.5	11.602
9	9 55 21.26	2.0069	7 20 31.7	11.579	9	11 28 17.45	1.8874	2 2 53.1	11.584
10	9 57 21.56	2.0032	7 8 56.3	11.601	10	11 30 10.67	1.8864	2 14 27.6	11.566
11	9 59 21.64	1.9994	6 57 19.6	11.620	11	11 32 3.82	1.8853	2 26 1.0	11.547
12	10 1 21.49	1.9957	6 45 41.9	11.638	12	11 33 56.91	1.8844	2 37 33.2	11.527
13	10 3 21.12	1.9920	6 34 3.1	11.656	13	11 35 49.95	1.8835	2 49 4.2	11.507
14	10 5 20.53	1.9884	6 22 23.2	11.673	14	11 37 42.93	1.8826	3 0 34.0	11.485
15	10 7 19.73	1.9848	6 10 42.4	11.688	15	11 39 35.86	1.8818	3 12 2.4	11.463
16	10 9 18.71	1.9813	5 59 0.7	11.702	16	11 41 28.75	1.8811	3 23 29.6	11.442
17	10 11 17.49	1.9780	5 47 18.2	11.716	17	11 43 21.59	1.8804	3 34 55.4	11.418
18	10 13 16.07	1.9746	5 35 34.8	11.729	18	11 45 14.40	1.8798	3 46 19.8	11.394
19	10 15 14.44	1.9712	5 23 50.7	11.741	19	11 47 7.17	1.8793	3 57 42.7	11.370
20	10 17 12.61	1.9680	5 12 5.9	11.753	20	11 48 59.91	1.8788	4 9 4.2	11.346
21	10 19 10.60	1.9648	5 0 20.4	11.763	21	11 50 52.62	1.8783	4 20 24.2	11.320
22	10 21 8.39	1.9616	4 48 34.4	11.771	22	11 52 45.30	1.8779	4 31 42.6	11.293
23	10 23 5.99	1.9585	4 36 47.9	11.779	23	11 54 37.97	1.8776	4 42 59.4	11.267
24	10 25 3.41	1.9555	+ 4 25 0.9	-11.787	24	11 56 30.61	1.8773	-4 54 14.6	-11.239

GREENWICH MEAN TIME.

Right cension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JANUARY 21.				JANUARY 23.				
m s	s	° ' "	"		h m s	s	° ' "	"
56 30.61	1.8773	- 4 54 14.6	-11.239	0	13 27 18.24	1.9250	-13 11 4.3	-9.242
58 23.24	1.8770	5 5 28.1	11.212	1	13 29 13.80	1.9272	13 20 17.1	9.186
0 15.85	1.8768	5 16 40.0	11.183	2	13 31 9.50	1.9294	13 29 26.6	9.130
2 8.46	1.8768	5 27 50.1	11.154	3	13 33 5.33	1.9316	13 38 32.7	9.073
4 1.06	1.8767	5 38 58.5	11.124	4	13 35 1.29	1.9338	13 47 35.3	9.016
5 53.66	1.8768	5 50 5.0	11.093	5	13 36 57.39	1.9363	13 56 34.6	8.958
7 46.27	1.8768	6 1 9.7	11.063	6	13 38 53.64	1.9386	14 5 30.3	8.899
9 38.87	1.8768	6 12 12.5	11.031	7	13 40 50.02	1.9409	14 14 22.5	8.840
11 31.49	1.8770	6 23 13.4	10.999	8	13 42 46.55	1.9433	14 23 11.1	8.781
13 24.11	1.8772	6 34 12.4	10.967	9	13 44 43.22	1.9458	14 31 56.2	8.721
15 16.75	1.8775	6 45 9.4	10.933	10	13 46 40.05	1.9483	14 40 37.6	8.660
17 9.41	1.8778	6 56 4.3	10.898	11	13 48 37.02	1.9508	14 49 15.4	8.598
19 2.09	1.8782	7 6 57.2	10.864	12	13 50 34.15	1.9535	14 57 49.4	8.536
20 54.79	1.8786	7 17 48.0	10.829	13	13 52 31.44	1.9561	15 6 19.7	8.473
22 47.52	1.8791	7 28 36.7	10.793	14	13 54 28.88	1.9587	15 14 46.2	8.410
24 40.28	1.8796	7 39 23.2	10.757	15	13 56 26.48	1.9613	15 23 8.9	8.347
26 33.07	1.8802	7 50 7.5	10.720	16	13 58 24.24	1.9641	15 31 27.8	8.283
28 25.90	1.8808	8 0 49.6	10.683	17	14 0 22.17	1.9668	15 39 42.8	8.218
30 18.77	1.8815	8 11 29.5	10.645	18	14 2 20.26	1.9696	15 47 53.9	8.152
32 11.68	1.8823	8 22 7.0	10.607	19	14 4 18.52	1.9724	15 56 1.0	8.085
34 4.64	1.8831	8 32 42.3	10.568	20	14 6 16.95	1.9753	16 4 4.1	8.019
35 57.65	1.8839	8 43 15.1	10.528	21	14 8 15.56	1.9782	16 12 3.3	7.952
37 50.71	1.8848	8 53 45.6	10.488	22	14 10 14.33	1.9810	16 19 58.3	7.883
39 43.83	1.8858	- 9 4 13.6	-10.447	23	14 12 13.28	1.9840	-16 27 49.3	-7.815
JANUARY 22.				JANUARY 24.				
41 37.00	1.8867	- 9 14 39.2	-10.406	0	14 14 12.41	1.9870	-16 35 36.1	-7.745
43 30.23	1.8878	9 25 2.3	10.363	1	14 16 11.72	1.9899	16 43 18.7	7.676
45 23.53	1.8889	9 35 22.8	10.321	2	14 18 11.20	1.9929	16 50 57.2	7.606
47 16.90	1.8901	9 45 40.8	10.278	3	14 20 10.87	1.9960	16 58 31.4	7.534
49 10.34	1.8913	9 55 56.1	10.233	4	14 22 10.72	1.9991	17 6 1.3	7.463
51 3.85	1.8924	10 6 8.8	10.190	5	14 24 10.76	2.0022	17 13 26.9	7.390
52 57.43	1.8938	10 16 18.9	10.145	6	14 26 10.98	2.0053	17 20 48.1	7.318
54 51.10	1.8951	10 26 26.2	10.099	7	14 28 11.39	2.0084	17 28 5.0	7.244
56 44.84	1.8965	10 36 30.8	10.054	8	14 30 11.99	2.0116	17 35 17.4	7.170
58 38.68	1.8980	10 46 32.7	10.008	9	14 32 12.78	2.0148	17 42 25.4	7.095
0 32.60	1.8994	10 56 31.7	9.960	10	14 34 13.76	2.0180	17 49 28.8	7.020
2 26.61	1.9009	11 6 27.9	9.913	11	14 36 14.94	2.0213	17 56 27.8	6.944
4 20.71	1.9025	11 16 21.2	9.864	12	14 38 16.31	2.0245	18 3 22.1	6.867
6 14.91	1.9042	11 26 11.6	9.815	13	14 40 17.88	2.0278	18 10 11.8	6.790
8 9.21	1.9058	11 35 59.0	9.766	14	14 42 19.64	2.0310	18 16 56.9	6.713
10 3.61	1.9075	11 45 43.5	9.717	15	14 44 21.60	2.0343	18 23 37.3	6.634
11 58.11	1.9093	11 55 25.0	9.666	16	14 46 23.76	2.0376	18 30 13.0	6.555
13 52.73	1.9112	12 5 3.4	9.615	17	14 48 26.11	2.0409	18 36 43.9	6.475
15 47.45	1.9129	12 14 38.8	9.563	18	14 50 28.67	2.0443	18 43 10.0	6.395
17 42.28	1.9148	12 24 11.0	9.511	19	14 52 31.43	2.0477	18 49 31.3	6.314
19 37.23	1.9168	12 33 40.1	9.458	20	14 54 34.39	2.0511	18 55 47.7	6.232
21 32.30	1.9188	12 43 6.0	9.405	21	14 56 37.56	2.0545	19 1 59.1	6.149
23 27.49	1.9208	12 52 28.7	9.351	22	14 58 40.93	2.0578	19 8 5.6	6.068
25 22.80	1.9229	13 1 48.1	9.297	23	15 0 44.50	2.0612	19 14 7.2	5.984
27 18.24	1.9250	-13 11 4.3	-9.242	24	15 2 48.27	2.0646	-19 20 3.7	-5.900

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JANUARY 25.					JANUARY 27.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	15 2 48.27	2.0646	-19 20 3.7	-5.900	0	16 45 46.94	2.2201	-22 14 46.6	-1.1
1	15 4 52.25	2.0681	19 25 55.2	5.815	1	16 48 0.23	2.2228	22 15 52.8	1.0
2	15 6 56.44	2.0715	19 31 41.5	5.729	2	16 50 13.67	2.2253	22 16 52.2	0.9
3	15 9 0.83	2.0749	19 37 22.7	5.644	3	16 52 27.27	2.2279	22 17 44.9	0.8
4	15 11 5.43	2.0783	19 42 58.8	5.558	4	16 54 41.02	2.2304	22 18 30.8	0.7
5	15 13 10.23	2.0818	19 48 29.6	5.470	5	16 56 54.92	2.2329	22 19 9.8	0.6
6	15 15 15.25	2.0853	19 53 55.2	5.383	6	16 59 8.97	2.2353	22 19 42.1	0.5
7	15 17 20.47	2.0888	19 59 15.5	5.294	7	17 1 23.16	2.2378	22 20 7.5	0.4
8	15 19 25.90	2.0922	20 4 30.5	5.205	8	17 3 37.50	2.2402	22 20 26.0	0.3
9	15 21 31.53	2.0956	20 9 40.1	5.115	9	17 5 51.98	2.2424	22 20 37.6	0.2
10	15 23 37.37	2.0991	20 14 44.3	5.024	10	17 8 6.59	2.2447	22 20 42.3	-0.1
11	15 25 43.42	2.1026	20 19 43.0	4.933	11	17 10 21.34	2.2469	22 20 40.1	+0.0
12	15 27 49.68	2.1060	20 24 36.3	4.843	12	17 12 36.22	2.2491	22 20 30.9	0.0
13	15 29 56.14	2.1094	20 29 24.1	4.750	13	17 14 51.23	2.2513	22 20 14.7	0.0
14	15 32 2.81	2.1129	20 34 6.3	4.657	14	17 17 6.37	2.2533	22 19 51.6	0.0
15	15 34 9.69	2.1163	20 38 42.9	4.564	15	17 19 21.63	2.2553	22 19 21.4	0.0
16	15 36 16.77	2.1198	20 43 14.0	4.470	16	17 21 37.00	2.2573	22 18 44.2	0.0
17	15 38 24.06	2.1232	20 47 39.3	4.375	17	17 23 52.50	2.2593	22 17 59.9	0.0
18	15 40 31.55	2.1266	20 51 59.0	4.280	18	17 26 8.11	2.2611	22 17 8.5	0.0
19	15 42 39.25	2.1300	20 56 12.9	4.183	19	17 28 23.83	2.2628	22 16 10.1	1.1
20	15 44 47.15	2.1334	21 0 21.0	4.088	20	17 30 39.65	2.2647	22 15 4.6	1.1
21	15 46 55.26	2.1368	21 4 23.4	3.991	21	17 32 55.59	2.2664	22 13 51.9	1.1
22	15 49 3.57	2.1402	21 8 19.9	3.893	22	17 35 11.62	2.2680	22 12 32.2	1.1
23	15 51 12.08	2.1435	-21 12 10.5	-3.794	23	17 37 27.75	2.2697	-22 11 5.3	+1.1
JANUARY 26.					JANUARY 28.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	15 53 20.79	2.1468	-21 15 55.2	-3.696	0	17 39 43.98	2.2713	-22 9 31.2	+1.1
1	15 55 29.70	2.1502	21 19 34.0	3.597	1	17 42 0.30	2.2728	22 7 50.0	1.1
2	15 57 38.81	2.1535	21 23 6.8	3.496	2	17 44 16.71	2.2742	22 6 1.6	1.1
3	15 59 48.12	2.1568	21 26 33.5	3.395	3	17 46 33.20	2.2756	22 4 6.0	1.1
4	16 1 57.63	2.1602	21 29 54.2	3.295	4	17 48 49.78	2.2770	22 2 3.2	2.1
5	16 4 7.34	2.1633	21 33 8.9	3.193	5	17 51 6.44	2.2783	21 59 53.3	2.1
6	16 6 17.23	2.1666	21 36 17.3	3.090	6	17 53 23.17	2.2795	21 57 36.1	2.1
7	16 8 27.33	2.1698	21 39 19.7	2.988	7	17 55 39.98	2.2807	21 55 11.7	2.1
8	16 10 37.61	2.1730	21 42 15.8	2.884	8	17 57 56.85	2.2818	21 52 40.1	2.1
9	16 12 48.09	2.1762	21 45 5.8	2.781	9	18 0 13.79	2.2828	21 50 1.3	2.1
10	16 14 58.75	2.1793	21 47 49.5	2.675	10	18 2 30.79	2.2838	21 47 15.3	2.1
11	16 17 9.60	2.1824	21 50 26.8	2.570	11	18 4 47.85	2.2848	21 44 22.1	2.1
12	16 19 20.64	2.1855	21 52 57.9	2.465	12	18 7 4.97	2.2858	21 41 21.6	3.1
13	16 21 31.86	2.1886	21 55 22.6	2.359	13	18 9 22.14	2.2867	21 38 13.9	3.1
14	16 23 43.27	2.1917	21 57 41.0	2.253	14	18 11 39.37	2.2875	21 34 58.9	3.1
15	16 25 54.86	2.1946	21 59 52.9	2.145	15	18 13 56.64	2.2882	21 31 36.8	3.1
16	16 28 6.62	2.1975	22 1 58.4	2.038	16	18 16 13.95	2.2888	21 28 7.4	3.1
17	16 30 18.56	2.2005	22 3 57.4	1.929	17	18 18 31.30	2.2895	21 24 30.8	3.1
18	16 32 30.68	2.2034	22 5 49.9	1.820	18	18 20 48.69	2.2902	21 20 47.0	3.1
19	16 34 42.97	2.2063	22 7 35.8	1.711	19	18 23 6.12	2.2907	21 16 55.9	3.1
20	16 36 55.43	2.2091	22 9 15.2	1.602	20	18 25 23.57	2.2911	21 12 57.7	4.1
21	16 39 8.06	2.2119	22 10 48.0	1.492	21	18 27 41.05	2.2916	21 8 52.3	4.1
22	16 41 20.86	2.2147	22 12 14.2	1.381	22	18 29 58.56	2.2920	21 4 39.6	4.1
23	16 43 33.82	2.2173	22 13 33.7	1.270	23	18 32 16.09	2.2923	21 0 19.8	4.1
24	16 45 46.94	2.2201	-22 14 46.6	-1.159	24	18 34 33.63	2.2925	-20 55 52.8	+4.1

MOON, 1919.

33

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JANUARY 29.					JANUARY 31.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 34 33.63	2.2925	-20 55 52.8	+4.510	0	20 24 4.39	2.2575	-15 8 41.2	+ 9.743
1	18 36 51.19	2.2928	20 51 18.6	4.629	1	20 26 19.80	2.2562	14 58 53.9	9.834
2	18 39 8.76	2.2929	20 46 37.3	4.748	2	20 28 35.13	2.2548	14 49 1.1	9.926
3	18 41 26.34	2.2930	20 41 48.8	4.868	3	20 30 50.38	2.2535	14 39 2.8	10.017
4	18 43 43.92	2.2931	20 36 53.2	4.986	4	20 33 5.55	2.2521	14 28 59.1	10.106
5	18 46 1.51	2.2932	20 31 50.5	5.104	5	20 35 20.63	2.2507	14 18 50.1	10.195
6	18 48 19.10	2.2931	20 26 40.7	5.223	6	20 37 35.63	2.2493	14 8 35.7	10.283
7	18 50 36.68	2.2930	20 21 23.8	5.341	7	20 39 50.55	2.2479	13 58 16.2	10.368
8	18 52 54.26	2.2928	20 15 59.8	5.458	8	20 42 5.38	2.2465	13 47 51.5	10.455
9	18 55 11.82	2.2927	20 10 28.8	5.575	9	20 44 20.13	2.2451	13 37 21.6	10.540
10	18 57 29.38	2.2925	20 4 50.8	5.693	10	20 46 34.79	2.2438	13 26 46.7	10.623
11	18 59 46.92	2.2922	19 59 5.7	5.809	11	20 48 49.38	2.2424	13 16 6.8	10.706
12	19 2 4.44	2.2918	19 53 13.7	5.925	12	20 51 3.88	2.2410	13 5 22.0	10.788
13	19 4 21.94	2.2915	19 47 14.7	6.041	13	20 53 18.30	2.2397	12 54 32.3	10.868
14	19 6 39.42	2.2911	19 41 8.8	6.157	14	20 55 32.64	2.2383	12 43 37.8	10.948
15	19 8 56.87	2.2907	19 34 55.9	6.272	15	20 57 46.89	2.2368	12 32 38.6	11.026
16	19 11 14.30	2.2902	19 28 36.2	6.386	16	21 0 1.06	2.2356	12 21 34.7	11.104
17	19 13 31.69	2.2896	19 22 9.6	6.501	17	21 2 15.16	2.2343	12 10 26.1	11.181
18	19 15 49.05	2.2891	19 15 36.1	6.615	18	21 4 29.17	2.2328	11 59 13.0	11.255
19	19 18 6.38	2.2884	19 8 55.8	6.728	19	21 6 43.10	2.2315	11 47 55.5	11.329
20	19 20 23.66	2.2878	19 2 8.8	6.840	20	21 8 56.95	2.2302	11 36 33.5	11.403
21	19 22 40.91	2.2871	18 55 15.0	6.953	21	21 11 10.72	2.2289	11 25 7.1	11.476
22	19 24 58.11	2.2863	18 48 14.4	7.065	22	21 13 24.42	2.2277	11 13 36.4	11.547
23	19 27 15.27	2.2856	-18 41 7.2	+7.176	23	21 15 38.04	2.2263	-11 2 1.5	+11.616
JANUARY 30.					FEBRUARY 1.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 29 32.38	2.2848	-18 33 53.3	+7.287	0	21 17 51.58	2.2251	-10 50 22.5	+11.684
1	19 31 49.44	2.2839	18 26 32.8	7.397	1	21 20 5.05	2.2238	10 38 39.4	11.752
2	19 34 6.45	2.2831	18 19 5.7	7.507	2	21 22 18.44	2.2227	10 26 52.3	11.818
3	19 36 23.41	2.2822	18 11 32.0	7.616	3	21 24 31.77	2.2215	10 15 1.2	11.883
4	19 38 40.31	2.2813	18 3 51.8	7.723	4	21 26 45.02	2.2203	10 3 6.3	11.948
5	19 40 57.16	2.2803	17 56 5.2	7.832	5	21 28 58.20	2.2191	9 51 7.5	12.011
6	19 43 13.94	2.2793	17 48 12.0	7.939	6	21 31 11.31	2.2179	9 39 5.0	12.072
7	19 45 30.67	2.2783	17 40 12.5	8.045	7	21 33 24.35	2.2168	9 26 58.9	12.132
8	19 47 47.33	2.2772	17 32 6.6	8.152	8	21 35 37.33	2.2158	9 14 49.2	12.192
9	19 50 3.93	2.2762	17 23 54.3	8.257	9	21 37 50.24	2.2147	9 2 35.9	12.250
10	19 52 20.47	2.2751	17 15 35.8	8.361	10	21 40 3.09	2.2136	8 50 19.2	12.306
11	19 54 36.94	2.2739	17 7 11.0	8.465	11	21 42 15.87	2.2126	8 37 59.2	12.362
12	19 56 53.34	2.2728	16 58 40.0	8.568	12	21 44 28.60	2.2117	8 25 35.8	12.417
13	19 59 9.67	2.2716	16 50 2.9	8.670	13	21 46 41.27	2.2107	8 13 9.2	12.469
14	20 1 25.93	2.2704	16 41 19.6	8.772	14	21 48 53.88	2.2097	8 0 39.5	12.521
15	20 3 42.12	2.2693	16 32 30.3	8.873	15	21 51 6.43	2.2088	7 48 6.7	12.572
16	20 5 58.24	2.2680	16 23 34.9	8.973	16	21 53 18.93	2.2079	7 35 30.9	12.621
17	20 8 14.28	2.2668	16 14 33.6	9.071	17	21 55 31.38	2.2070	7 22 52.2	12.669
18	20 10 30.25	2.2655	16 5 26.4	9.170	18	21 57 43.77	2.2062	7 10 10.6	12.716
19	20 12 46.14	2.2642	15 56 13.2	9.268	19	21 59 56.12	2.2054	6 57 26.3	12.762
20	20 15 1.95	2.2628	15 46 54.3	9.364	20	22 2 8.42	2.2047	6 44 39.2	12.806
21	20 17 17.68	2.2615	15 37 29.5	9.460	21	22 4 20.68	2.2040	6 31 49.6	12.848
22	20 19 33.33	2.2602	15 27 59.1	9.554	22	22 6 32.90	2.2033	6 18 57.4	12.891
23	20 21 48.90	2.2588	15 18 23.0	9.649	23	22 8 45.07	2.2026	6 6 2.7	12.932
24	20 24 4.39	2.2575	-15 8 41.2	+9.743	24	22 10 57.21	2.2020	- 5 53 5.6	+12.971

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
FEBRUARY 2.					FEBRUARY 4.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	22 10 57.21	2.2020	-5 53 5.6	+12.971	0	23 56 43.74	2.2228	+ 4 49 8.3	+13.265
1	22 13 9.31	2.2014	5 40 6.2	13.008	1	23 58 57.16	2.2243	5 2 23.4	13.238
2	22 15 21.38	2.2009	5 27 4.7	13.044	2	0 1 10.66	2.2259	5 15 36.9	13.209
3	22 17 33.42	2.2003	5 14 0.9	13.080	3	0 3 24.27	2.2277	5 28 48.5	13.178
4	22 19 45.42	2.1998	5 0 55.1	13.113	4	0 5 37.98	2.2293	5 41 58.3	13.148
5	22 21 57.40	2.1995	4 47 47.3	13.147	5	0 7 51.79	2.2311	5 55 6.2	13.114
6	22 24 9.36	2.1991	4 34 37.5	13.178	6	0 10 5.71	2.2329	6 8 12.0	13.080
7	22 26 21.29	2.1987	4 21 26.0	13.207	7	0 12 19.74	2.2348	6 21 15.8	13.045
8	22 28 33.20	2.1984	4 8 12.7	13.237	8	0 14 33.89	2.2367	6 34 17.4	13.008
9	22 30 45.10	2.1982	3 54 57.6	13.264	9	0 16 48.14	2.2386	6 47 16.7	12.968
10	22 32 56.98	2.1979	3 41 41.0	13.289	10	0 19 2.52	2.2406	7 0 13.6	12.929
11	22 35 8.85	2.1978	3 28 22.9	13.314	11	0 21 17.01	2.2426	7 13 8.2	12.888
12	22 37 20.71	2.1976	3 15 3.3	13.338	12	0 23 31.63	2.2447	7 26 0.2	12.845
13	22 39 32.56	2.1975	3 1 42.4	13.359	13	0 25 46.37	2.2468	7 38 49.6	12.802
14	22 41 44.41	2.1974	2 48 20.2	13.380	14	0 28 1.24	2.2488	7 51 36.4	12.757
15	22 43 56.25	2.1973	2 34 56.8	13.399	15	0 30 16.23	2.2511	8 4 20.4	12.709
16	22 46 8.09	2.1974	2 21 32.3	13.417	16	0 32 31.37	2.2533	8 17 1.5	12.662
17	22 48 19.94	2.1975	2 8 6.8	13.433	17	0 34 46.63	2.2555	8 29 39.8	12.613
18	22 50 31.79	2.1976	1 54 40.4	13.448	18	0 37 2.03	2.2579	8 42 15.0	12.562
19	22 52 43.65	2.1978	1 41 13.0	13.463	19	0 39 17.58	2.2603	8 54 47.2	12.510
20	22 54 55.52	2.1980	1 27 44.9	13.475	20	0 41 33.26	2.2626	9 7 16.2	12.456
21	22 57 7.41	2.1983	1 14 16.0	13.486	21	0 43 49.09	2.2650	9 19 41.9	12.402
22	22 59 19.31	2.1985	1 0 46.6	13.495	22	0 46 5.06	2.2675	9 32 4.4	12.346
23	23 1 31.23	2.1988	-0 47 16.6	+13.504	23	0 48 21.19	2.2700	+ 9 44 23.4	+12.288
FEBRUARY 3.					FEBRUARY 5.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	23 3 43.17	2.1993	-0 33 46.1	+13.511	0	0 50 37.46	2.2725	+ 9 56 39.0	+12.230
1	23 5 55.14	2.1997	0 20 15.3	13.517	1	0 52 53.89	2.2751	10 8 51.0	12.169
2	23 8 7.13	2.2002	-0 6 44.1	13.521	2	0 55 10.47	2.2776	10 20 59.3	12.108
3	23 10 19.16	2.2008	+0 6 47.2	13.523	3	0 57 27.20	2.2803	10 33 4.0	12.047
4	23 12 31.22	2.2013	0 20 18.7	13.526	4	0 59 44.10	2.2829	10 45 4.9	11.983
5	23 14 43.31	2.2018	0 33 50.3	13.525	5	1 2 1.15	2.2856	10 57 1.9	11.917
6	23 16 55.44	2.2026	0 47 21.7	13.523	6	1 4 18.37	2.2884	11 8 54.9	11.850
7	23 19 7.62	2.2033	1 0 53.1	13.522	7	1 6 35.76	2.2911	11 20 43.9	11.783
8	23 21 19.84	2.2041	1 14 24.3	13.518	8	1 8 53.30	2.2938	11 32 28.8	11.713
9	23 23 32.11	2.2049	1 27 55.2	13.512	9	1 11 11.02	2.2968	11 44 9.5	11.643
10	23 25 44.43	2.2057	1 41 25.7	13.505	10	1 13 28.91	2.2995	11 55 46.0	11.572
11	23 27 56.79	2.2066	1 54 55.8	13.497	11	1 15 46.96	2.3023	12 7 18.1	11.498
12	23 30 9.22	2.2076	2 8 25.3	13.487	12	1 18 5.19	2.3053	12 18 45.8	11.424
13	23 32 21.70	2.2086	2 21 54.2	13.477	13	1 20 23.59	2.3082	12 30 9.0	11.348
14	23 34 34.25	2.2097	2 35 22.5	13.464	14	1 22 42.17	2.3111	12 41 27.6	11.272
15	23 36 46.86	2.2108	2 48 49.9	13.450	15	1 25 0.92	2.3140	12 52 41.6	11.194
16	23 38 59.54	2.2119	3 2 16.5	13.436	16	1 27 19.85	2.3170	13 3 50.9	11.115
17	23 41 12.29	2.2131	3 15 42.2	13.419	17	1 29 38.96	2.3199	13 14 55.4	11.034
18	23 43 25.11	2.2143	3 29 6.8	13.401	18	1 31 58.24	2.3229	13 25 55.0	10.952
19	23 45 38.01	2.2157	3 42 30.3	13.382	19	1 34 17.71	2.3260	13 36 49.6	10.868
20	23 47 50.99	2.2170	3 55 52.6	13.361	20	1 36 37.36	2.3290	13 47 39.2	10.785
21	23 50 4.05	2.2183	4 9 13.6	13.339	21	1 38 57.19	2.3320	13 58 23.8	10.699
22	23 52 17.19	2.2197	4 22 33.3	13.317	22	1 41 17.20	2.3351	14 9 3.1	10.613
23	23 54 30.42	2.2213	4 35 51.6	13.292	23	1 43 37.40	2.3382	14 19 37.3	10.525
24	23 56 43.74	2.2228	+4 49 8.3	+13.265	24	1 45 57.78	2.3413	+14 30 6.1	+10.435

GREENWICH MEAN TIME.

Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
FEBRUARY 6.					FEBRUARY 8.			
h m s	s	° ' "	"		h m s	s	° ' "	"
1 45 57.78	2.3413	+14 30 6.1	+10.435	0	3 41 43.42	2.4714	+20 47 37.2	+4.933
1 48 18.35	2.3444	14 40 29.5	10.345	1	3 44 11.76	2.4731	20 52 29.1	4.798
1 50 39.10	2.3474	14 50 47.5	10.253	2	3 46 40.19	2.4747	20 57 12.9	4.663
1 53 0.04	2.3505	15 0 59.9	10.161	3	3 49 8.72	2.4763	21 1 48.6	4.527
1 55 21.16	2.3536	15 11 6.8	10.068	4	3 51 37.34	2.4778	21 6 16.1	4.390
1 57 42.47	2.3568	15 21 8.0	9.972	5	3 54 6.06	2.4793	21 10 35.4	4.253
2 0 3.97	2.3598	15 31 3.4	9.875	6	3 56 34.85	2.4805	21 14 46.5	4.116
2 2 25.65	2.3629	15 40 53.0	9.778	7	3 59 3.72	2.4818	21 18 49.3	3.978
2 4 47.52	2.3661	15 50 36.7	9.679	8	4 1 32.67	2.4831	21 22 43.9	3.840
2 7 9.58	2.3692	16 0 14.5	9.580	9	4 4 1.69	2.4842	21 26 30.1	3.701
2 9 31.82	2.3723	16 9 46.3	9.479	10	4 6 30.77	2.4853	21 30 8.0	3.563
2 11 54.25	2.3753	16 19 12.0	9.378	11	4 8 59.92	2.4863	21 33 37.6	3.423
2 14 16.86	2.3784	16 28 31.6	9.275	12	4 11 29.12	2.4871	21 36 58.8	3.283
2 16 39.66	2.3815	16 37 45.0	9.170	13	4 13 58.37	2.4880	21 40 11.6	3.143
2 19 2.64	2.3846	16 46 52.0	9.065	14	4 16 27.68	2.4888	21 43 15.9	3.003
2 21 25.81	2.3877	16 55 52.8	8.959	15	4 18 57.02	2.4893	21 46 11.9	2.863
2 23 49.16	2.3908	17 4 47.1	8.852	16	4 21 26.40	2.4899	21 48 59.4	2.721
2 26 12.70	2.3938	17 13 35.0	8.743	17	4 23 55.81	2.4904	21 51 38.4	2.580
2 28 36.41	2.3967	17 22 16.3	8.633	18	4 26 25.25	2.4909	21 54 9.0	2.438
2 31 0.30	2.3998	17 30 51.0	8.523	19	4 28 54.72	2.4913	21 56 31.0	2.297
2 33 24.38	2.4028	17 39 19.1	8.412	20	4 31 24.20	2.4914	21 58 44.6	2.156
2 35 48.63	2.4056	17 47 40.4	8.299	21	4 33 53.69	2.4917	22 0 49.7	2.014
2 38 13.05	2.4086	17 55 55.0	8.187	22	4 36 23.20	2.4918	22 2 46.3	1.873
2 40 37.66	2.4115	+18 4 2.8	+8.072	23	4 38 52.70	2.4917	+22 4 34.4	+1.730
FEBRUARY 7.					FEBRUARY 9.			
2 43 2.43	2.4143	+18 12 3.6	+7.956	0	4 41 22.20	2.4916	+22 6 13.9	+1.588
2 45 27.38	2.4173	18 19 57.5	7.840	1	4 43 51.69	2.4914	22 7 44.9	1.446
2 47 52.50	2.4201	18 27 44.4	7.723	2	4 46 21.17	2.4912	22 9 7.4	1.303
2 50 17.79	2.4228	18 35 24.2	7.603	3	4 48 50.63	2.4908	22 10 21.3	1.161
2 52 43.24	2.4255	18 42 56.8	7.484	4	4 51 20.07	2.4904	22 11 26.7	1.019
2 55 8.85	2.4283	18 50 22.3	7.365	5	4 53 49.48	2.4898	22 12 23.6	0.877
2 57 34.63	2.4310	18 57 40.6	7.244	6	4 56 18.85	2.4892	22 13 11.9	0.734
3 0 0.57	2.4337	19 4 51.6	7.122	7	4 58 48.18	2.4886	22 13 51.7	0.593
3 2 26.67	2.4363	19 11 55.2	6.999	8	5 1 17.48	2.4878	22 14 23.0	0.451
3 4 52.92	2.4388	19 18 51.5	6.877	9	5 3 46.71	2.4868	22 14 45.8	0.309
3 7 19.32	2.4413	19 25 40.4	6.752	10	5 6 15.90	2.4859	22 15 0.1	0.168
3 9 45.88	2.4438	19 32 21.7	6.626	11	5 8 45.02	2.4848	22 15 5.9	+0.026
3 12 12.58	2.4463	19 38 55.5	6.500	12	5 11 14.08	2.4838	22 15 3.2	-0.116
3 14 39.43	2.4487	19 45 21.7	6.373	13	5 13 43.07	2.4825	22 14 52.0	0.257
3 17 6.42	2.4510	19 51 40.3	6.246	14	5 16 11.98	2.4811	22 14 32.4	0.398
3 19 33.55	2.4533	19 57 51.2	6.118	15	5 18 40.80	2.4798	22 14 4.3	0.538
3 22 0.81	2.4555	20 3 54.4	5.989	16	5 21 9.55	2.4783	22 13 27.8	0.678
3 24 28.21	2.4578	20 9 49.9	5.859	17	5 23 38.19	2.4767	22 12 42.9	0.818
3 26 55.74	2.4598	20 15 37.5	5.728	18	5 26 6.75	2.4750	22 11 49.6	0.958
3 29 23.39	2.4619	20 21 17.3	5.598	19	5 28 35.19	2.4733	22 10 47.9	1.098
3 31 51.17	2.4639	20 26 49.2	5.466	20	5 31 3.54	2.4715	22 9 37.8	1.237
3 34 19.06	2.4658	20 32 13.2	5.333	21	5 33 31.77	2.4695	22 8 19.5	1.375
3 36 47.07	2.4678	20 37 29.2	5.200	22	5 35 59.88	2.4675	22 6 52.8	1.514
3 39 15.19	2.4696	20 42 37.2	5.067	23	5 38 27.87	2.4654	22 5 17.8	1.652
3 41 43.42	2.4714	+20 47 37.2	+4.933	24	5 40 55.73	2.4633	+22 3 34.6	-1.794

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
FEBRUARY 10.					FEBRUARY 12.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	5 40 55.73	2.4633	+22 3 34.6	-1.789	0	7 35 22.24	2.2853	+18 12 17.4	-7.518
1	5 43 23.46	2.4610	22 1 43.1	1.926	1	7 37 39.22	2.2806	18 4 43.4	7.613
2	5 45 51.05	2.4587	21 59 43.5	2.063	2	7 39 55.91	2.2758	17 57 3.8	7.708
3	5 48 18.50	2.4563	21 57 35.6	2.198	3	7 42 12.32	2.2713	17 49 18.4	7.803
4	5 50 45.80	2.4538	21 55 19.7	2.333	4	7 44 28.46	2.2665	17 41 27.5	7.895
5	5 53 12.95	2.4513	21 52 55.6	2.469	5	7 46 44.30	2.2618	17 33 31.0	7.987
6	5 55 39.95	2.4486	21 50 23.4	2.603	6	7 48 59.87	2.2571	17 25 29.1	8.077
7	5 58 6.78	2.4458	21 47 43.3	2.736	7	7 51 15.15	2.2523	17 17 21.8	8.167
8	6 0 33.45	2.4431	21 44 55.1	2.870	8	7 53 30.15	2.2476	17 9 9.1	8.255
9	6 2 59.95	2.4402	21 41 58.9	3.002	9	7 55 44.86	2.2428	17 0 51.2	8.341
10	6 5 26.27	2.4373	21 38 54.9	3.133	10	7 57 59.29	2.2382	16 52 28.2	8.427
11	6 7 52.42	2.4343	21 35 42.9	3.265	11	8 0 13.44	2.2334	16 44 0.0	8.513
12	6 10 18.38	2.4312	21 32 23.1	3.395	12	8 2 27.30	2.2286	16 35 26.7	8.596
13	6 12 44.16	2.4280	21 28 55.5	3.524	13	8 4 40.87	2.2238	16 26 48.5	8.678
14	6 15 9.74	2.4248	21 25 20.2	3.653	14	8 6 54.16	2.2192	16 18 5.3	8.759
15	6 17 35.13	2.4215	21 21 37.1	3.783	15	8 9 7.17	2.2144	16 9 17.4	8.839
16	6 20 0.32	2.4182	21 17 46.3	3.910	16	8 11 19.89	2.2097	16 0 24.6	8.919
17	6 22 25.31	2.4148	21 13 47.9	4.036	17	8 13 32.33	2.2049	15 51 27.1	8.997
18	6 24 50.09	2.4113	21 9 42.0	4.162	18	8 15 44.48	2.2002	15 42 25.0	9.073
19	6 27 14.66	2.4078	21 5 28.5	4.288	19	8 17 56.35	2.1955	15 33 18.4	9.148
20	6 29 39.02	2.4042	21 1 7.5	4.413	20	8 20 7.94	2.1908	15 24 7.2	9.223
21	6 32 3.16	2.4005	20 56 39.0	4.536	21	8 22 19.25	2.1861	15 14 51.6	9.297
22	6 34 27.08	2.3968	20 52 3.2	4.658	22	8 24 30.27	2.1813	15 5 31.6	9.368
23	6 36 50.78	2.3931	+20 47 20.0	-4.781	23	8 26 41.01	2.1768	+14 56 7.4	-9.439
FEBRUARY 11.					FEBRUARY 13.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	6 39 14.25	2.3893	+20 42 29.5	-4.902	0	8 28 51.48	2.1722	+14 46 38.9	-9.509
1	6 41 37.49	2.3853	20 37 31.8	5.022	1	8 31 1.67	2.1675	14 37 6.3	9.578
2	6 44 0.49	2.3814	20 32 26.9	5.142	2	8 33 11.58	2.1629	14 27 29.6	9.646
3	6 46 23.26	2.3774	20 27 14.8	5.260	3	8 35 21.22	2.1583	14 17 48.8	9.712
4	6 48 45.78	2.3734	20 21 55.7	5.377	4	8 37 30.57	2.1537	14 8 4.2	9.777
5	6 51 8.07	2.3694	20 16 29.6	5.493	5	8 39 39.66	2.1492	13 58 15.6	9.842
6	6 53 30.11	2.3653	20 10 56.5	5.609	6	8 41 48.47	2.1446	13 48 23.2	9.904
7	6 55 51.90	2.3611	20 5 16.5	5.724	7	8 43 57.01	2.1401	13 38 27.1	9.966
8	6 58 13.44	2.3568	19 59 29.6	5.838	8	8 46 5.28	2.1356	13 28 27.3	10.028
9	7 0 34.72	2.3526	19 53 35.9	5.951	9	8 48 13.28	2.1312	13 18 23.8	10.087
10	7 2 55.75	2.3484	19 47 35.5	6.062	10	8 50 21.02	2.1268	13 8 16.9	10.145
11	7 5 16.53	2.3441	19 41 28.5	6.173	11	8 52 28.49	2.1223	12 58 6.4	10.203
12	7 7 37.04	2.3397	19 35 14.8	6.283	12	8 54 35.69	2.1178	12 47 52.5	10.259
13	7 9 57.29	2.3353	19 28 54.6	6.391	13	8 56 42.63	2.1135	12 37 35.3	10.313
14	7 12 17.28	2.3309	19 22 27.9	6.499	14	8 58 49.31	2.1093	12 27 14.9	10.368
15	7 14 37.00	2.3264	19 15 54.7	6.605	15	9 0 55.74	2.1049	12 16 51.2	10.421
16	7 16 56.45	2.3219	19 9 15.3	6.711	16	9 3 1.90	2.1006	12 6 24.4	10.473
17	7 19 15.63	2.3174	19 2 29.4	6.816	17	9 5 7.81	2.0963	11 55 54.6	10.523
18	7 21 34.54	2.3129	18 55 37.4	6.919	18	9 7 13.46	2.0922	11 45 21.7	10.573
19	7 23 53.18	2.3084	18 48 39.1	7.022	19	9 9 18.87	2.0880	11 34 45.8	10.621
20	7 26 11.55	2.3038	18 41 34.8	7.123	20	9 11 24.02	2.0838	11 24 7.2	10.668
21	7 28 29.64	2.2992	18 34 24.4	7.223	21	9 13 28.92	2.0797	11 13 25.6	10.715
22	7 30 47.45	2.2945	18 27 8.0	7.323	22	9 15 33.58	2.0757	11 2 41.4	10.760
23	7 33 4.98	2.2899	18 19 45.6	7.422	23	9 17 38.00	2.0716	10 51 54.4	10.804
24	7 35 22.24	2.2853	+18 12 17.4	-7.518	24	9 19 42.17	2.0676	+10 41 4.9	-10.847

37

Star	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
FEBRUARY 14.								
12.17	2.0676	+10 41 4.9	-10.847	0	10 55 7.16	1.9257	+1 30 11.5	-11.742
16.11	2.0636	10 30 12.8	10.888	1	10 57 2.65	1.9239	1 18 27.1	11.738
19.80	2.0597	10 19 18.3	10.929	2	10 58 58.03	1.9222	1 6 42.9	11.734
23.27	2.0558	10 8 21.3	10.970	3	11 0 53.31	1.9205	0 54 59.0	11.729
26.50	2.0519	9 57 21.9	11.008	4	11 2 48.49	1.9188	0 43 15.4	11.723
29.50	2.0481	9 46 20.3	11.045	5	11 4 43.57	1.9172	0 31 32.2	11.716
2.27	2.0443	9 35 16.5	11.083	6	11 6 38.55	1.9157	0 19 49.5	11.708
4.81	2.0406	9 24 10.4	11.118	7	11 8 33.45	1.9143	+0 8 7.2	11.701
7.14	2.0369	9 13 2.3	11.153	8	11 10 28.26	1.9128	-0 3 34.6	11.692
9.24	2.0332	9 1 52.1	11.187	9	11 12 22.98	1.9113	0 15 15.8	11.682
11.12	2.0296	8 50 39.9	11.219	10	11 14 17.62	1.9100	0 26 56.4	11.671
12.79	2.0260	8 39 25.8	11.250	11	11 16 12.18	1.9087	0 38 36.3	11.659
14.24	2.0224	8 28 9.9	11.280	12	11 18 6.66	1.9074	0 50 15.5	11.648
15.48	2.0190	8 16 52.2	11.310	13	11 20 1.07	1.9063	1 1 54.0	11.634
16.52	2.0155	8 5 32.7	11.338	14	11 21 55.41	1.9051	1 13 31.6	11.620
17.34	2.0121	7 54 11.6	11.365	15	11 23 49.68	1.9040	1 25 8.4	11.607
17.97	2.0088	7 42 48.9	11.392	16	11 25 43.89	1.9030	1 36 44.4	11.592
18.39	2.0053	7 31 24.6	11.418	17	11 27 38.04	1.9020	1 48 19.4	11.575
18.61	2.0021	7 19 58.8	11.442	18	11 29 32.13	1.9010	1 59 53.4	11.558
18.64	1.9989	7 8 31.6	11.465	19	11 31 26.16	1.9001	2 11 26.4	11.541
18.48	1.9958	6 57 3.0	11.488	20	11 33 20.14	1.8993	2 22 58.3	11.523
18.13	1.9926	6 45 33.1	11.509	21	11 35 14.07	1.8984	2 34 29.1	11.504
17.59	1.9895	6 34 1.9	11.530	22	11 37 7.95	1.8977	2 45 58.8	11.485
16.87	1.9864	+ 6 22 29.5	-11.549	23	11 39 1.79	1.8970	-2 57 27.3	-11.464
FEBRUARY 15.								
15.96	1.9834	+ 6 10 56.0	-11.568	0	11 40 55.59	1.8963	-3 8 54.5	-11.443
14.88	1.9805	5 59 21.4	11.586	1	11 42 49.35	1.8958	3 20 20.5	11.422
13.62	1.9775	5 47 45.7	11.603	2	11 44 43.08	1.8952	3 31 45.1	11.398
12.18	1.9747	5 36 9.1	11.618	3	11 46 36.77	1.8947	3 43 8.3	11.376
10.58	1.9719	5 24 31.6	11.633	4	11 48 30.44	1.8943	3 54 30.2	11.352
8.81	1.9691	5 12 53.2	11.647	5	11 50 24.08	1.8938	4 5 50.5	11.328
6.87	1.9664	5 1 14.0	11.660	6	11 52 17.69	1.8934	4 17 9.5	11.303
4.78	1.9638	4 49 34.0	11.673	7	11 54 11.29	1.8931	4 28 26.9	11.277
2.52	1.9611	4 37 53.3	11.683	8	11 56 4.86	1.8928	4 39 42.7	11.249
0.11	1.9585	4 26 12.0	11.693	9	11 57 58.42	1.8926	4 50 56.8	11.223
57.54	1.9560	4 14 30.1	11.703	10	11 59 51.97	1.8924	5 2 9.4	11.195
54.83	1.9535	4 2 47.7	11.711	11	12 1 45.51	1.8923	5 13 20.2	11.166

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
FEBRUARY 18.					FEBRUARY 20.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	12 26 21.95	1.8948	- 7 35 49.1	-10.735	0	13 58 38.36	1.9643	-15 16 53.6	-8.250
1	12 28 15.65	1.8953	7 46 32.1	10.698	1	14 0 36.29	1.9666	15 25 6.6	8.184
2	12 30 9.39	1.8959	7 57 12.8	10.659	2	14 2 34.35	1.9688	15 33 15.7	8.118
3	12 32 3.16	1.8965	8 7 51.2	10.620	3	14 4 32.55	1.9713	15 41 20.7	8.050
4	12 33 56.97	1.8971	8 18 27.2	10.580	4	14 6 30.90	1.9737	15 49 21.7	7.983
5	12 35 50.81	1.8978	8 29 0.8	10.540	5	14 8 29.39	1.9760	15 57 18.7	7.915
6	12 37 44.70	1.8986	8 39 32.0	10.500	6	14 10 28.02	1.9784	16 5 11.5	7.845
7	12 39 38.64	1.8993	8 50 0.8	10.458	7	14 12 26.80	1.9808	16 13 0.1	7.776
8	12 41 32.62	1.9001	9 0 27.0	10.416	8	14 14 25.72	1.9833	16 20 44.6	7.707
9	12 43 26.65	1.9009	9 10 50.7	10.374	9	14 16 24.79	1.9858	16 28 24.9	7.636
10	12 45 20.73	1.9018	9 21 11.9	10.331	10	14 18 24.02	1.9883	16 36 0.9	7.564
11	12 47 14.87	1.9028	9 31 30.4	10.286	11	14 20 23.39	1.9908	16 43 32.6	7.493
12	12 49 9.07	1.9038	9 41 46.2	10.242	12	14 22 22.92	1.9934	16 51 0.0	7.421
13	12 51 3.33	1.9048	9 51 59.4	10.198	13	14 24 22.60	1.9960	16 58 23.1	7.348
14	12 52 57.65	1.9058	10 2 9.9	10.152	14	14 26 22.44	1.9986	17 5 41.8	7.274
15	12 54 52.03	1.9070	10 12 17.6	10.105	15	14 28 22.43	2.0012	17 12 56.0	7.200
16	12 56 46.49	1.9082	10 22 22.5	10.058	16	14 30 22.58	2.0038	17 20 5.8	7.127
17	12 58 41.01	1.9093	10 32 24.6	10.011	17	14 32 22.89	2.0065	17 27 11.2	7.052
18	13 0 35.61	1.9106	10 42 23.8	9.963	18	14 34 23.36	2.0092	17 34 12.0	6.975
19	13 2 30.28	1.9118	10 52 20.1	9.914	19	14 36 23.99	2.0118	17 41 8.2	6.899
20	13 4 25.03	1.9132	11 2 13.5	9.865	20	14 38 24.78	2.0146	17 47 59.9	6.823
21	13 6 19.86	1.9145	11 12 3.9	9.815	21	14 40 25.74	2.0173	17 54 47.0	6.746
22	13 8 14.77	1.9158	11 21 51.3	9.765	22	14 42 26.86	2.0200	18 1 29.4	6.669
23	13 10 9.76	1.9173	-11 31 35.7	-9.714	23	14 44 28.14	2.0228	-18 8 7.1	-6.589
FEBRUARY 19.					FEBRUARY 21.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	13 12 4.84	1.9188	-11 41 17.0	-9.663	0	14 46 29.59	2.0255	-18 14 40.1	-6.511
1	13 14 0.01	1.9203	11 50 55.2	9.610	1	14 48 31.20	2.0283	18 21 8.4	6.431
2	13 15 55.27	1.9218	12 0 30.2	9.557	2	14 50 32.98	2.0311	18 27 31.8	6.351
3	13 17 50.63	1.9234	12 10 2.0	9.503	3	14 52 34.93	2.0339	18 33 50.5	6.271
4	13 19 46.08	1.9250	12 19 30.6	9.450	4	14 54 37.05	2.0368	18 40 4.3	6.189
5	13 21 41.63	1.9267	12 28 56.0	9.396	5	14 56 39.34	2.0395	18 46 13.2	6.108
6	13 23 37.28	1.9283	12 38 18.1	9.341	6	14 58 41.79	2.0423	18 52 17.2	6.025
7	13 25 33.03	1.9301	12 47 36.9	9.285	7	15 0 44.42	2.0453	18 58 16.2	5.943
8	13 27 28.89	1.9318	12 56 52.3	9.228	8	15 2 47.22	2.0481	19 4 10.3	5.859
9	13 29 24.85	1.9336	13 6 4.3	9.172	9	15 4 50.19	2.0509	19 9 59.3	5.775
10	13 31 20.92	1.9354	13 15 12.9	9.114	10	15 6 53.33	2.0538	19 15 43.3	5.691
11	13 33 17.10	1.9373	13 24 18.0	9.056	11	15 8 56.64	2.0567	19 21 22.2	5.606
12	13 35 13.39	1.9392	13 33 19.6	8.998	12	15 11 0.13	2.0596	19 26 56.0	5.521
13	13 37 9.80	1.9411	13 42 17.7	8.938	13	15 13 3.79	2.0624	19 32 24.7	5.434
14	13 39 6.32	1.9430	13 51 12.2	8.878	14	15 15 7.62	2.0653	19 37 48.1	5.348
15	13 41 2.96	1.9450	14 0 3.1	8.818	15	15 17 11.63	2.0683	19 43 6.4	5.261
16	13 42 59.72	1.9470	14 8 50.4	8.758	16	15 19 15.81	2.0711	19 48 19.4	5.173
17	13 44 56.60	1.9491	14 17 34.0	8.696	17	15 21 20.16	2.0740	19 53 27.1	5.085
18	13 46 53.61	1.9512	14 26 13.9	8.633	18	15 23 24.69	2.0769	19 58 29.6	4.997
19	13 48 50.74	1.9533	14 34 50.0	8.571	19	15 25 29.39	2.0798	20 3 26.7	4.907
20	13 50 48.00	1.9554	14 43 22.4	8.508	20	15 27 34.27	2.0828	20 8 18.4	4.817
21	13 52 45.39	1.9577	14 51 51.0	8.445	21	15 29 39.32	2.0856	20 13 4.7	4.727
22	13 54 42.92	1.9598	15 0 15.8	8.380	22	15 31 44.54	2.0885	20 17 45.6	4.636
23	13 56 40.57	1.9620	15 8 36.6	8.315	23	15 33 49.94	2.0915	20 22 21.0	4.544
24	13 58 38.36	1.9643	-15 16 53.6	-8.250	24	15 35 55.52	2.0944	-20 26 50.9	-4.453

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
FEBRUARY 22.					FEBRUARY 24.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	15 35 55.52	2.0044	-20 26 50.9	-4.453	0	17 19 32.70	2.2150	-22 5 33.2	+0.503
1	15 38 1.27	2.0973	20 31 15.3	4.360	1	17 21 45.66	2.2169	22 4 59.7	0.615
2	15 40 7.19	2.1001	20 35 34.1	4.267	2	17 23 58.73	2.2187	22 4 19.4	0.728
3	15 42 13.28	2.1029	20 39 47.3	4.173	3	17 26 11.90	2.2204	22 3 32.4	0.840
4	15 44 19.54	2.1058	20 43 54.9	4.080	4	17 28 25.18	2.2223	22 2 38.6	0.953
5	15 46 25.98	2.1088	20 47 56.9	3.985	5	17 30 38.57	2.2240	22 1 38.0	1.067
6	15 48 32.59	2.1116	20 51 53.1	3.890	6	17 32 52.06	2.2257	22 0 30.6	1.181
7	15 50 39.37	2.1144	20 55 43.7	3.795	7	17 35 5.65	2.2273	21 59 16.3	1.294
8	15 52 46.32	2.1173	20 59 28.5	3.698	8	17 37 19.33	2.2289	21 57 55.3	1.408
9	15 54 53.44	2.1201	21 3 7.5	3.602	9	17 39 33.12	2.2305	21 56 27.4	1.523
10	15 57 0.73	2.1228	21 6 40.7	3.505	10	17 41 46.99	2.2320	21 54 52.6	1.637
11	15 59 8.18	2.1257	21 10 8.1	3.408	11	17 44 0.96	2.2335	21 53 11.0	1.751
12	16 1 15.81	2.1285	21 13 29.6	3.309	12	17 46 15.01	2.2349	21 51 22.5	1.866
13	16 3 23.60	2.1313	21 16 45.2	3.211	13	17 48 29.15	2.2364	21 49 27.1	1.981
14	16 5 31.57	2.1341	21 19 54.9	3.113	14	17 50 43.38	2.2378	21 47 24.8	2.096
15	16 7 39.69	2.1368	21 22 58.7	3.013	15	17 52 57.69	2.2392	21 45 15.6	2.211
16	16 9 47.98	2.1395	21 25 56.4	2.913	16	17 55 12.08	2.2404	21 42 59.5	2.327
17	16 11 56.43	2.1423	21 28 48.2	2.813	17	17 57 26.54	2.2417	21 40 36.4	2.442
18	16 14 5.05	2.1450	21 31 33.9	2.712	18	17 59 41.08	2.2430	21 38 6.5	2.557
19	16 16 13.83	2.1477	21 34 13.6	2.611	19	18 1 55.70	2.2442	21 35 29.6	2.673
20	16 18 22.77	2.1503	21 36 47.2	2.508	20	18 4 10.38	2.2453	21 32 45.7	2.789
21	16 20 31.87	2.1529	21 39 14.6	2.406	21	18 6 25.13	2.2464	21 29 54.9	2.904
22	16 22 41.12	2.1556	21 41 35.9	2.304	22	18 8 39.95	2.2476	21 26 57.2	3.020
23	16 24 50.54	2.1583	-21 43 51.1	-2.201	23	18 10 54.84	2.2486	-21 23 52.5	+3.136
FEBRUARY 23.					FEBRUARY 25.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	16 27 0.11	2.1608	-21 46 0.0	-2.097	0	18 13 9.78	2.2495	-21 20 40.9	+3.252
1	16 29 9.84	2.1634	21 48 2.7	1.993	1	18 15 24.78	2.2505	21 17 22.3	3.368
2	16 31 19.72	2.1659	21 49 59.2	1.889	2	18 17 39.84	2.2515	21 13 56.8	3.483
3	16 33 29.75	2.1684	21 51 49.4	1.784	3	18 19 54.96	2.2524	21 10 24.3	3.599
4	16 35 39.93	2.1709	21 53 33.3	1.679	4	18 22 10.13	2.2532	21 6 44.9	3.715
5	16 37 50.26	2.1734	21 55 10.9	1.573	5	18 24 25.34	2.2540	21 2 58.5	3.831
6	16 40 0.74	2.1759	21 56 42.1	1.468	6	18 26 40.61	2.2548	20 59 5.2	3.948
7	16 42 11.37	2.1783	21 58 7.0	1.361	7	18 28 55.92	2.2555	20 55 4.8	4.063
8	16 44 22.14	2.1807	21 59 25.4	1.254	8	18 31 11.27	2.2562	20 50 57.6	4.178
9	16 46 33.05	2.1831	22 0 37.5	1.148	9	18 33 26.66	2.2569	20 46 43.4	4.294
10	16 48 44.11	2.1854	22 1 43.1	1.040	10	18 35 42.10	2.2576	20 42 22.3	4.410
11	16 50 55.30	2.1877	22 2 42.3	0.932	11	18 37 57.57	2.2581	20 37 54.2	4.526
12	16 53 6.63	2.1900	22 3 34.9	0.823	12	18 40 13.07	2.2587	20 33 19.2	4.641
13	16 55 18.10	2.1923	22 4 21.0	0.715	13	18 42 28.61	2.2592	20 28 37.3	4.756
14	16 57 29.70	2.1944	22 5 0.7	0.606	14	18 44 44.17	2.2597	20 23 48.5	4.871
15	16 59 41.43	2.1967	22 5 33.7	0.496	15	18 46 59.77	2.2602	20 18 52.8	4.986
16	17 1 53.30	2.1988	22 6 0.2	0.387	16	18 49 15.39	2.2605	20 13 50.2	5.101
17	17 4 5.29	2.2009	22 6 20.1	0.277	17	18 51 31.03	2.2609	20 8 40.7	5.216
18	17 6 17.41	2.2031	22 6 33.4	0.166	18	18 53 46.70	2.2613	20 3 24.3	5.330
19	17 8 29.66	2.2052	22 6 40.0	-0.055	19	18 56 2.39	2.2616	19 58 1.1	5.443
20	17 10 42.03	2.2072	22 6 40.0	+0.056	20	18 58 18.09	2.2618	19 52 31.1	5.558
21	17 12 54.52	2.2092	22 6 33.3	0.167	21	19 0 33.81	2.2622	19 46 54.2	5.673
22	17 15 7.13	2.2112	22 6 20.0	0.278	22	19 2 49.55	2.2623	19 41 10.4	5.788
23	17 17 19.86	2.2131	22 6 0.0	0.390	23	19 5 5.29	2.2625	19 35 19.9	5.903
24	17 19 32.70	2.2150	-22 5 33.2	+0.503	24	19 7 21.05	2.2628	-19 29 22.6	+0.618

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
FEBRUARY 26.					FEBRUARY 28.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 7 21.05	2.2628	-19 29 22.6	+ 6.012	0	20 55 43.73	2.2483	-12 38 56.4	+10.854
1	19 9 36.82	2.2628	19 23 18.5	6.124	1	20 57 58.62	2.2479	12 28 2.7	10.937
2	19 11 52.59	2.2629	19 17 7.7	6.237	2	21 0 13.48	2.2475	12 17 4.0	11.020
3	19 14 8.37	2.2630	19 10 50.1	6.350	3	21 2 28.32	2.2471	12 6 0.3	11.101
4	19 16 24.15	2.2630	19 4 25.7	6.462	4	21 4 43.13	2.2467	11 54 51.9	11.180
5	19 18 39.93	2.2630	18 57 54.7	6.573	5	21 6 57.92	2.2463	11 43 38.7	11.260
6	19 20 55.71	2.2630	18 51 17.0	6.683	6	21 9 12.69	2.2460	11 32 20.7	11.338
7	19 23 11.49	2.2630	18 44 32.7	6.794	7	21 11 27.44	2.2456	11 20 58.1	11.415
8	19 25 27.27	2.2629	18 37 41.7	6.905	8	21 13 42.16	2.2453	11 9 30.9	11.492
9	19 27 43.04	2.2628	18 30 44.1	7.015	9	21 15 56.87	2.2449	10 57 59.1	11.567
10	19 29 58.81	2.2628	18 23 39.9	7.124	10	21 18 11.55	2.2445	10 46 22.9	11.640
11	19 32 14.57	2.2626	18 16 29.2	7.233	11	21 20 26.21	2.2443	10 34 42.3	11.713
12	19 34 30.32	2.2624	18 9 11.9	7.343	12	21 22 40.86	2.2440	10 22 57.3	11.786
13	19 36 46.06	2.2623	18 1 48.1	7.451	13	21 24 55.49	2.2438	10 11 8.0	11.856
14	19 39 1.79	2.2621	17 54 17.8	7.559	14	21 27 10.11	2.2435	9 59 14.6	11.925
15	19 41 17.51	2.2618	17 46 41.0	7.667	15	21 29 24.71	2.2432	9 47 17.0	11.994
16	19 43 33.21	2.2616	17 38 57.8	7.773	16	21 31 39.29	2.2430	9 35 15.3	12.062
17	19 45 48.90	2.2613	17 31 8.2	7.879	17	21 33 53.87	2.2429	9 23 9.6	12.128
18	19 48 4.57	2.2610	17 23 12.3	7.985	18	21 36 8.44	2.2427	9 10 59.9	12.193
19	19 50 20.22	2.2608	17 15 10.0	8.091	19	21 38 22.99	2.2425	8 58 46.4	12.257
20	19 52 35.86	2.2604	17 7 1.4	8.196	20	21 40 37.54	2.2425	8 46 29.1	12.320
21	19 54 51.47	2.2601	16 58 46.5	8.300	21	21 42 52.09	2.2423	8 34 8.0	12.382
22	19 57 7.07	2.2598	16 50 25.4	8.403	22	21 45 6.62	2.2423	8 21 43.3	12.442
23	19 59 22.65	2.2594	-16 41 58.1	+ 8.507	23	21 47 21.16	2.2423	- 8 9 15.0	+12.501
FEBRUARY 27.					MARCH 1.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	20 1 38.20	2.2590	-16 33 24.6	+ 8.609	0	21 49 35.69	2.2422	- 7 56 43.2	+12.558
1	20 3 53.73	2.2587	16 24 45.0	8.711	1	21 51 50.22	2.2422	7 44 8.0	12.615
2	20 6 9.24	2.2583	16 15 59.3	8.813	2	21 54 4.75	2.2423	7 31 29.4	12.671
3	20 8 24.73	2.2579	16 7 7.5	8.913	3	21 56 19.29	2.2423	7 18 47.5	12.725
4	20 10 40.19	2.2575	15 58 9.7	9.013	4	21 58 33.82	2.2423	7 6 2.4	12.778
5	20 12 55.63	2.2571	15 49 5.9	9.113	5	22 0 48.37	2.2425	6 53 14.2	12.829
6	20 15 11.04	2.2566	15 39 56.1	9.212	6	22 3 2.92	2.2426	6 40 22.9	12.880
7	20 17 26.42	2.2562	15 30 40.5	9.309	7	22 5 17.48	2.2428	6 27 28.6	12.929
8	20 19 41.78	2.2558	15 21 19.0	9.407	8	22 7 32.05	2.2429	6 14 31.4	12.977
9	20 21 57.11	2.2553	15 11 51.7	9.503	9	22 9 46.63	2.2432	6 1 31.4	13.023
10	20 24 12.41	2.2548	15 2 18.7	9.598	10	22 12 1.23	2.2435	5 48 28.7	13.068
11	20 26 27.69	2.2544	14 52 39.9	9.694	11	22 14 15.85	2.2438	5 35 23.3	13.112
12	20 28 42.94	2.2539	14 42 55.4	9.788	12	22 16 30.48	2.2441	5 22 15.3	13.154
13	20 30 58.16	2.2534	14 33 5.3	9.882	13	22 18 45.14	2.2444	5 9 4.8	13.195
14	20 33 13.35	2.2529	14 23 9.6	9.974	14	22 20 59.81	2.2448	4 55 51.9	13.234
15	20 35 28.51	2.2525	14 13 8.4	10.067	15	22 23 14.51	2.2453	4 42 36.7	13.273
16	20 37 43.65	2.2521	14 3 1.6	10.158	16	22 25 29.24	2.2458	4 29 19.2	13.310
17	20 39 58.76	2.2516	13 52 49.5	10.248	17	22 27 44.00	2.2462	4 15 59.5	13.345
18	20 42 13.84	2.2511	13 42 31.9	10.338	18	22 29 58.78	2.2467	4 2 37.8	13.379
19	20 44 28.89	2.2506	13 32 9.0	10.426	19	22 32 13.60	2.2473	3 49 14.0	13.412
20	20 46 43.91	2.2502	13 21 40.8	10.513	20	22 34 28.46	2.2479	3 35 48.4	13.443
21	20 48 58.91	2.2497	13 11 7.4	10.599	21	22 36 43.35	2.2485	3 22 20.9	13.473
22	20 51 13.87	2.2493	13 0 28.9	10.685	22	22 38 58.28	2.2492	3 8 51.7	13.501
23	20 53 28.82	2.2488	12 49 45.2	10.771	23	22 41 13.25	2.2499	2 55 20.8	13.528
	20 55 43.73	2.2483	-12 38 56.4	+10.854	24	22 43 28.27	2.2507	- 2 41 48.4	+13.553

MOON, 1919.

41

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MARCH 2.					MARCH 4.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	22 43 28.27	2.2507	-2 41 48.4	+13.553	0	0 33 4.68	2.3304	+ 8 8 56.2	+12.956
1	22 45 43.33	2.2514	2 28 14.5	13.577	1	0 35 24.58	2.3328	8 21 52.0	12.904
2	22 47 58.44	2.2523	2 14 39.2	13.600	2	0 37 44.62	2.3353	8 34 44.7	12.851
3	22 50 13.60	2.2531	2 1 2.5	13.621	3	0 40 4.82	2.3379	8 47 34.1	12.796
4	22 52 28.81	2.2540	1 47 24.7	13.640	4	0 42 25.17	2.3404	9 0 20.2	12.740
5	22 54 44.08	2.2549	1 33 45.7	13.658	5	0 44 45.67	2.3430	9 13 2.9	12.683
6	22 56 59.40	2.2558	1 20 5.7	13.674	6	0 47 6.33	2.3457	9 25 42.1	12.624
7	22 59 14.78	2.2569	1 6 24.8	13.689	7	0 49 27.15	2.3483	9 38 17.8	12.563
8	23 1 30.23	2.2580	0 52 43.0	13.703	8	0 51 48.13	2.3509	9 50 49.7	12.500
9	23 3 45.74	2.2590	0 39 0.4	13.715	9	0 54 9.26	2.3535	10 3 17.8	12.437
10	23 6 1.31	2.2601	0 25 17.2	13.726	10	0 56 30.55	2.3563	10 15 42.1	12.372
11	23 8 16.95	2.2613	-0 11 33.3	13.735	11	0 58 52.01	2.3590	10 28 2.4	12.305
12	23 10 32.66	2.2624	+0 2 11.0	13.742	12	1 1 13.63	2.3617	10 40 18.7	12.237
13	23 12 48.44	2.2637	0 15 55.7	13.748	13	1 3 35.41	2.3644	10 52 30.8	12.167
14	23 15 4.30	2.2650	0 29 40.7	13.753	14	1 5 57.36	2.3672	11 4 38.7	12.095
15	23 17 20.24	2.2663	0 43 26.0	13.755	15	1 8 19.47	2.3699	11 16 42.2	12.022
16	23 19 36.26	2.2678	0 57 11.3	13.756	16	1 10 41.75	2.3727	11 28 41.3	11.948
17	23 21 52.37	2.2691	1 10 56.7	13.756	17	1 13 4.19	2.3754	11 40 35.9	11.872
18	23 24 8.55	2.2705	1 24 42.0	13.753	18	1 15 26.80	2.3783	11 52 25.9	11.795
19	23 26 24.83	2.2720	1 38 27.1	13.750	19	1 17 49.58	2.3811	12 4 11.3	11.716
20	23 28 41.19	2.2734	1 52 12.0	13.746	20	1 20 12.53	2.3838	12 15 51.8	11.635
21	23 30 57.64	2.2750	2 5 56.6	13.739	21	1 22 35.64	2.3867	12 27 27.5	11.553
22	23 33 14.19	2.2767	2 19 40.7	13.730	22	1 24 58.93	2.3895	12 38 58.2	11.470
23	23 35 30.84	2.2783	+2 33 24.2	+13.720	23	1 27 22.38	2.3923	+12 50 23.9	+11.386
MARCH 3.					MARCH 5.				
0	23 37 47.58	2.2799	+2 47 7.1	+13.709	0	1 29 46.00	2.3951	+13 1 44.5	+11.300
1	23 40 4.43	2.2816	3 0 49.3	13.696	1	1 32 9.79	2.3979	13 12 59.9	11.213
2	23 42 21.37	2.2833	3 14 30.6	13.681	2	1 34 33.75	2.4008	13 24 10.0	11.123
3	23 44 38.43	2.2852	3 28 11.0	13.665	3	1 36 57.88	2.4035	13 35 14.7	11.033
4	23 46 55.59	2.2869	3 41 50.4	13.648	4	1 39 22.17	2.4063	13 46 14.0	10.942
5	23 49 12.86	2.2888	3 55 28.7	13.628	5	1 41 46.64	2.4092	13 57 7.7	10.848
6	23 51 30.25	2.2908	4 9 5.7	13.607	6	1 44 11.27	2.4119	14 7 55.8	10.754
7	23 53 47.75	2.2926	4 22 41.5	13.584	7	1 46 36.07	2.4147	14 18 38.2	10.659
8	23 56 5.36	2.2946	4 36 15.8	13.560	8	1 49 1.03	2.4175	14 29 14.9	10.562
9	23 58 23.10	2.2966	4 49 48.7	13.534	9	1 51 26.17	2.4203	14 39 45.7	10.463
10	0 0 40.95	2.2986	5 3 19.9	13.507	10	1 53 51.47	2.4230	14 50 10.5	10.364
11	0 2 58.93	2.3007	5 16 49.5	13.478	11	1 56 16.93	2.4258	15 0 29.4	10.263
12	0 5 17.03	2.3028	5 30 17.3	13.448	12	1 58 42.56	2.4285	15 10 42.1	10.161
13	0 7 35.26	2.3048	5 43 43.2	13.415	13	2 1 8.35	2.4313	15 20 48.7	10.058
14	0 9 53.61	2.3070	5 57 7.1	13.382	14	2 3 34.31	2.4340	15 30 49.0	9.953
15	0 12 12.10	2.3093	6 10 29.0	13.346	15	2 6 0.43	2.4367	15 40 43.0	9.847
16	0 14 30.72	2.3115	6 23 48.6	13.308	16	2 8 26.71	2.4393	15 50 30.6	9.740
17	0 16 49.48	2.3138	6 37 6.0	13.270	17	2 10 53.14	2.4419	16 0 11.8	9.632
18	0 19 8.37	2.3160	6 50 21.0	13.230	18	2 13 19.74	2.4446	16 9 46.4	9.522
19	0 21 27.40	2.3183	7 3 33.6	13.188	19	2 15 46.49	2.4471	16 19 14.4	9.412
20	0 23 46.57	2.3207	7 16 43.6	13.145	20	2 18 13.39	2.4497	16 28 35.8	9.300
21	0 26 5.88	2.3230	7 29 51.0	13.100	21	2 20 40.45	2.4522	16 37 50.4	9.187
22	0 28 25.33	2.3254	7 42 55.6	13.053	22	2 23 7.65	2.4547	16 46 58.2	9.073
23	0 30 44.93	2.3279	7 55 57.4	13.005	23	2 25 35.01	2.4572	16 55 59.2	8.958
24	0 33 4.68	2.3304	+8 8 56.2	+12.955	24	2 28 2.51	2.4596	+17 4 53.2	+ 8.843

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	
MARCH 6.					MARCH 8.				
	h m s	s	° ' "	"		h m s	s	° ' "	
0	2 28 2.51	2.4596	+17 4 53.2	+8.842	0	4 27 55.89	2.5102	+21 39 37.1	
1	2 30 30.16	2.4620	17 13 40.2	8.724	1	4 30 26.48	2.5095	21 41 56.1	
2	2 32 57.95	2.4643	17 22 20.1	8.606	2	4 32 57.03	2.5086	21 44 6.5	
3	2 35 25.88	2.4667	17 30 52.9	8.487	3	4 35 27.51	2.5077	21 46 8.4	
4	2 37 53.95	2.4690	17 39 18.5	8.367	4	4 37 57.95	2.5068	21 48 1.6	
5	2 40 22.16	2.4713	17 47 36.9	8.245	5	4 40 28.32	2.5056	21 49 46.2	
6	2 42 50.50	2.4734	17 55 47.9	8.123	6	4 42 58.62	2.5043	21 51 22.2	
7	2 45 18.97	2.4756	18 3 51.6	7.999	7	4 45 28.84	2.5031	21 52 49.6	
8	2 47 47.57	2.4777	18 11 47.8	7.875	8	4 47 58.99	2.5018	21 54 8.4	
9	2 50 16.29	2.4798	18 19 36.6	7.750	9	4 50 29.06	2.5004	21 55 18.7	
10	2 52 45.14	2.4818	18 27 17.8	7.624	10	4 52 59.04	2.4988	21 56 20.4	
11	2 55 14.11	2.4838	18 34 51.5	7.498	11	4 55 28.92	2.4973	21 57 13.5	
12	2 57 43.19	2.4857	18 42 17.5	7.369	12	4 57 58.71	2.4956	21 57 58.1	
13	3 0 12.39	2.4875	18 49 35.8	7.241	13	5 0 28.39	2.4938	21 58 34.2	
14	3 2 41.69	2.4893	18 56 46.4	7.112	14	5 2 57.97	2.4920	21 59 1.8	
15	3 5 11.11	2.4911	19 3 49.2	6.982	15	5 5 27.43	2.4900	21 59 20.9	
16	3 7 40.62	2.4928	19 10 44.2	6.851	16	5 7 56.77	2.4880	21 59 31.5	
17	3 10 10.24	2.4945	19 17 31.3	6.718	17	5 10 25.99	2.4859	21 59 33.7	
18	3 12 39.96	2.4960	19 24 10.4	6.586	18	5 12 55.08	2.4838	21 59 27.5	
19	3 15 9.76	2.4975	19 30 41.6	6.453	19	5 15 24.04	2.4815	21 59 12.9	
20	3 17 39.66	2.4990	19 37 4.8	6.320	20	5 17 52.86	2.4792	21 58 49.9	
21	3 20 9.64	2.5004	19 43 20.0	6.186	21	5 20 21.54	2.4768	21 58 18.5	
22	3 22 39.71	2.5018	19 49 27.1	6.050	22	5 22 50.07	2.4743	21 57 38.8	
23	3 25 9.85	2.5029	+19 55 26.0	+5.914	23	5 25 18.45	2.4717	+21 56 50.9	
MARCH 7.					MARCH 9.				
	h m s	s	° ' "	"		h m s	s	° ' "	
0	3 27 40.06	2.5042	+20 1 16.8	+5.778	0	5 27 46.67	2.4690	+21 55 54.6	
1	3 30 10.35	2.5053	20 6 59.4	5.641	1	5 30 14.73	2.4663	21 54 50.1	
2	3 32 40.70	2.5063	20 12 33.7	5.503	2	5 32 42.63	2.4636	21 53 37.4	
3	3 35 11.11	2.5073	20 17 59.8	5.366	3	5 35 10.36	2.4607	21 52 16.6	
4	3 37 41.58	2.5083	20 23 17.6	5.227	4	5 37 37.91	2.4578	21 50 47.5	
5	3 40 12.10	2.5091	20 28 27.0	5.088	5	5 40 5.29	2.4548	21 49 10.4	
6	3 42 42.67	2.5099	20 33 28.1	4.949	6	5 42 32.48	2.4517	21 47 25.2	
7	3 45 13.29	2.5106	20 38 20.9	4.809	7	5 44 59.49	2.4485	21 45 32.0	
8	3 47 43.94	2.5112	20 43 5.2	4.668	8	5 47 26.30	2.4453	21 43 30.7	
9	3 50 14.63	2.5118	20 47 41.1	4.528	9	5 49 52.93	2.4421	21 41 21.5	
10	3 52 45.35	2.5122	20 52 8.6	4.388	10	5 52 19.35	2.4387	21 39 4.3	
11	3 55 16.09	2.5125	20 56 27.6	4.246	11	5 54 45.57	2.4353	21 36 39.3	
12	3 57 46.85	2.5128	21 0 38.1	4.104	12	5 57 11.59	2.4319	21 34 6.4	
13	4 0 17.63	2.5131	21 4 40.1	3.963	13	5 59 37.40	2.4283	21 31 25.7	
14	4 2 48.42	2.5133	21 8 33.6	3.821	14	6 2 2.99	2.4248	21 28 37.3	
15	4 5 19.22	2.5133	21 12 18.6	3.678	15	6 4 28.37	2.4212	21 25 41.1	
16	4 7 50.02	2.5133	21 15 55.0	3.535	16	6 6 53.53	2.4174	21 22 37.3	
17	4 10 20.82	2.5133	21 19 22.8	3.393	17	6 9 18.46	2.4137	21 19 25.8	
18	4 12 51.61	2.5130	21 22 42.1	3.250	18	6 11 43.17	2.4099	21 16 6.8	
19	4 15 22.38	2.5128	21 25 52.8	3.106	19	6 14 7.65	2.4061	21 12 40.2	
20	4 17 53.14	2.5125	21 28 54.8	2.963	20	6 16 31.90	2.4022	21 9 6.1	
21	4 20 23.88	2.5120	21 31 48.3	2.820	21	6 18 55.91	2.3982	21 5 24.6	
22	4 22 54.58	2.5115	21 34 33.2	2.677	22	6 21 19.68	2.3942	21 1 35.7	
23	4 25 25.26	2.5109	21 37 9.5	2.533	23	6 23 43.21	2.3902	20 57 39.4	
24	4 27 55.89	2.5102	+21 39 37.1	+2.388	24	6 26 6.50	2.3861	+20 53 35.9	

MOON, 1919.

43

GREENWICH MEAN TIME.

Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MARCH 10.					MARCH 12.			
h m s	s	° ' "	"		h m s	s	° ' "	"
6 26 6.50	2.3861	+20 53 35.9	-4.119	0	8 15 24.22	2.1643	+15 34 19.2	-8.798
6 28 29.54	2.3819	20 49 25.1	4.239	1	8 17 33.94	2.1598	15 25 29.2	8.869
6 30 52.33	2.3777	20 45 7.2	4.358	2	8 19 43.39	2.1552	15 16 34.9	8.941
6 33 14.86	2.3734	20 40 42.1	4.478	3	8 21 52.56	2.1506	15 7 36.3	9.011
6 35 37.14	2.3693	20 36 9.9	4.595	4	8 24 1.46	2.1461	14 58 33.6	9.080
6 37 59.17	2.3649	20 31 30.7	4.712	5	8 26 10.09	2.1416	14 49 26.7	9.148
6 40 20.93	2.3606	20 26 44.5	4.828	6	8 28 18.45	2.1372	14 40 15.8	9.215
6 42 42.44	2.3563	20 21 51.4	4.943	7	8 30 26.55	2.1328	14 31 0.9	9.282
6 45 3.68	2.3518	20 16 51.4	5.057	8	8 32 34.38	2.1283	14 21 42.0	9.347
6 47 24.65	2.3473	20 11 44.6	5.170	9	8 34 41.94	2.1238	14 12 19.3	9.411
6 49 45.36	2.3428	20 6 31.0	5.282	10	8 36 49.24	2.1195	14 2 52.7	9.474
6 52 5.79	2.3383	20 1 10.8	5.393	11	8 38 56.28	2.1152	13 53 22.4	9.536
6 54 26.96	2.3338	19 55 43.9	5.503	12	8 41 3.06	2.1108	13 43 48.4	9.597
6 56 45.85	2.3293	19 50 10.4	5.613	13	8 43 9.58	2.1066	13 34 10.8	9.657
6 59 5.47	2.3247	19 44 30.4	5.720	14	8 45 15.85	2.1023	13 24 29.6	9.716
7 1 24.81	2.3201	19 38 44.0	5.828	15	8 47 21.86	2.0981	13 14 44.9	9.773
7 3 43.88	2.3154	19 32 51.1	5.934	16	8 49 27.62	2.0939	13 4 56.8	9.830
7 6 2.66	2.3108	19 26 51.9	6.040	17	8 51 33.13	2.0898	12 55 5.3	9.886
7 8 21.17	2.3062	19 20 46.3	6.144	18	8 53 38.39	2.0857	12 45 10.5	9.941
7 10 39.40	2.3015	19 14 34.6	6.247	19	8 55 43.41	2.0816	12 35 12.4	9.995
7 12 57.35	2.2968	19 8 16.7	6.349	20	8 57 48.18	2.0774	12 25 11.1	10.048
7 15 15.01	2.2920	19 1 52.7	6.451	21	8 59 52.70	2.0734	12 15 6.6	10.100
7 17 32.39	2.2873	18 55 22.6	6.551	22	9 1 56.99	2.0695	12 4 59.1	10.151
7 19 49.49	2.2826	+18 48 46.6	-6.650	23	9 4 1.04	2.0656	+11 54 48.5	-10.201
MARCH 11.					MARCH 13.			
7 22 6.30	2.2778	+18 42 4.6	-6.748	0	9 6 4.86	2.0617	+11 44 35.0	-10.249
7 24 22.83	2.2732	18 35 16.8	6.846	1	9 8 8.44	2.0578	11 34 18.6	10.298
7 26 39.08	2.2684	18 28 23.1	6.943	2	9 10 11.79	2.0539	11 23 59.3	10.344
7 28 55.04	2.2636	18 21 23.7	7.038	3	9 12 14.91	2.0501	11 13 37.3	10.390
7 31 10.71	2.2588	18 14 18.6	7.132	4	9 14 17.80	2.0463	11 3 12.5	10.435
7 33 26.10	2.2541	18 7 7.9	7.225	5	9 16 20.47	2.0427	10 52 45.1	10.479
7 35 41.20	2.2493	17 59 51.6	7.317	6	9 18 22.92	2.0390	10 42 15.0	10.523
7 37 56.01	2.2445	17 52 29.9	7.408	7	9 20 25.15	2.0353	10 31 42.4	10.564
7 40 10.54	2.2397	17 45 2.7	7.498	8	9 22 27.16	2.0318	10 21 7.3	10.606
7 42 24.77	2.2349	17 37 30.1	7.588	9	9 24 28.96	2.0282	10 10 29.7	10.646
7 44 38.73	2.2302	17 29 52.2	7.676	10	9 26 30.54	2.0247	9 59 49.8	10.685
7 46 52.39	2.2253	17 22 9.0	7.763	11	9 28 31.92	2.0213	9 49 7.5	10.723
7 49 5.77	2.2206	17 14 20.7	7.848	12	9 30 33.09	2.0178	9 38 23.0	10.760
7 51 18.86	2.2158	17 6 27.3	7.933	13	9 32 34.05	2.0144	9 27 36.3	10.797
7 53 31.67	2.2112	16 58 28.8	8.017	14	9 34 34.82	2.0111	9 16 47.4	10.833
7 55 44.20	2.2064	16 50 25.3	8.099	15	9 36 35.38	2.0077	9 5 56.4	10.867
7 57 56.44	2.2017	16 42 16.9	8.181	16	9 38 35.74	2.0045	8 55 3.4	10.900
8 0 8.40	2.1969	16 34 3.6	8.263	17	9 40 35.92	2.0013	8 44 8.4	10.933
8 2 20.07	2.1922	16 25 45.4	8.342	18	9 42 35.89	1.9981	8 33 11.5	10.964
8 4 31.46	2.1875	16 17 22.6	8.420	19	9 44 35.69	1.9950	8 22 12.7	10.996
8 6 42.57	2.1828	16 8 55.0	8.498	20	9 46 35.29	1.9919	8 11 12.0	11.026
8 8 53.40	2.1782	16 0 22.8	8.574	21	9 48 34.72	1.9889	8 0 9.6	11.054
8 11 3.95	2.1736	15 51 46.1	8.649	22	9 50 33.96	1.9858	7 49 5.5	11.082
8 13 14.23	2.1689	15 43 4.9	8.724	23	9 52 33.02	1.9829	7 37 59.8	11.109
8 15 24.22	2.1643	+15 34 19.2	-8.798	24	9 54 31.91	1.9800	+7 26 52.4	-11.135

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.
MARCH 14.					MARCH 16.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	9 54 31.91	1.9800	+7 26 52.4	-11.136	0	11 27 7.10	1.8958	- 1 41 33.1
1	9 56 30.62	1.9772	7 15 43.5	11.161	1	11 29 0.83	1.8952	1 52 56.8
2	9 58 29.17	1.9744	7 4 33.1	11.186	2	11 30 54.52	1.8947	2 4 19.6
3	10 0 27.55	1.9716	6 53 21.2	11.209	3	11 32 48.19	1.8942	2 15 41.5
4	10 2 25.76	1.9688	6 42 8.0	11.232	4	11 34 41.82	1.8936	2 27 2.5
5	10 4 23.81	1.9662	6 30 53.4	11.254	5	11 36 35.42	1.8932	2 38 22.5
6	10 6 21.70	1.9636	6 19 37.5	11.275	6	11 38 29.00	1.8928	2 49 41.5
7	10 8 19.44	1.9610	6 8 20.4	11.294	7	11 40 22.56	1.8924	3 0 59.3
8	10 10 17.02	1.9585	5 57 2.2	11.313	8	11 42 16.09	1.8922	3 12 16.1
9	10 12 14.46	1.9560	5 45 42.8	11.333	9	11 44 9.62	1.8920	3 23 31.7
10	10 14 11.74	1.9535	5 34 22.3	11.350	10	11 46 3.13	1.8917	3 34 46.1
11	10 16 8.88	1.9512	5 23 0.8	11.366	11	11 47 56.62	1.8915	3 45 59.2
12	10 18 5.88	1.9488	5 11 38.4	11.381	12	11 49 50.11	1.8914	3*57 11.1
13	10 20 2.74	1.9465	5 0 15.1	11.396	13	11 51 43.59	1.8913	4 8 21.6
14	10 21 59.46	1.9443	4 48 50.9	11.410	14	11 53 37.07	1.8913	4 19 30.8
15	10 23 56.05	1.9421	4 37 25.9	11.423	15	11 55 30.54	1.8913	4 30 38.5
16	10 25 52.51	1.9399	4 26 0.1	11.436	16	11 57 24.02	1.8913	4 41 44.8
17	10 27 48.84	1.9378	4 14 33.6	11.447	17	11 59 17.50	1.8914	4 52 49.6
18	10 29 45.05	1.9358	4 3 6.5	11.458	18	12 1 10.99	1.8915	5 3 52.8
19	10 31 41.13	1.9338	3 51 38.7	11.468	19	12 3 4.48	1.8917	5 14 54.5
20	10 33 37.10	1.9318	3 40 10.4	11.476	20	12 4 57.99	1.8919	5 25 54.5
21	10 35 32.95	1.9298	3 28 41.6	11.484	21	12 6 51.51	1.8922	5 36 52.8
22	10 37 28.68	1.9279	3 17 12.3	11.492	22	12 8 45.05	1.8925	5 47 49.5
23	10 39 24.30	1.9262	+3 5 42.6	-11.498	23	12 10 38.61	1.8928	- 5 58 44.3
MARCH 15.					MARCH 17.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	10 41 19.82	1.9244	+2 54 12.5	-11.504	0	12 12 32.19	1.8932	- 6 9 37.4
1	10 43 15.23	1.9226	2 42 42.1	11.508	1	12 14 25.79	1.8936	6 20 28.6
2	10 45 10.53	1.9209	2 31 11.5	11.513	2	12 16 19.42	1.8941	6 31 18.0
3	10 47 5.74	1.9193	2 19 40.6	11.516	3	12 18 13.08	1.8946	6 42 5.4
4	10 49 0.85	1.9178	2 8 9.6	11.518	4	12 20 6.77	1.8951	6 52 50.9
5	10 50 55.87	1.9162	1 56 38.4	11.520	5	12 22 0.49	1.8957	7 3 34.4
6	10 52 50.79*	1.9147	1 45 7.2	11.520	6	12 23 54.25	1.8963	7 14 15.8
7	10 54 45.63	1.9133	1 33 36.0	11.521	7	12 25 48.05	1.8970	7 24 55.2
8	10 56 40.38	1.9118	1 22 4.7	11.520	8	12 27 41.89	1.8977	7 35 32.4
9	10 58 35.05	1.9105	1 10 33.6	11.518	9	12 29 35.77	1.8984	7 46 7.5
10	11 0 29.64	1.9092	0 59 2.6	11.516	10	12 31 29.70	1.8992	7 56 40.4
11	11 2 24.15	1.9079	0 47 31.7	11.513	11	12 33 23.67	1.8999	8 7 11.0
12	11 4 18.59	1.9067	0 36 1.1	11.508	12	12 35 17.69	1.9008	8 17 39.3
13	11 6 12.95	1.9056	0 24 30.7	11.503	13	12 37 11.76	1.9017	8 28 5.3
14	11 8 7.26	1.9045	0 13 0.7	11.498	14	12 39 5.89	1.9027	8 38 29.0
15	11 10 1.49	1.9033	+0 1 30.9	11.493	15	12 41 0.08	1.9036	8 48 50.2
16	11 11 55.66	1.9023	-0 9 58.4	11.485	16	12 42 54.32	1.9045	8 59 9.0
17	11 13 49.77	1.9013	0 21 27.3	11.478	17	12 44 48.62	1.9056	9 9 25.3
18	11 15 43.82	1.9004	0 32 55.7	11.468	18	12 46 42.99	1.9067	9 19 39.1
19	11 17 37.82	1.8996	0 44 23.5	11.459	19	12 48 37.42	1.9078	9 29 50.3
20	11 19 31.77	1.8988	0 55 50.8	11.449	20	12 50 31.92	1.9088	9 39 59.0
21	11 21 25.67	1.8979	1 7 17.4	11.438	21	12 52 26.48	1.9100	9 50 5.0
22	11 23 19.52	1.8972	1 18 43.4	11.427	22	12 54 21.12	1.9113	10 0 8.3
23	11 25 13.33	1.8965	1 30 8.6	11.414	23	12 56 15.83	1.9124	10 10 8.9
24	11 27 7.10	1.8958	-1 41 33.1	-11.402	24	12 58 10.61	1.9137	-10 20 6.

GREENWICH MEAN TIME.

Day.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MARCH 18.					MARCH 20.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
0	12 58 10.61	1.9137	-10 20 6.7	-9.940	0	14 32 1.57	2.0053	-17 12 11.2	-6.999
1	13 0 5.47	1.9150	10 30 1.7	9.894	1	14 34 1.96	2.0077	17 19 8.9	6.923
2	13 2 0.41	1.9163	10 39 54.0	9.847	2	14 36 2.49	2.0100	17 26 2.0	6.847
3	13 3 55.43	1.9178	10 49 43.3	9.798	3	14 38 3.16	2.0123	17 32 50.5	6.770
4	13 5 50.54	1.9191	10 59 29.8	9.750	4	14 40 3.97	2.0148	17 39 34.4	6.693
5	13 7 45.72	1.9205	11 9 13.3	9.700	5	14 42 4.93	2.0172	17 46 13.7	6.615
6	13 9 41.00	1.9220	11 18 53.8	9.650	6	14 44 6.03	2.0195	17 52 48.2	6.537
7	13 11 36.36	1.9234	11 28 31.3	9.599	7	14 46 7.27	2.0219	17 59 18.1	6.458
8	13 13 31.81	1.9250	11 38 5.7	9.548	8	14 48 8.66	2.0243	18 5 43.2	6.378
9	13 15 27.36	1.9266	11 47 37.0	9.496	9	14 50 10.19	2.0268	18 12 3.5	6.298
0	13 17 23.00	1.9281	11 57 5.2	9.443	10	14 52 11.87	2.0292	18 18 19.0	6.218
1	13 19 18.73	1.9297	12 6 30.2	9.390	11	14 54 13.69	2.0316	18 24 29.7	6.138
2	13 21 14.56	1.9313	12 15 52.0	9.336	12	14 56 15.66	2.0340	18 30 35.5	6.058
3	13 23 10.49	1.9330	12 25 10.5	9.282	13	14 58 17.77	2.0364	18 36 36.4	5.974
4	13 25 6.52	1.9348	12 34 25.8	9.227	14	15 0 20.03	2.0388	18 42 32.4	5.892
5	13 27 2.66	1.9364	12 43 37.7	9.171	15	15 2 22.43	2.0413	18 48 23.4	5.808
6	13 28 58.89	1.9382	12 52 46.3	9.115	16	15 4 24.98	2.0438	18 54 9.4	5.724
7	13 30 55.24	1.9400	13 1 51.5	9.058	17	15 6 27.68	2.0462	18 59 50.3	5.640
8	13 32 51.69	1.9418	13 10 53.2	9.000	18	15 8 30.52	2.0485	19 5 26.2	5.556
9	13 34 48.25	1.9436	13 19 51.5	8.943	19	15 10 33.50	2.0509	19 10 57.0	5.471
20	13 36 44.92	1.9454	13 28 46.3	8.883	20	15 12 36.63	2.0533	19 16 22.7	5.386
21	13 38 41.70	1.9473	13 37 37.5	8.824	21	15 14 39.90	2.0558	19 21 43.3	5.299
22	13 40 38.59	1.9492	13 46 25.2	8.764	22	15 16 43.32	2.0582	19 26 58.6	5.213
23	13 42 35.60	1.9511	-13 55 9.2	-8.703	23	15 18 46.88	2.0606	-19 32 8.8	-5.126
MARCH 19.					MARCH 21.				
0	13 44 32.72	1.9530	-14 3 49.6	-8.643	0	15 20 50.59	2.0630	-19 37 13.7	-5.038
1	13 46 29.96	1.9550	14 12 26.3	8.581	1	15 22 54.44	2.0654	19 42 13.3	4.950
2	13 48 27.32	1.9570	14 20 59.3	8.518	2	15 24 58.44	2.0678	19 47 7.7	4.862
3	13 50 24.80	1.9590	14 29 28.5	8.455	3	15 27 2.58	2.0703	19 51 56.7	4.773
4	13 52 22.40	1.9611	14 37 53.9	8.392	4	15 29 6.87	2.0727	19 56 40.4	4.684
5	13 54 20.13	1.9632	14 46 15.5	8.328	5	15 31 11.30	2.0750	20 1 18.8	4.593
6	13 56 17.98	1.9652	14 54 33.2	8.263	6	15 33 15.87	2.0773	20 5 51.6	4.503
7	13 58 15.95	1.9673	15 2 47.0	8.198	7	15 35 20.58	2.0797	20 10 19.1	4.413
8	14 0 14.05	1.9693	15 10 56.9	8.132	8	15 37 25.43	2.0820	20 14 41.1	4.321
9	14 2 12.27	1.9715	15 19 2.8	8.065	9	15 39 30.42	2.0844	20 18 57.6	4.229
10	14 4 10.63	1.9737	15 27 4.7	7.998	10	15 41 35.56	2.0868	20 23 8.6	4.138
11	14 6 9.11	1.9758	15 35 2.6	7.931	11	15 43 40.83	2.0890	20 27 14.1	4.045
12	14 8 7.72	1.9779	15 42 56.4	7.863	12	15 45 46.24	2.0913	20 31 14.0	3.952
13	14 10 6.46	1.9802	15 50 46.1	7.793	13	15 47 51.79	2.0937	20 35 8.3	3.858
14	14 12 5.34	1.9824	15 58 31.6	7.724	14	15 49 57.48	2.0959	20 38 57.0	3.764
15	14 14 4.35	1.9847	16 6 13.0	7.654	15	15 52 3.30	2.0982	20 42 40.0	3.670
16	14 16 3.50	1.9868	16 13 50.1	7.583	16	15 54 9.26	2.1005	20 46 17.4	3.575
17	14 18 2.77	1.9891	16 21 23.0	7.512	17	15 56 15.36	2.1028	20 49 49.0	3.480
18	14 20 2.19	1.9914	16 28 51.5	7.440	18	15 58 21.59	2.1049	20 53 15.0	3.385
19	14 22 1.74	1.9937	16 36 15.8	7.368	19	16 0 27.95	2.1071	20 56 35.2	3.288
20	14 24 1.43	1.9960	16 43 35.7	7.296	20	16 2 34.44	2.1093	20 59 49.6	3.192
21	14 26 1.26	1.9983	16 50 51.3	7.223	21	16 4 41.07	2.1115	21 2 58.2	3.095
22	14 28 1.22	2.0006	16 58 2.4	7.148	22	16 6 47.82	2.1137	21 6 1.0	2.998
23	14 30 1.33	2.0029	17 5 9.0	7.073	23	16 8 54.71	2.1158	21 8 58.0	2.901
24	14 32 1.57	2.0053	-17 12 11.2	-6.999	24	16 11 1.72	2.1179	-21 11 49.1	-2.803

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.
MARCH 22.					MARCH 24.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	16 11 1.72	2.1179	-21 11 49.1	-2.803	0	17 54 41.75	2.1913	-21 27 38.0
1	16 13 8.86	2.1201	21 14 34.3	2.705	1	17 56 53.25	2.1921	21 25 20.8
2	16 15 16.13	2.1222	21 17 13.7	2.606	2	17 59 4.80	2.1928	21 22 57.1
3	16 17 23.52	2.1243	21 19 47.0	2.507	3	18 1 16.39	2.1937	21 20 26.8
4	16 19 31.04	2.1263	21 22 14.5	2.408	4	18 3 28.04	2.1944	21 17 50.0
5	16 21 38.68	2.1283	21 24 35.9	2.308	5	18 5 39.72	2.1951	21 15 6.6
6	16 23 46.44	2.1303	21 26 51.4	2.208	6	18 7 51.45	2.1959	21 12 16.6
7	16 25 54.32	2.1323	21 29 0.8	2.107	7	18 10 3.23	2.1966	21 9 20.2
8	16 28 2.31	2.1343	21 31 4.2	2.007	8	18 12 15.04	2.1972	21 6 17.1
9	16 30 10.43	2.1362	21 33 1.6	1.905	9	18 14 26.89	2.1978	21 3 7.5
10	16 32 18.65	2.1381	21 34 52.8	1.803	10	18 16 38.77	2.1984	20 59 51.4
11	16 34 27.00	2.1400	21 36 38.0	1.702	11	18 18 50.70	2.1990	20 56 28.7
12	16 36 35.45	2.1418	21 38 17.0	1.599	12	18 21 2.65	2.1995	20 52 59.5
13	16 38 44.02	2.1437	21 39 49.9	1.497	13	18 23 14.64	2.2000	20 49 23.7
14	16 40 52.69	2.1455	21 41 16.6	1.394	14	18 25 26.65	2.2005	20 45 41.4
15	16 43 1.48	2.1473	21 42 37.2	1.292	15	18 27 38.70	2.2010	20 41 52.5
16	16 45 10.37	2.1491	21 43 51.6	1.188	16	18 29 50.77	2.2014	20 37 57.1
17	16 47 19.37	2.1508	21 44 59.8	1.084	17	18 32 2.87	2.2018	20 33 55.2
18	16 49 28.47	2.1525	21 46 1.7	0.980	18	18 34 14.99	2.2023	20 29 46.7
19	16 51 37.67	2.1543	21 46 57.4	0.876	19	18 36 27.14	2.2026	20 25 31.7
20	16 53 46.98	2.1559	21 47 46.8	0.772	20	18 38 39.30	2.2029	20 21 10.2
21	16 55 56.38	2.1576	21 48 30.0	0.668	21	18 40 51.49	2.2033	20 16 42.3
22	16 58 5.89	2.1592	21 49 6.9	0.562	22	18 43 3.70	2.2036	20 12 7.8
23	17 0 15.48	2.1608	-21 49 37.4	-0.457	23	18 45 15.92	2.2038	-20 7 26.8
MARCH 23.					MARCH 25.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	17 2 25.18	2.1624	-21 50 1.7	-0.352	0	18 47 28.16	2.2042	-20 2 39.4
1	17 4 34.97	2.1639	21 50 19.6	0.246	1	18 49 40.42	2.2044	19 57 45.5
2	17 6 44.85	2.1654	21 50 31.2	0.141	2	18 51 52.69	2.2046	19 52 45.1
3	17 8 54.82	2.1668	21 50 36.5	-0.034	3	18 54 4.97	2.2048	19 47 38.2
4	17 11 4.87	2.1683	21 50 35.3	+0.073	4	18 56 17.27	2.2050	19 42 25.0
5	17 13 15.01	2.1698	21 50 27.8	0.178	5	18 58 29.57	2.2052	19 37 5.2
6	17 15 25.24	2.1712	21 50 13.9	0.286	6	19 0 41.89	2.2053	19 31 39.1
7	17 17 35.55	2.1725	21 49 53.5	0.393	7	19 2 54.21	2.2055	19 26 6.6
8	17 19 45.94	2.1738	21 49 26.7	0.499	8	19 5 6.55	2.2057	19 20 27.6
9	17 21 56.41	2.1751	21 48 53.6	0.607	9	19 7 18.89	2.2057	19 14 42.3
10	17 24 6.95	2.1763	21 48 13.9	0.714	10	19 9 31.23	2.2058	19 8 50.7
11	17 26 17.57	2.1777	21 47 27.9	0.822	11	19 11 43.58	2.2058	19 2 52.6
12	17 28 28.27	2.1789	21 46 35.3	0.930	12	19 13 55.93	2.2059	18 56 48.3
13	17 30 39.04	2.1801	21 45 36.3	1.038	13	19 16 8.29	2.2059	18 50 37.6
14	17 32 49.88	2.1813	21 44 30.8	1.146	14	19 18 20.64	2.2059	18 44 20.6
15	17 35 0.79	2.1823	21 43 18.8	1.254	15	19 20 33.00	2.2060	18 37 57.4
16	17 37 11.76	2.1834	21 42 0.3	1.362	16	19 22 45.36	2.2060	18 31 27.8
17	17 39 22.80	2.1845	21 40 35.4	1.470	17	19 24 57.72	2.2060	18 24 52.0
18	17 41 33.90	2.1856	21 39 3.9	1.579	18	19 27 10.08	2.2060	18 18 10.0
19	17 43 45.07	2.1866	21 37 25.9	1.688	19	19 29 22.44	2.2059	18 11 21.8
20	17 45 56.29	2.1875	21 35 41.4	1.797	20	19 31 34.79	2.2059	18 4 27.3
21	17 48 7.57	2.1885	21 33 50.3	1.905	21	19 33 47.15	2.2059	17 57 26.7
22	17 50 18.91	2.1894	21 31 52.8	2.013	22	19 35 59.50	2.2058	17 50 20.0
23	17 52 30.30	2.1903	21 29 48.7	2.123	23	19 38 11.85	2.2058	17 43 7.1
24	17 54 41.75	2.1913	-21 27 38.0	+2.233	24	19 40 24.19	2.2057	-17 35 48.1

MOON, 1919.

47

GREENWICH MEAN TIME.

gr.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MARCH 26.					MARCH 28.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 40 24.19	2.2057	-17 35 48.1	+ 7.368	0	21 26 16.35	2.2103	-9 54 45.9	+11.595
1	19 42 36.53	2.2057	17 28 23.0	7.468	1	21 28 28.98	2.2108	9 43 8.1	11.664
2	19 44 48.87	2.2056	17 20 51.9	7.569	2	21 30 41.65	2.2114	9 31 26.2	11.733
3	19 47 1.20	2.2055	17 13 14.7	7.670	3	21 32 54.35	2.2120	9 19 40.1	11.802
4	19 49 13.53	2.2055	17 5 31.5	7.770	4	21 35 7.09	2.2126	9 7 50.0	11.868
5	19 51 25.86	2.2054	16 57 42.3	7.870	5	21 37 19.86	2.2133	8 55 55.9	11.934
6	19 53 38.18	2.2053	16 49 47.1	7.968	6	21 39 32.68	2.2140	8 43 57.9	11.999
7	19 55 50.50	2.2053	16 41 46.1	8.067	7	21 41 45.54	2.2148	8 31 56.0	12.063
8	19 58 2.81	2.2051	16 33 39.1	8.166	8	21 43 58.45	2.2155	8 19 50.3	12.127
9	20 0 15.11	2.2050	16 25 26.2	8.263	9	21 46 11.40	2.2163	8 7 40.8	12.189
0	20 2 27.41	2.2049	16 17 7.5	8.361	10	21 48 24.40	2.2171	7 55 27.6	12.249
1	20 4 39.70	2.2048	16 8 42.9	8.458	11	21 50 37.45	2.2179	7 43 10.9	12.309
2	20 6 51.99	2.2048	16 0 12.6	8.553	12	21 52 50.55	2.2188	7 30 50.5	12.368
3	20 9 4.28	2.2048	15 51 36.5	8.649	13	21 55 3.71	2.2198	7 18 26.7	12.426
4	20 11 16.56	2.2047	15 42 54.7	8.745	14	21 57 16.92	2.2207	7 5 59.4	12.483
5	20 13 28.84	2.2046	15 34 7.1	8.840	15	21 59 30.19	2.2217	6 53 28.8	12.538
6	20 15 41.11	2.2046	15 25 13.9	8.933	16	22 1 43.52	2.2228	6 40 54.8	12.593
7	20 17 53.39	2.2046	15 16 15.1	9.028	17	22 3 56.92	2.2238	6 28 17.7	12.646
8	20 20 5.66	2.2044	15 7 10.6	9.121	18	22 6 10.38	2.2250	6 15 37.3	12.698
9	20 22 17.92	2.2044	14 58 0.6	9.213	19	22 8 23.92	2.2262	6 2 53.9	12.748
0	20 24 30.19	2.2044	14 48 45.1	9.305	20	22 10 37.52	2.2273	5 50 7.5	12.798
1	20 26 42.45	2.2044	14 39 24.0	9.397	21	22 12 51.19	2.2285	5 37 18.1	12.848
2	20 28 54.72	2.2044	14 29 57.5	9.487	22	22 15 4.94	2.2298	5 24 25.8	12.894
3	20 31 6.98	2.2043	-14 20 25.6	+ 9.577	23	22 17 18.77	2.2311	-5 11 30.8	+12.940
MARCH 27.					MARCH 29.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	20 33 19.24	2.2044	-14 10 48.3	+ 9.667	0	22 19 32.67	2.2324	-4 58 33.0	+12.985
1	20 35 31.51	2.2044	14 1 5.6	9.755	1	22 21 46.66	2.2338	4 45 32.6	13.029
2	20 37 43.77	2.2044	13 51 17.7	9.843	2	22 24 0.73	2.2353	4 32 29.5	13.072
3	20 39 56.04	2.2046	13 41 24.4	9.932	3	22 26 14.89	2.2368	4 19 24.0	13.113
4	20 42 8.32	2.2047	13 31 25.9	10.018	4	22 28 29.14	2.2383	4 6 16.0	13.153
5	20 44 20.60	2.2048	13 21 22.3	10.104	5	22 30 43.48	2.2398	3 53 5.7	13.192
6	20 46 32.89	2.2048	13 11 13.4	10.190	6	22 32 57.92	2.2414	3 39 53.0	13.229
7	20 48 45.18	2.2049	13 0 59.5	10.274	7	22 35 12.45	2.2430	3 26 38.2	13.264
8	20 50 57.48	2.2051	12 50 40.5	10.358	8	22 37 27.08	2.2447	3 13 21.3	13.299
9	20 53 9.79	2.2052	12 40 16.5	10.442	9	22 39 41.81	2.2464	3 0 2.3	13.333
10	20 55 22.10	2.2054	12 29 47.5	10.525	10	22 41 56.65	2.2482	2 46 41.4	13.364
11	20 57 34.44	2.2057	12 19 13.5	10.607	11	22 44 11.59	2.2499	2 33 18.6	13.395
12	20 59 46.78	2.2058	12 8 34.7	10.687	12	22 46 26.64	2.2518	2 19 54.0	13.424
13	21 1 59.14	2.2061	11 57 51.1	10.768	13	22 48 41.80	2.2537	2 6 27.7	13.452
14	21 4 11.51	2.2063	11 47 2.6	10.847	14	22 50 57.08	2.2556	1 52 59.8	13.478
15	21 6 23.90	2.2066	11 36 9.5	10.925	15	22 53 12.47	2.2575	1 39 30.3	13.503
16	21 8 36.30	2.2069	11 25 11.6	11.003	16	22 55 27.98	2.2596	1 25 59.4	13.527
17	21 10 48.73	2.2073	11 14 9.1	11.080	17	22 57 43.62	2.2616	1 12 27.1	13.548
18	21 13 1.17	2.2076	11 3 2.0	11.156	18	22 59 59.37	2.2637	0 58 53.6	13.569
19	21 15 13.64	2.2080	10 51 50.4	11.232	19	23 2 15.26	2.2658	0 45 18.8	13.588
20	21 17 26.13	2.2083	10 40 34.2	11.306	20	23 4 31.27	2.2680	0 31 43.0	13.606
21	21 19 38.64	2.2088	10 29 13.7	11.379	21	23 6 47.42	2.2703	0 18 6.1	13.623
22	21 21 51.18	2.2093	10 17 48.7	11.452	22	23 9 3.70	2.2724	-0 4 28.3	13.637
23	21 24 3.75	2.2098	10 6 19.5	11.523	23	23 11 20.11	2.2748	+0 9 10.3	13.650
24	21 26 16.35	2.2103	- 9 54 45.9	+11.595	24	23 13 36.07	2.2772	+0 22 49.7	+13.662

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.
MARCH 30.					APRIL 1.			
0	h m s	s	" ' "	"	0	h m s	s	" ' "
0	23 13 36.67	2.2772	+ 0 22 49.7	+13.662	0	1 6 19.60	2.4306	+11 0 43.5
1	23 15 53.37	2.2795	0 36 29.7	13.672	1	1 8 45.55	2.4343	11 12 56.7
2	23 18 10.21	2.2819	0 50 10.3	13.680	2	1 11 11.72	2.4380	11 25 5.6
3	23 20 27.20	2.2844	1 3 51.3	13.687	3	1 13 38.11	2.4418	11 37 10.0
4	23 22 44.34	2.2869	1 17 32.7	13.692	4	1 16 4.73	2.4455	11 49 9.8
5	23 25 1.63	2.2895	1 31 14.3	13.696	5	1 18 31.57	2.4492	12 1 4.0
6	23 27 19.08	2.2922	1 44 56.2	13.698	6	1 20 58.63	2.4529	12 12 55.2
7	23 29 36.69	2.2948	1 58 38.1	13.698	7	1 23 25.92	2.4567	12 24 40.6
8	23 31 54.45	2.2974	2 12 20.0	13.698	8	1 25 53.43	2.4603	12 36 21.0
9	23 34 12.38	2.3001	2 26 1.8	13.696	9	1 28 21.16	2.4640	12 47 56.4
10	23 36 30.46	2.3028	2 39 43.5	13.692	10	1 30 49.11	2.4677	12 59 26.5
11	23 38 48.72	2.3058	2 53 24.8	13.685	11	1 33 17.28	2.4713	13 10 51.3
12	23 41 7.15	2.3086	3 7 5.7	13.678	12	1 35 45.67	2.4750	13 22 10.8
13	23 43 25.75	2.3113	3 20 46.1	13.668	13	1 38 14.28	2.4787	13 33 24.8
14	23 45 44.51	2.3143	3 34 25.9	13.658	14	1 40 43.11	2.4823	13 44 33.1
15	23 48 3.46	2.3173	3 48 5.0	13.645	15	1 43 12.15	2.4858	13 55 35.8
16	23 50 22.58	2.3203	4 1 43.3	13.631	16	1 45 41.41	2.4894	14 6 32.7
17	23 52 41.89	2.3233	4 15 20.7	13.615	17	1 48 10.88	2.4930	14 17 23.7
18	23 55 1.37	2.3263	4 28 57.1	13.598	18	1 50 40.57	2.4965	14 28 8.7
19	23 57 21.04	2.3294	4 42 32.4	13.578	19	1 53 10.46	2.4999	14 38 47.7
20	23 59 40.90	2.3325	4 56 6.5	13.557	20	1 55 40.56	2.5035	14 49 20.5
21	0 2 0.94	2.3357	5 9 39.2	13.534	21	1 58 10.88	2.5069	14 59 47.0
22	0 4 21.18	2.3389	5 23 10.6	13.510	22	2 0 41.39	2.5103	15 10 7.2
23	0 6 41.61	2.3421	+ 5 36 40.4	+13.483	23	2 3 12.11	2.5137	+15 20 21.0
MARCH 31.					APRIL 2.			
0	h m s	s	" ' "	"	0	h m s	s	" ' "
0	0 9 2.23	2.3453	+ 5 50 8.6	+13.456	0	2 5 43.03	2.5170	+15 30 28.2
1	0 11 23.05	2.3487	6 3 35.1	13.426	1	2 8 14.15	2.5203	15 40 28.8
2	0 13 44.07	2.3520	6 16 59.7	13.394	2	2 10 45.47	2.5236	15 50 22.7
3	0 16 5.29	2.3553	6 30 22.4	13.361	3	2 13 16.98	2.5268	16 0 9.8
4	0 18 26.70	2.3587	6 43 43.0	13.326	4	2 15 48.68	2.5299	16 9 50.0
5	0 20 48.33	2.3621	6 57 1.5	13.289	5	2 18 20.57	2.5330	16 19 23.3
6	0 23 10.15	2.3655	7 10 17.7	13.251	6	2 20 52.64	2.5361	16 28 49.5
7	0 25 32.19	2.3690	7 23 31.6	13.211	7	2 23 24.90	2.5392	16 38 8.6
8	0 27 54.43	2.3724	7 36 43.0	13.169	8	2 25 57.34	2.5421	16 47 20.5
9	0 30 16.88	2.3760	7 49 51.9	13.125	9	2 28 29.95	2.5449	16 56 25.1
10	0 32 39.55	2.3795	8 2 58.0	13.079	10	2 31 2.73	2.5478	17 5 22.3
11	0 35 2.42	2.3830	8 16 1.4	13.033	11	2 33 35.69	2.5507	17 14 12.1
12	0 37 25.51	2.3866	8 29 1.9	12.983	12	2 36 8.81	2.5533	17 22 54.4
13	0 39 48.81	2.3902	8 41 59.4	12.933	13	2 38 42.09	2.5560	17 31 29.1
14	0 42 12.33	2.3938	8 54 53.8	12.880	14	2 41 15.53	2.5587	17 39 56.1
15	0 44 36.07	2.3974	9 7 45.0	12.825	15	2 43 49.13	2.5612	17 48 15.4
16	0 47 0.02	2.4011	9 20 32.8	12.768	16	2 46 22.87	2.5636	17 56 26.9
17	0 49 24.20	2.4048	9 33 17.2	12.711	17	2 48 56.76	2.5660	18 4 30.5
18	0 51 48.59	2.4083	9 45 58.1	12.652	18	2 51 30.79	2.5683	18 12 26.2
19	0 54 13.20	2.4121	9 58 35.4	12.590	19	2 54 4.96	2.5707	18 20 14.0
20	0 56 38.04	2.4158	10 11 8.9	12.527	20	2 56 39.27	2.5728	18 27 53.6
21	0 59 3.09	2.4194	10 23 38.6	12.462	21	2 59 13.70	2.5748	18 35 25.2
22	1 1 28.37	2.4232	10 36 4.3	12.395	22	3 1 48.25	2.5769	18 42 48.6
23	1 3 53.88	2.4269	10 48 26.0	12.327	23	3 4 22.93	2.5789	18 50 3.7
24	1 6 19.60	2.4306	+11 0 43.5	+12.256	24	3 6 57.72	2.5808	+18 57 10.6

GREENWICH MEAN TIME.

at don.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
APRIL 3.				APRIL 5.				
s	s	° ' "	"	h m s	s	° ' "	"	
57.72	2.5808	+18 57 10.6	+7.045	0	5 11 9.64	2.5547	+21 45 13.3	-0.104
32.62	2.5825	19 4 9.1	6.905	1	5 13 42.83	2.5516	21 45 2.6	0.251
7.62	2.5842	19 10 59.2	6.764	2	5 16 15.83	2.5484	21 44 43.2	0.397
42.72	2.5858	19 17 40.8	6.623	3	5 18 48.64	2.5452	21 44 15.0	0.543
17.92	2.5873	19 24 13.9	6.480	4	5 21 21.25	2.5418	21 43 38.0	0.688
53.20	2.5888	19 30 38.4	6.338	5	5 23 53.66	2.5384	21 42 52.4	0.833
28.57	2.5902	19 36 54.4	6.194	6	5 26 25.86	2.5349	21 41 58.1	0.976
4.02	2.5914	19 43 1.7	6.050	7	5 28 57.85	2.5313	21 40 55.3	1.119
39.54	2.5925	19 49 0.4	5.905	8	5 31 29.62	2.5277	21 39 43.8	1.262
15.12	2.5936	19 54 50.3	5.759	9	5 34 1.17	2.5239	21 38 23.9	1.403
50.77	2.5946	20 0 31.5	5.613	10	5 36 32.49	2.5200	21 36 55.4	1.545
26.47	2.5954	20 6 3.9	5.467	11	5 39 3.57	2.5161	21 35 18.5	1.685
2.22	2.5962	20 11 27.5	5.319	12	5 41 34.42	2.5122	21 33 33.2	1.824
38.01	2.5969	20 16 42.2	5.171	13	5 44 5.03	2.5080	21 31 39.6	1.963
13.85	2.5975	20 21 48.0	5.022	14	5 46 35.38	2.5038	21 29 37.6	2.102
49.71	2.5979	20 26 44.8	4.873	15	5 49 5.49	2.4997	21 27 27.4	2.238
25.60	2.5983	20 31 32.7	4.724	16	5 51 35.34	2.4953	21 25 9.0	2.374
1.50	2.5985	20 36 11.7	4.574	17	5 54 4.93	2.4910	21 22 42.5	2.509
37.42	2.5988	20 40 41.6	4.423	18	5 56 34.26	2.4865	21 20 7.9	2.644
13.35	2.5988	20 45 2.5	4.273	19	5 59 3.31	2.4819	21 17 25.2	2.778
49.28	2.5988	20 49 14.3	4.122	20	6 1 32.09	2.4774	21 14 34.5	2.910
25.20	2.5986	20 53 17.1	3.971	21	6 4 0.60	2.4728	21 11 36.0	3.042
1.11	2.5983	20 57 10.8	3.820	22	6 6 28.83	2.4681	21 8 29.5	3.173
37.00	2.5980	+21 0 55.5	+3.668	23	6 8 56.77	2.4633	+21 5 15.2	-3.303
APRIL 4.				APRIL 6.				
12.87	2.5976	+21 4 31.0	+3.515	0	6 11 24.43	2.4586	+21 1 53.1	-3.433
48.71	2.5969	21 7 57.4	3.364	1	6 13 51.80	2.4537	20 58 23.3	3.560
24.50	2.5962	21 11 14.7	3.212	2	6 16 18.87	2.4487	20 54 45.9	3.687
0.25	2.5954	21 14 22.8	3.059	3	6 18 45.64	2.4438	20 51 0.9	3.813
35.95	2.5945	21 17 21.8	2.908	4	6 21 12.12	2.4388	20 47 8.3	3.938
11.59	2.5935	21 20 11.7	2.756	5	6 23 38.29	2.4337	20 43 8.3	4.062
47.17	2.5925	21 22 52.5	2.603	6	6 26 4.16	2.4286	20 39 0.9	4.185
22.69	2.5913	21 25 24.1	2.451	7	6 28 29.72	2.4234	20 34 46.1	4.307
58.12	2.5899	21 27 46.6	2.298	8	6 30 54.97	2.4182	20 30 24.1	4.428
33.48	2.5886	21 29 59.9	2.147	9	6 33 19.90	2.4129	20 25 54.8	4.548
8.75	2.5870	21 32 4.2	1.995	10	6 35 44.52	2.4078	20 21 18.3	4.667
43.92	2.5853	21 33 59.3	1.843	11	6 38 8.83	2.4024	20 16 34.8	4.784
18.99	2.5836	21 35 45.3	1.691	12	6 40 32.81	2.3970	20 11 44.2	4.901
53.95	2.5818	21 37 22.2	1.539	13	6 42 56.47	2.3917	20 6 46.7	5.016
28.80	2.5798	21 38 50.0	1.388	14	6 45 19.81	2.3863	20 1 42.3	5.131
3.53	2.5778	21 40 8.8	1.238	15	6 47 42.82	2.3808	19 56 31.0	5.244
38.13	2.5755	21 41 18.6	1.088	16	6 50 5.51	2.3754	19 51 13.0	5.356
12.59	2.5733	21 42 19.3	0.937	17	6 52 27.87	2.3698	19 45 48.3	5.468
46.92	2.5709	21 43 11.0	0.787	18	6 54 49.89	2.3643	19 40 16.9	5.578
21.10	2.5685	21 43 53.7	0.637	19	6 57 11.59	2.3588	19 34 39.0	5.686
55.14	2.5659	21 44 27.4	0.488	20	6 59 32.95	2.3533	19 28 54.6	5.793
29.01	2.5633	21 44 52.2	0.339	21	7 1 53.98	2.3478	19 23 3.8	5.900
2.73	2.5605	21 45 8.1	0.191	22	7 4 14.68	2.3422	19 17 6.6	6.007
36.27	2.5576	21 45 15.1	+0.043	23	7 6 35.04	2.3365	19 11 3.0	6.111
9.64	2.5547	+21 45 13.3	-0.104	24	7 8 55.06	2.3308	+19 4 53.3	-6.213

GREENWICH MEAN TIME.

Hour.	Right Ascension.			Var. per Min.	Declination.			Var. per Min.	Hour.	Right Ascension.			Var. per Min.	Declination.				
APRIL 7.									APRIL 9.									
	h	m	s	s	"	"	"	"		h	m	s	s	"	"	"	"	
0	7	8	55.06	2.3309	+19	4	53.3	-6.213	0	8	54	29.80	2.0773	+12	29	4.4		
1	7	11	14.75	2.3253		18	58	37.4	6.316	1	8	56	34.30	2.0728		12	19	11.3
2	7	13	34.10	2.3197		18	52	15.4	6.417	2	8	58	38.54	2.0684		12	9	15.3
3	7	15	53.11	2.3140		18	45	47.4	6.517	3	9	0	42.51	2.0639		11	59	16.4
4	7	18	11.78	2.3084		18	39	13.4	6.615	4	9	2	46.21	2.0596		11	49	14.6
5	7	20	30.12	2.3028		18	32	33.6	6.713	5	9	4	49.66	2.0553		11	39	10.0
6	7	22	48.11	2.2971		18	25	47.9	6.809	6	9	6	52.85	2.0510		11	29	2.7
7	7	25	5.77	2.2915		18	18	56.5	6.904	7	9	8	55.78	2.0468		11	18	52.6
8	7	27	23.09	2.2859		18	11	59.4	6.999	8	9	10	58.47	2.0427		11	8	40.0
9	7	29	40.08	2.2803		18	4	56.6	7.092	9	9	13	0.90	2.0385		10	58	24.8
10	7	31	56.72	2.2746		17	57	48.4	7.183	10	9	15	3.09	2.0345		10	48	7.0
11	7	34	13.03	2.2690		17	50	34.6	7.275	11	9	17	5.04	2.0305		10	37	46.8
12	7	36	29.00	2.2633		17	43	15.4	7.364	12	9	19	6.75	2.0265		10	27	24.2
13	7	38	44.63	2.2578		17	35	50.9	7.453	13	9	21	8.22	2.0226		10	16	59.3
14	7	40	59.93	2.2523		17	28	21.1	7.540	14	9	23	9.46	2.0188		10	6	32.0
15	7	43	14.90	2.2467		17	20	46.1	7.626	15	9	25	10.47	2.0149		9	56	2.5
16	7	45	29.53	2.2411		17	13	6.0	7.711	16	9	27	11.25	2.0111		9	45	30.8
17	7	47	43.83	2.2355		17	5	20.8	7.795	17	9	29	11.80	2.0073		9	34	57.0
18	7	49	57.79	2.2299		16	57	30.6	7.878	18	9	31	12.13	2.0038		9	24	21.1
19	7	52	11.42	2.2245		16	49	35.5	7.959	19	9	33	12.25	2.0002		9	13	43.2
20	7	54	24.73	2.2190		16	41	35.5	8.040	20	9	35	12.15	1.9966		9	3	3.3
21	7	56	37.70	2.2135		16	33	30.7	8.120	21	9	37	11.84	1.9931		8	52	21.5
22	7	58	50.35	2.2081		16	25	21.1	8.198	22	9	39	11.32	1.9897		8	41	37.8
23	8	1	2.67	2.2026	+16	17	6.9	-8.275		23	9	41	10.60	1.9863	+	8	30	52.3
APRIL 8.									APRIL 10.									
0	8	3	14.66	2.1972	+16	8	48.1	-8.351	0	9	43	9.67	1.9828	+	8	20	5.0	
1	8	5	26.33	2.1918		16	0	24.8	8.426	1	9	45	8.54	1.9796		8	9	16.0
2	8	7	37.68	2.1865		15	51	57.0	8.500	2	9	47	7.22	1.9764		7	58	25.4
3	8	9	48.71	2.1812		15	43	24.8	8.573	3	9	49	5.71	1.9732		7	47	33.1
4	8	11	59.42	2.1759		15	34	48.3	8.645	4	9	51	4.00	1.9700		7	36	39.3
5	8	14	9.82	2.1707		15	26	7.4	8.716	5	9	53	2.11	1.9670		7	25	44.0
6	8	16	19.90	2.1653		15	17	22.4	8.785	6	9	55	0.04	1.9639		7	14	47.2
7	8	18	29.66	2.1602		15	8	33.2	8.853	7	9	56	57.78	1.9609		7	3	49.0
8	8	20	39.12	2.1550		14	59	40.0	8.921	8	9	58	55.35	1.9581		6	52	49.4
9	8	22	48.26	2.1498		14	50	42.7	8.988	9	10	0	52.75	1.9552		6	41	48.5
10	8	24	57.10	2.1448		14	41	41.5	9.053	10	10	2	49.97	1.9523		6	30	46.4
11	8	27	5.63	2.1397		14	32	36.4	9.118	11	10	4	47.03	1.9496		6	19	43.0
12	8	29	13.86	2.1347		14	23	27.4	9.181	12	10	6	43.92	1.9468		6	8	38.5
13	8	31	21.79	2.1297		14	14	14.7	9.243	13	10	8	40.65	1.9443		5	57	32.9
14	8	33	29.42	2.1247		14	4	58.3	9.303	14	10	10	37.23	1.9417		5	46	26.2
15	8	35	36.75	2.1197		13	55	38.3	9.363	15	10	12	33.65	1.9391		5	35	18.5
16	8	37	43.78	2.1148		13	46	14.7	9.423	16	10	14	29.92	1.9366		5	24	9.8
17	8	39	50.53	2.1101		13	36	47.6	9.481	17	10	16	26.04	1.9342		5	13	0.1
18	8	41	56.99	2.1053		13	27	17.0	9.538	18	10	18	22.02	1.9318		5	1	49.6
19	8	44	3.16	2.1004		13	17	43.0	9.594	19	10	20	17.86	1.9295		4	50	38.3
20	8	46	9.04	2.0958		13	8	5.7	9.648	20	10	22	13.56	1.9272		4	39	26.2
21	8	48	14.65	2.0912		12	58	25.2	9.703	21	10	24	9.12	1.9250		4	28	13.3
22	8	50	19.98	2.0865		12	48	41.4	9.757	22	10	26	4.56	1.9228		4	16	59.7
23	8	52	25.03	2.0818		12	38	54.4	9.808	23	10	27	59.86	1.9207		4	5	45.5
24	8	54	29.80	2.0773	+12	29	4.4	-9.859		24	10	29	55.04	1.9187	+	3	54	30.7

MOON, 1919.

51

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
APRIL 11.					APRIL 13.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	10 29 55.04	1.9187	+3 54 30.7	-11.252	0	12 0 37.98	1.8802	- 5 2 47.8	-10.867
1	10 31 50.10	1.9167	3 43 15.3	11.260	1	12 2 30.80	1.8806	5 13 39.0	10.841
2	10 33 45.04	1.9147	3 31 59.5	11.268	2	12 4 23.65	1.8810	5 24 28.7	10.815
3	10 35 39.86	1.9128	3 20 43.1	11.277	3	12 6 16.52	1.8814	5 35 16.8	10.788
4	10 37 34.58	1.9110	3 9 26.3	11.283	4	12 8 9.42	1.8819	5 46 3.3	10.761
5	10 39 29.18	1.9092	2 58 9.2	11.288	5	12 10 2.35	1.8825	5 56 48.1	10.733
6	10 41 23.68	1.9075	2 46 51.7	11.293	6	12 11 55.32	1.8831	6 7 31.3	10.706
7	10 43 18.08	1.9058	2 35 34.0	11.298	7	12 13 48.32	1.8837	6 18 12.8	10.677
8	10 45 12.38	1.9042	2 24 16.0	11.302	8	12 15 41.36	1.8843	6 28 52.5	10.647
9	10 47 6.58	1.9026	2 12 57.8	11.305	9	12 17 34.44	1.8851	6 39 30.4	10.617
10	10 49 0.69	1.9011	2 1 39.4	11.307	10	12 19 27.57	1.8858	6 50 6.5	10.585
11	10 50 54.71	1.8996	1 50 21.0	11.308	11	12 21 20.74	1.8866	7 0 40.6	10.553
12	10 52 48.64	1.8982	1 39 2.5	11.308	12	12 23 13.96	1.8874	7 11 12.9	10.522
13	10 54 42.49	1.8968	1 27 44.0	11.308	13	12 25 7.23	1.8883	7 21 43.2	10.488
14	10 56 36.26	1.8955	1 16 25.5	11.308	14	12 27 0.55	1.8892	7 32 11.5	10.455
15	10 58 29.95	1.8942	1 5 7.0	11.307	15	12 28 53.93	1.8901	7 42 37.8	10.421
16	11 0 23.56	1.8930	0 53 48.7	11.304	16	12 30 47.36	1.8911	7 53 2.0	10.385
17	11 2 17.11	1.8919	0 42 30.5	11.302	17	12 32 40.86	1.8921	8 3 24.0	10.349
18	11 4 10.59	1.8908	0 31 12.5	11.298	18	12 34 34.41	1.8931	8 13 43.9	10.313
19	11 6 4.00	1.8897	0 19 54.8	11.293	19	12 36 28.03	1.8943	8 24 1.6	10.277
20	11 7 57.35	1.8887	+0 8 37.3	11.288	20	12 38 21.72	1.8953	8 34 17.1	10.239
21	11 9 50.64	1.8877	-0 2 39.8	11.283	21	12 40 15.47	1.8965	8 44 30.3	10.200
22	11 11 43.87	1.8868	0 13 56.6	11.277	22	12 42 9.30	1.8978	8 54 41.1	10.161
23	11 13 37.05	1.8859	-0 25 13.0	-11.269	23	12 44 3.20	1.8989	- 9 4 49.6	-10.122
APRIL 12.					APRIL 14.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	11 15 30.18	1.8852	-0 36 28.9	-11.261	0	12 45 57.17	1.9002	- 9 14 55.7	-10.082
1	11 17 23.27	1.8844	0 47 44.3	11.253	1	12 47 51.22	1.9015	9 24 59.4	10.041
2	11 19 16.31	1.8837	0 58 59.2	11.244	2	12 49 45.35	1.9028	9 35 0.6	9.998
3	11 21 9.31	1.8830	1 10 13.6	11.234	3	12 51 39.56	1.9043	9 44 59.2	9.956
4	11 23 2.27	1.8824	1 21 27.3	11.223	4	12 53 33.86	1.9057	9 54 55.3	9.913
5	11 24 55.20	1.8818	1 32 40.3	11.211	5	12 55 28.24	1.9070	10 4 48.8	9.870
6	11 26 48.09	1.8813	1 43 52.6	11.199	6	12 57 22.70	1.9085	10 14 39.7	9.826
7	11 28 40.96	1.8809	1 55 4.2	11.187	7	12 59 17.26	1.9101	10 24 27.9	9.781
8	11 30 33.80	1.8805	2 6 15.0	11.173	8	13 1 11.91	1.9116	10 34 13.4	9.736
9	11 32 26.62	1.8802	2 17 25.0	11.160	9	13 3 6.65	1.9131	10 43 56.2	9.690
10	11 34 19.42	1.8798	2 28 34.2	11.145	10	13 5 1.48	1.9147	10 53 36.2	9.643
11	11 36 12.20	1.8795	2 39 42.4	11.128	11	13 6 56.41	1.9163	11 3 13.3	9.591
12	11 38 4.96	1.8793	2 50 49.6	11.113	12	13 8 51.44	1.9180	11 12 47.5	9.546
13	11 39 57.71	1.8792	3 1 55.9	11.096	13	13 10 46.57	1.9197	11 22 18.8	9.498
14	11 41 50.46	1.8790	3 13 1.1	11.078	14	13 12 41.80	1.9213	11 31 47.2	9.448
15	11 43 43.19	1.8788	3 24 5.3	11.061	15	13 14 37.13	1.9231	11 41 12.6	9.398
16	11 45 35.92	1.8788	3 35 8.4	11.042	16	13 16 32.57	1.9248	11 50 35.0	9.348
17	11 47 28.65	1.8789	3 46 10.3	11.022	17	13 18 28.11	1.9267	11 59 54.4	9.297
18	11 49 21.39	1.8790	3 57 11.0	11.002	18	13 20 23.77	1.9285	12 9 10.6	9.244
19	11 51 14.13	1.8790	4 8 10.5	10.981	19	13 22 19.53	1.9303	12 18 23.7	9.192
20	11 53 6.87	1.8791	4 19 8.7	10.958	20	13 24 15.40	1.9322	12 27 33.6	9.138
21	11 54 59.62	1.8793	4 30 5.5	10.936	21	13 26 11.39	1.9341	12 36 40.3	9.085
22	11 56 52.39	1.8797	4 41 1.0	10.913	22	13 28 7.49	1.9360	12 45 43.8	9.030
23	11 58 45.18	1.8799	4 51 55.0	10.890	23	13 30 3.71	1.9380	12 54 43.9	8.971
24	12 0 37.98	1.8802	-5 2 47.8	-10.867	24	13 32 0.05	1.9399	-13 3 40.7	- 8.918

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.
APRIL 15.					APRIL 17.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	13 32 0.05	1.9399	-13 3 40.7	-8.918	0	15 7 40.27	2.0492	-18 55 39.6
1	13 33 56.50	1.9418	13 12 34.1	8.862	1	15 9 43.29	2.0515	19 1 8.3
2	13 35 53.07	1.9439	13 21 24.1	8.805	2	15 11 46.45	2.0538	19 6 31.9
3	13 37 49.77	1.9459	13 30 10.7	8.748	3	15 13 49.75	2.0562	19 11 50.3
4	13 39 46.58	1.9479	13 38 53.8	8.689	4	15 15 53.19	2.0585	19 17 3.7
5	13 41 43.52	1.9501	13 47 33.4	8.630	5	15 17 56.77	2.0608	19 22 11.8
6	13 43 40.59	1.9522	13 56 9.4	8.570	6	15 20 0.48	2.0630	19 27 14.7
7	13 45 37.78	1.9543	14 4 41.8	8.510	7	15 22 4.33	2.0653	19 32 12.4
8	13 47 35.10	1.9563	14 13 10.6	8.448	8	15 24 8.31	2.0675	19 37 4.7
9	13 49 32.54	1.9585	14 21 35.6	8.387	9	15 26 12.43	2.0698	19 41 51.8
10	13 51 30.12	1.9607	14 29 57.0	8.326	10	15 28 16.68	2.0719	19 46 33.6
11	13 53 27.82	1.9628	14 38 14.7	8.263	11	15 30 21.06	2.0742	19 51 10.0
12	13 55 25.66	1.9651	14 46 28.5	8.198	12	15 32 25.58	2.0764	19 55 41.0
13	13 57 23.63	1.9673	14 54 38.5	8.135	13	15 34 30.23	2.0785	20 0 6.6
14	13 59 21.73	1.9695	15 2 44.7	8.070	14	15 36 35.00	2.0806	20 4 26.8
15	14 1 19.97	1.9718	15 10 46.9	8.004	15	15 38 39.90	2.0828	20 8 41.5
16	14 3 18.34	1.9739	15 18 45.2	7.939	16	15 40 44.93	2.0849	20 12 50.7
17	14 5 16.84	1.9762	15 26 39.6	7.873	17	15 42 50.09	2.0870	20 16 54.4
18	14 7 15.48	1.9785	15 34 29.9	7.805	18	15 44 55.37	2.0890	20 20 52.5
19	14 9 14.26	1.9808	15 42 16.2	7.738	19	15 47 0.77	2.0911	20 24 45.1
20	14 11 13.18	1.9831	15 49 58.4	7.669	20	15 49 6.30	2.0932	20 28 32.1
21	14 13 12.23	1.9854	15 57 36.5	7.600	21	15 51 11.95	2.0952	20 32 13.5
22	14 15 11.43	1.9878	16 5 10.4	7.531	22	15 53 17.72	2.0972	20 35 49.2
23	14 17 10.77	1.9901	-16 12 40.2	-7.461	23	15 55 23.61	2.0991	-20 39 19.3
APRIL 16.					APRIL 18.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	14 19 10.24	1.9923	-16 20 5.7	-7.390	0	15 57 29.61	2.1010	-20 42 43.7
1	14 21 9.85	1.9948	16 27 27.0	7.318	1	15 59 35.73	2.1030	20 46 2.4
2	14 23 9.61	1.9972	16 34 43.9	7.246	2	16 1 41.97	2.1048	20 49 15.3
3	14 25 9.51	1.9995	16 41 56.5	7.174	3	16 3 48.31	2.1067	20 52 22.5
4	14 27 9.55	2.0018	16 49 4.8	7.101	4	16 5 54.77	2.1086	20 55 23.8
5	14 29 9.73	2.0042	16 56 8.6	7.027	5	16 8 1.34	2.1104	20 58 19.4
6	14 31 10.05	2.0065	17 3 8.0	6.953	6	16 10 8.02	2.1123	21 1 9.2
7	14 33 10.51	2.0089	17 10 3.0	6.878	7	16 12 14.81	2.1139	21 3 53.1
8	14 35 11.12	2.0114	17 16 53.4	6.803	8	16 14 21.69	2.1157	21 6 31.2
9	14 37 11.88	2.0138	17 23 39.3	6.727	9	16 16 28.69	2.1174	21 9 3.4
10	14 39 12.77	2.0161	17 30 20.6	6.650	10	16 18 35.78	2.1191	21 11 29.6
11	14 41 13.81	2.0185	17 36 57.3	6.573	11	16 20 42.98	2.1208	21 13 50.0
12	14 43 14.99	2.0209	17 43 29.3	6.495	12	16 22 50.27	2.1223	21 16 4.4
13	14 45 16.32	2.0233	17 49 56.7	6.417	13	16 24 57.66	2.1240	21 18 12.5
14	14 47 17.78	2.0256	17 56 19.3	6.338	14	16 27 5.15	2.1256	21 20 15.3
15	14 49 19.39	2.0280	18 2 37.2	6.259	15	16 29 12.73	2.1271	21 22 11.8
16	14 51 21.14	2.0303	18 8 50.4	6.179	16	16 31 20.40	2.1286	21 24 2.3
17	14 53 23.03	2.0328	18 14 58.7	6.098	17	16 33 28.16	2.1301	21 25 46.7
18	14 55 25.07	2.0352	18 21 2.2	6.018	18	16 35 36.01	2.1315	21 27 25.1
19	14 57 27.25	2.0375	18 27 0.8	5.936	19	16 37 43.94	2.1329	21 28 57.5
20	14 59 29.57	2.0399	18 32 54.5	5.853	20	16 39 51.96	2.1343	21 30 23.8
21	15 1 32.04	2.0423	18 38 43.2	5.771	21	16 42 0.06	2.1357	21 31 44.0
22	15 3 34.64	2.0446	18 44 27.0	5.688	22	16 44 8.24	2.1370	21 32 58.0
23	15 5 37.39	2.0469	18 50 5.8	5.605	23	16 46 16.50	2.1383	21 34 6.0
24	15 7 40.27	2.0492	-18 55 39.6	-5.521	24	16 48 24.84	2.1396	-21 35 7.5

MOON, 1919.

53

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
APRIL 19.					APRIL 21.				
	<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>		<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>
0	16 48 24.84	2.1396	-21 35 7.9	-0.980	0	18 31 57.07	2.1628	-20 22 11.1	+4.026
1	16 50 33.25	2.1408	21 36 3.6	0.878	1	18 34 6.83	2.1626	20 18 6.5	4.128
2	16 52 41.74	2.1420	21 36 53.2	0.775	2	18 36 16.58	2.1623	20 13 55.7	4.232
3	16 54 50.29	2.1432	21 37 36.6	0.673	3	18 38 26.31	2.1621	20 9 38.7	4.334
4	16 56 58.92	2.1443	21 38 13.9	0.569	4	18 40 36.03	2.1618	20 5 15.6	4.437
5	16 59 7.61	2.1453	21 38 44.9	0.465	5	18 42 45.73	2.1616	20 0 46.3	4.539
6	17 1 16.36	2.1464	21 39 9.7	0.363	6	18 44 55.42	2.1613	19 56 10.9	4.641
7	17 3 25.18	2.1475	21 39 28.4	0.259	7	18 47 5.09	2.1610	19 51 29.4	4.743
8	17 5 34.06	2.1485	21 39 40.8	0.155	8	18 49 14.74	2.1607	19 46 41.7	4.845
9	17 7 43.00	2.1494	21 39 47.0	-0.052	9	18 51 24.37	2.1603	19 41 48.0	4.946
10	17 9 51.99	2.1504	21 39 47.0	+0.053	10	18 53 33.97	2.1599	19 36 48.2	5.048
11	17 12 1.05	2.1513	21 39 40.7	0.158	11	18 55 43.56	2.1596	19 31 42.3	5.148
12	17 14 10.15	2.1522	21 39 28.1	0.262	12	18 57 53.12	2.1592	19 26 30.4	5.248
13	17 16 19.31	2.1530	21 39 9.3	0.365	13	19 0 2.66	2.1588	19 21 12.5	5.349
14	17 18 28.51	2.1538	21 38 44.3	0.469	14	19 2 12.17	2.1583	19 15 48.5	5.450
15	17 20 37.76	2.1546	21 38 13.0	0.574	15	19 4 21.66	2.1579	19 10 18.5	5.549
16	17 22 47.06	2.1553	21 37 35.4	0.679	16	19 6 31.12	2.1575	19 4 42.6	5.648
17	17 24 56.40	2.1560	21 36 51.5	0.784	17	19 8 40.56	2.1570	18 59 0.7	5.748
18	17 27 5.78	2.1567	21 36 1.3	0.888	18	19 10 49.96	2.1565	18 53 12.8	5.848
19	17 29 15.20	2.1573	21 35 4.9	0.993	19	19 12 59.34	2.1562	18 47 19.0	5.946
20	17 31 24.65	2.1578	21 34 2.2	1.098	20	19 15 8.70	2.1557	18 41 19.3	6.044
21	17 33 34.14	2.1585	21 32 53.1	1.203	21	19 17 18.02	2.1552	18 35 13.7	6.143
22	17 35 43.67	2.1591	21 31 37.8	1.308	22	19 19 27.32	2.1548	18 29 2.2	6.240
23	17 37 53.23	2.1595	-21 30 16.2	+1.413	23	19 21 36.59	2.1543	-18 22 44.9	+6.338
APRIL 20.					APRIL 22.				
	<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>		<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>
0	17 40 2.81	2.1599	-21 28 48.2	+1.518	0	19 23 45.83	2.1538	-18 16 21.7	+6.435
1	17 42 12.42	2.1604	21 27 14.0	1.623	1	19 25 55.04	2.1533	18 9 52.7	6.532
2	17 44 22.06	2.1609	21 25 33.4	1.728	2	19 28 4.22	2.1528	18 3 17.9	6.628
3	17 46 31.73	2.1613	21 23 46.6	1.833	3	19 30 13.37	2.1523	17 56 37.4	6.723
4	17 48 41.41	2.1616	21 21 53.4	1.938	4	19 32 22.49	2.1518	17 49 51.1	6.819
5	17 50 51.12	2.1619	21 19 54.0	2.043	5	19 34 31.58	2.1512	17 42 59.1	6.915
6	17 53 0.84	2.1622	21 17 48.2	2.148	6	19 36 40.63	2.1507	17 36 1.3	7.010
7	17 55 10.58	2.1625	21 15 36.2	2.253	7	19 38 49.66	2.1503	17 28 57.9	7.104
8	17 57 20.34	2.1628	21 13 17.8	2.359	8	19 40 58.66	2.1498	17 21 48.8	7.198
9	17 59 30.11	2.1628	21 10 53.1	2.463	9	19 43 7.63	2.1493	17 14 34.1	7.292
10	18 1 39.88	2.1630	21 8 22.2	2.568	10	19 45 16.57	2.1488	17 7 13.8	7.385
11	18 3 49.67	2.1633	21 5 44.9	2.673	11	19 47 25.49	2.1483	16 59 47.9	7.478
12	18 5 59.47	2.1633	21 3 1.4	2.778	12	19 49 34.37	2.1478	16 52 16.4	7.571
13	18 8 9.27	2.1634	21 0 11.6	2.883	13	19 51 43.22	2.1473	16 44 39.4	7.663
14	18 10 19.08	2.1635	20 57 15.5	2.987	14	19 53 52.04	2.1468	16 36 56.8	7.755
15	18 12 28.89	2.1635	20 54 13.2	3.091	15	19 56 0.84	2.1463	16 29 8.8	7.846
16	18 14 38.70	2.1635	20 51 4.6	3.196	16	19 58 9.60	2.1458	16 21 15.3	7.937
17	18 16 48.51	2.1635	20 47 49.7	3.300	17	20 0 18.34	2.1455	16 13 16.4	8.027
18	18 18 58.32	2.1635	20 44 28.6	3.403	18	20 2 27.06	2.1450	16 5 12.1	8.117
19	18 21 8.13	2.1634	20 41 1.3	3.508	19	20 4 35.74	2.1445	15 57 2.4	8.206
20	18 23 17.93	2.1633	20 37 27.7	3.612	20	20 6 44.40	2.1442	15 48 47.4	8.295
21	18 25 27.73	2.1633	20 33 47.9	3.716	21	20 8 53.04	2.1438	15 40 27.0	8.384
22	18 27 37.52	2.1631	20 30 1.8	3.819	22	20 11 1.65	2.1433	15 32 1.3	8.472
23	18 29 47.30	2.1629	20 26 9.6	3.923	23	20 13 10.24	2.1430	15 23 30.4	8.558
24	18 31 57.07	2.1628	-20 22 11.1	+4.026	24	20 15 18.81	2.1427	-15 14 54.3	+8.645

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.
APRIL 23.					APRIL 25.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	20 15 18.81	2.1427	-15 14 54.3	+ 8.645	0	21 58 12.54	2.1575	-6 51 7.7
1	20 17 27.36	2.1423	15 6 13.0	8.732	1	22 0 22.03	2.1588	6 39 1.5
2	20 19 35.89	2.1419	14 57 26.5	8.818	2	22 2 31.59	2.1600	6 26 52.1
3	20 21 44.39	2.1416	14 48 34.8	8.903	3	22 4 41.23	2.1613	6 14 39.7
4	20 23 52.88	2.1413	14 39 38.1	8.988	4	22 6 50.95	2.1628	6 2 24.3
5	20 26 1.35	2.1411	14 30 36.2	9.073	5	22 9 0.76	2.1642	5 50 5.9
6	20 28 9.81	2.1408	14 21 29.4	9.156	6	22 11 10.65	2.1657	5 37 44.6
7	20 30 18.25	2.1406	14 12 17.5	9.239	7	22 13 20.64	2.1673	5 25 20.5
8	20 32 26.68	2.1404	14 3 0.7	9.322	8	22 15 30.72	2.1688	5 12 53.6
9	20 34 35.10	2.1402	13 53 38.9	9.404	9	22 17 40.90	2.1704	5 0 24.0
10	20 36 43.50	2.1399	13 44 12.2	9.486	10	22 19 51.17	2.1721	4 47 51.7
11	20 38 51.89	2.1398	13 34 40.6	9.567	11	22 22 1.55	2.1739	4 35 16.9
12	20 41 0.28	2.1398	13 25 4.2	9.647	12	22 24 12.04	2.1758	4 22 39.5
13	20 43 8.66	2.1397	13 15 23.0	9.726	13	22 26 22.64	2.1775	4 9 59.6
14	20 45 17.04	2.1396	13 5 37.1	9.805	14	22 28 33.34	2.1794	3 57 17.4
15	20 47 25.41	2.1395	12 55 46.4	9.884	15	22 30 44.17	2.1814	3 44 32.8
16	20 49 33.78	2.1395	12 45 51.0	9.963	16	22 32 55.11	2.1833	3 31 45.9
17	20 51 42.15	2.1395	12 35 50.9	10.039	17	22 35 6.17	2.1854	3 18 56.8
18	20 53 50.52	2.1396	12 25 46.3	10.116	18	22 37 17.36	2.1876	3 6 5.5
19	20 55 58.90	2.1397	12 15 37.0	10.193	19	22 39 28.68	2.1898	2 53 12.2
20	20 58 7.28	2.1397	12 5 23.2	10.268	20	22 41 40.13	2.1920	2 40 16.9
21	21 0 15.66	2.1398	11 55 4.9	10.342	21	22 43 51.72	2.1943	2 27 19.7
22	21 2 24.06	2.1400	11 44 42.2	10.416	22	22 46 3.44	2.1965	2 14 20.5
23	21 4 32.46	2.1402	-11 34 15.0	+10.489	23	22 48 15.30	2.1989	-2 1 19.6
APRIL 24.					APRIL 26.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	21 6 40.88	2.1404	-11 23 43.5	+10.562	0	22 50 27.31	2.2013	-1 48 16.9
1	21 8 49.31	2.1408	11 13 7.6	10.634	1	22 52 39.46	2.2038	1 35 12.6
2	21 10 57.77	2.1411	11 2 27.4	10.705	2	22 54 51.77	2.2063	1 22 6.7
3	21 13 6.24	2.1413	10 51 43.0	10.776	3	22 57 4.22	2.2089	1 8 59.4
4	21 15 14.73	2.1417	10 40 54.3	10.846	4	22 59 16.84	2.2117	0 55 50.6
5	21 17 23.24	2.1421	10 30 1.5	10.915	5	23 1 29.62	2.2143	0 42 40.4
6	21 19 31.78	2.1426	10 19 4.5	10.983	6	23 3 42.55	2.2170	0 29 29.0
7	21 21 40.35	2.1431	10 8 3.5	11.051	7	23 5 55.66	2.2199	0 16 16.4
8	21 23 48.95	2.1436	9 56 58.4	11.118	8	23 8 8.94	2.2228	-0 3 2.6
9	21 25 57.58	2.1441	9 45 49.4	11.183	9	23 10 22.39	2.2256	+0 10 12.2
10	21 28 6.24	2.1447	9 34 36.4	11.249	10	23 12 36.01	2.2286	0 23 28.0
11	21 30 14.94	2.1453	9 23 19.5	11.313	11	23 14 49.82	2.2317	0 36 44.6
12	21 32 23.68	2.1460	9 11 58.8	11.377	12	23 17 3.81	2.2348	0 50 2.1
13	21 34 32.46	2.1468	9 0 34.3	11.440	13	23 19 17.99	2.2378	1 3 20.3
14	21 36 41.29	2.1475	8 49 6.0	11.503	14	23 21 32.35	2.2410	1 16 39.1
15	21 38 50.16	2.1483	8 37 34.0	11.563	15	23 23 46.91	2.2443	1 29 58.5
16	21 40 59.08	2.1491	8 25 58.4	11.624	16	23 26 1.67	2.2476	1 43 18.3
17	21 43 8.05	2.1500	8 14 19.1	11.684	17	23 28 16.62	2.2508	1 56 38.6
18	21 45 17.08	2.1509	8 2 36.3	11.743	18	23 30 31.77	2.2543	2 9 59.1
19	21 47 26.16	2.1519	7 50 50.0	11.801	19	23 32 47.13	2.2578	2 23 19.9
20	21 49 35.31	2.1530	7 39 0.2	11.858	20	23 35 2.70	2.2613	2 36 40.8
21	21 51 44.52	2.1540	7 27 7.1	11.913	21	23 37 18.48	2.2648	2 50 1.7
22	21 53 53.79	2.1551	7 15 10.6	11.970	22	23 39 34.47	2.2683	3 3 22.5
23	21 56 3.13	2.1563	7 3 10.7	12.024	23	23 41 50.68	2.2720	3 16 43.3
24	21 58 12.54	2.1575	-6 51 7.7	+12.077	24	23 44 7.11	2.2757	+3 30 3.8

MOON, 1919.

55

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
APRIL 27.					APRIL 29.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	23 44 7.11	2.2757	+ 3 30 3.8	+13.339	0	1 38 22.10	2.4946	+13 33 38.9	+11.138
1	23 46 23.76	2.2794	3 43 24.0	13.333	1	1 40 51.92	2.4994	13 44 44.5	11.048
2	23 48 40.64	2.2833	3 56 43.8	13.325	2	1 43 22.03	2.5043	13 55 44.7	10.957
3	23 50 57.75	2.2871	4 10 3.0	13.316	3	1 45 52.43	2.5091	14 6 39.3	10.863
4	23 53 15.09	2.2910	4 23 21.7	13.305	4	1 48 23.12	2.5139	14 17 28.3	10.769
5	23 55 32.67	2.2949	4 36 39.6	13.293	5	1 50 54.10	2.5187	14 28 11.6	10.672
6	23 57 50.48	2.2989	4 49 56.8	13.279	6	1 53 25.36	2.5234	14 38 48.9	10.573
7	0 0 8.54	2.3030	5 3 13.1	13.263	7	1 55 56.91	2.5282	14 49 20.4	10.474
8	0 2 26.84	2.3070	5 16 28.4	13.247	8	1 58 28.74	2.5328	14 59 45.8	10.372
9	0 4 45.38	2.3111	5 29 42.7	13.228	9	2 1 0.85	2.5375	15 10 5.0	10.268
10	0 7 4.17	2.3153	5 42 55.7	13.207	10	2 3 33.24	2.5422	15 20 17.9	10.163
11	0 9 23.21	2.3195	5 56 7.5	13.185	11	2 6 5.91	2.5468	15 30 24.5	10.056
12	0 11 42.51	2.3238	6 9 17.9	13.161	12	2 8 38.85	2.5513	15 40 24.6	9.947
13	0 14 2.06	2.3280	6 22 26.8	13.136	13	2 11 12.06	2.5558	15 50 18.1	9.837
14	0 16 21.87	2.3323	6 35 34.2	13.109	14	2 13 45.55	2.5603	16 0 5.0	9.725
15	0 18 41.94	2.3368	6 48 39.9	13.080	15	2 16 19.30	2.5647	16 9 45.1	9.611
16	0 21 2.28	2.3412	7 1 43.8	13.050	16	2 18 53.31	2.5690	16 19 18.3	9.496
17	0 23 22.88	2.3456	7 14 45.9	13.018	17	2 21 27.58	2.5733	16 28 44.6	9.379
18	0 25 43.75	2.3501	7 27 45.9	12.983	18	2 24 2.11	2.5776	16 38 3.8	9.260
19	0 28 4.89	2.3546	7 40 43.8	12.948	19	2 26 36.89	2.5818	16 47 15.8	9.140
20	0 30 26.30	2.3592	7 53 39.6	12.911	20	2 29 11.92	2.5858	16 56 20.6	9.019
21	0 32 47.99	2.3638	8 6 33.1	12.872	21	2 31 47.19	2.5899	17 5 18.1	8.896
22	0 35 9.95	2.3683	8 19 24.2	12.830	22	2 34 22.71	2.5939	17 14 8.1	8.771
23	0 37 32.19	2.3730	+ 8 32 12.7	+12.788	23	2 36 58.46	2.5978	+17 22 50.6	+ 8.645
APRIL 28.					APRIL 30.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	0 39 54.71	2.3777	+ 8 44 58.7	+12.743	0	2 39 34.45	2.6018	+17 31 25.5	+ 8.518
1	0 42 17.51	2.3823	8 57 41.9	12.697	1	2 42 10.67	2.6055	17 39 52.7	8.389
2	0 44 40.59	2.3871	9 10 22.3	12.649	2	2 44 47.11	2.6093	17 48 12.2	8.259
3	0 47 3.96	2.3918	9 22 59.8	12.600	3	2 47 23.78	2.6129	17 56 23.8	8.127
4	0 49 27.61	2.3966	9 35 34.3	12.548	4	2 50 0.66	2.6164	18 4 27.4	7.993
5	0 51 51.55	2.4014	9 48 5.6	12.495	5	2 52 37.75	2.6198	18 12 23.0	7.859
6	0 54 15.78	2.4063	10 0 33.7	12.440	6	2 55 15.04	2.6232	18 20 10.5	7.723
7	0 56 40.30	2.4111	10 12 58.4	12.383	7	2 57 52.53	2.6265	18 27 49.8	7.586
8	0 59 5.11	2.4159	10 25 19.6	12.323	8	3 0 30.22	2.6298	18 35 20.8	7.448
9	1 1 30.21	2.4208	10 37 37.2	12.263	9	3 3 8.10	2.6328	18 42 43.5	7.309
10	1 3 55.60	2.4257	10 49 51.2	12.202	10	3 5 46.16	2.6358	18 49 57.9	7.168
11	1 6 21.29	2.4306	11 2 1.4	12.138	11	3 8 24.39	2.6387	18 57 3.7	7.026
12	1 8 47.27	2.4355	11 14 7.7	12.072	12	3 11 2.80	2.6415	19 4 1.0	6.883
13	1 11 13.55	2.4404	11 26 10.0	12.003	13	3 13 41.37	2.6443	19 10 49.7	6.739
14	1 13 40.12	2.4453	11 38 8.1	11.933	14	3 16 20.11	2.6469	19 17 29.7	6.593
15	1 16 6.99	2.4503	11 50 2.0	11.863	15	3 18 59.00	2.6493	19 24 0.9	6.448
16	1 18 34.15	2.4552	12 1 51.6	11.789	16	3 21 38.03	2.6517	19 30 23.4	6.301
17	1 21 1.61	2.4602	12 13 36.7	11.714	17	3 24 17.20	2.6539	19 36 37.0	6.152
18	1 23 29.37	2.4651	12 25 17.3	11.637	18	3 26 56.50	2.6562	19 42 41.6	6.003
19	1 25 57.42	2.4700	12 36 53.2	11.558	19	3 29 35.94	2.6583	19 48 37.3	5.853
20	1 28 25.77	2.4749	12 48 24.3	11.478	20	3 32 15.49	2.6601	19 54 24.0	5.703
21	1 30 54.41	2.4798	12 59 50.6	11.396	21	3 34 55.15	2.6619	20 0 1.6	5.550
22	1 33 23.34	2.4847	13 11 11.8	11.312	22	3 37 34.92	2.6637	20 5 30.0	5.398
23	1 35 52.57	2.4897	13 22 28.0	11.226	23	3 40 14.79	2.6653	20 10 49.3	5.245
24	1 38 22.10	2.4946	+13 33 38.9	+11.138	24	3 42 54.75	2.6667	+20 15 59.4	+ 5.091

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MAY 1.					MAY 3.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	3 42 54.75	2.6667	+20 15 59.4	+5.091	0	5 50 5.86	2.5833	+21 18 15.8	-2.416
1	3 45 34.79	2.6680	20 21 0.2	4.936	1	5 52 40.72	2.5787	21 15 46.5	2.561
2	3 48 14.91	2.6693	20 25 51.7	4.781	2	5 55 15.30	2.5739	21 13 8.5	2.705
3	3 50 55.10	2.6703	20 30 33.9	4.625	3	5 57 49.59	2.5690	21 10 21.9	2.847
4	3 53 35.34	2.6712	20 35 6.7	4.468	4	6 0 23.58	2.5640	21 7 26.9	2.988
5	3 56 15.64	2.6720	20 39 30.1	4.312	5	6 2 57.27	2.5590	21 4 23.3	3.129
6	3 58 55.98	2.6728	20 43 44.1	4.154	6	6 5 30.66	2.5539	21 1 11.4	3.268
7	4 1 36.37	2.6733	20 47 48.6	3.996	7	6 8 3.74	2.5488	20 57 51.2	3.407
8	4 4 16.78	2.6737	20 51 43.6	3.838	8	6 10 36.51	2.5435	20 54 22.6	3.544
9	4 6 57.21	2.6740	20 55 29.1	3.679	9	6 13 8.96	2.5381	20 50 45.9	3.680
10	4 9 37.66	2.6742	20 59 5.1	3.519	10	6 15 41.08	2.5327	20 47 1.0	3.815
11	4 12 18.11	2.6742	21 2 31.4	3.359	11	6 18 12.88	2.5272	20 43 8.1	3.948
12	4 14 58.56	2.6741	21 5 48.2	3.200	12	6 20 44.34	2.5216	20 39 7.2	4.081
13	4 17 39.00	2.6738	21 8 55.4	3.040	13	6 23 15.47	2.5159	20 34 58.4	4.213
14	4 20 19.42	2.6735	21 11 53.0	2.880	14	6 25 46.25	2.5102	20 30 41.7	4.343
15	4 22 59.82	2.6730	21 14 41.0	2.720	15	6 28 16.69	2.5044	20 26 17.3	4.472
16	4 25 40.18	2.6723	21 17 19.4	2.559	16	6 30 46.78	2.4987	20 21 45.1	4.600
17	4 28 20.49	2.6715	21 19 48.1	2.398	17	6 33 16.53	2.4928	20 17 5.3	4.726
18	4 31 0.76	2.6707	21 22 7.2	2.238	18	6 35 45.92	2.4868	20 12 18.0	4.852
19	4 33 40.97	2.6696	21 24 16.7	2.078	19	6 38 14.95	2.4808	20 7 23.1	4.976
20	4 36 21.11	2.6683	21 26 16.5	1.917	20	6 40 43.62	2.4748	20 2 20.9	5.098
21	4 39 1.17	2.6670	21 28 6.7	1.757	21	6 43 11.93	2.4688	19 57 11.3	5.220
22	4 41 41.15	2.6656	21 29 47.3	1.597	22	6 45 39.87	2.4626	19 51 54.5	5.340
23	4 44 21.04	2.6640	+21 31 18.3	+1.437	23	6 48 7.44	2.4565	+19 46 30.5	-5.459
MAY 2.					MAY 4.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	4 47 0.83	2.6623	+21 32 39.7	+1.277	0	6 50 34.65	2.4503	+19 40 59.4	-5.577
1	4 49 40.51	2.6603	21 33 51.5	1.117	1	6 53 1.48	2.4440	19 35 21.3	5.693
2	4 52 20.07	2.6584	21 34 53.7	0.958	2	6 55 27.93	2.4378	19 29 36.2	5.808
3	4 54 59.52	2.6562	21 35 46.4	0.798	3	6 57 54.01	2.4315	19 23 44.3	5.922
4	4 57 38.82	2.6539	21 36 29.5	0.640	4	7 0 19.71	2.4252	19 17 45.6	6.034
5	5 0 17.99	2.6517	21 37 3.2	0.482	5	7 2 45.03	2.4188	19 11 40.2	6.146
6	5 2 57.02	2.6491	21 37 27.3	0.323	6	7 5 9.96	2.4124	19 5 28.1	6.256
7	5 5 35.88	2.6464	21 37 41.9	0.166	7	7 7 34.52	2.4060	18 59 9.5	6.363
8	5 8 14.59	2.6437	21 37 47.2	+0.009	8	7 9 58.68	2.3995	18 52 44.5	6.471
9	5 10 53.12	2.6408	21 37 43.0	-0.148	9	7 12 22.46	2.3932	18 46 13.0	6.577
10	5 13 31.48	2.6378	21 37 29.4	0.304	10	7 14 45.86	2.3867	18 39 35.3	6.681
11	5 16 9.65	2.6346	21 37 6.5	0.460	11	7 17 8.86	2.3802	18 32 51.3	6.785
12	5 18 47.63	2.6313	21 36 34.2	0.615	12	7 19 31.48	2.3738	18 26 1.1	6.887
13	5 21 25.41	2.6279	21 35 52.7	0.769	13	7 21 53.71	2.3673	18 19 4.9	6.986
14	5 24 2.98	2.6244	21 35 1.9	0.923	14	7 24 15.55	2.3607	18 12 2.8	7.085
15	5 26 40.34	2.6208	21 34 1.9	1.076	15	7 26 36.99	2.3542	18 4 54.7	7.183
16	5 29 17.48	2.6171	21 32 52.8	1.228	16	7 28 58.05	2.3478	17 57 40.8	7.279
17	5 31 54.39	2.6133	21 31 34.5	1.380	17	7 31 18.72	2.3412	17 50 21.2	7.374
18	5 34 31.07	2.6093	21 30 7.2	1.530	18	7 33 38.99	2.3347	17 42 55.9	7.468
19	5 37 7.50	2.6052	21 28 30.9	1.680	19	7 35 58.88	2.3283	17 35 25.0	7.561
20	5 39 43.69	2.6011	21 26 45.6	1.829	20	7 38 18.38	2.3218	17 27 48.6	7.652
21	5 42 19.63	2.5968	21 24 51.4	1.978	21	7 40 37.49	2.3153	17 20 6.8	7.741
22	5 44 55.31	2.5924	21 22 48.3	2.125	22	7 42 56.21	2.3088	17 12 19.7	7.830
23	5 47 30.72	2.5879	21 20 36.4	2.271	23	7 45 14.55	2.3023	17 4 27.2	7.918
24	5 50 5.86	2.5833	+21 18 15.8	-2.416	24	7 47 32.49	2.2958	+16 56 29.6	-8.003

MOON, 1919.

57

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MAY 5.					MAY 7.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	7 47 32.49	2.2988	+16 56 29.6	-8.003	0	9 30 55.36	2.0288	+9 16 54.1	-10.712
1	7 49 50.05	2.2895	16 48 26.9	8.088	1	9 32 56.96	2.0246	9 6 10.5	10.742
2	7 52 7.23	2.2831	16 40 19.1	8.171	2	9 34 58.31	2.0203	8 55 25.1	10.772
3	7 54 24.02	2.2767	16 32 6.4	8.252	3	9 36 59.40	2.0162	8 44 37.9	10.800
4	7 56 40.43	2.2703	16 23 48.9	8.333	4	9 39 0.25	2.0121	8 33 49.1	10.828
5	7 58 56.46	2.2639	16 15 26.5	8.413	5	9 41 0.85	2.0079	8 22 58.6	10.855
6	8 1 12.10	2.2576	16 6 59.4	8.490	6	9 43 1.20	2.0039	8 12 6.5	10.881
7	8 3 27.37	2.2513	15 58 27.7	8.568	7	9 45 1.32	2.0000	8 1 12.9	10.905
8	8 5 42.26	2.2451	15 49 51.3	8.643	8	9 47 1.20	1.9961	7 50 17.9	10.929
9	8 7 56.78	2.2388	15 41 10.5	8.717	9	9 49 0.85	1.9923	7 39 21.4	10.953
10	8 10 10.92	2.2326	15 32 25.3	8.790	10	9 51 0.27	1.9885	7 28 23.6	10.975
11	8 12 24.69	2.2264	15 23 35.7	8.862	11	9 52 59.47	1.9848	7 17 24.4	10.997
12	8 14 38.09	2.2203	15 14 41.9	8.932	12	9 54 58.45	1.9813	7 6 24.0	11.017
13	8 16 51.12	2.2142	15 5 43.9	9.001	13	9 56 57.22	1.9777	6 55 22.4	11.037
14	8 19 3.79	2.2081	14 56 41.8	9.069	14	9 58 55.77	1.9741	6 44 19.6	11.056
15	8 21 16.09	2.2020	14 47 35.6	9.136	15	10 0 54.11	1.9707	6 33 15.7	11.074
16	8 23 28.03	2.1960	14 38 25.5	9.202	16	10 2 52.25	1.9673	6 22 10.7	11.092
17	8 25 39.61	2.1900	14 29 11.4	9.266	17	10 4 50.18	1.9639	6 11 4.7	11.108
18	8 27 50.83	2.1841	14 19 53.6	9.328	18	10 6 47.92	1.9607	5 59 57.7	11.124
19	8 30 1.70	2.1783	14 10 32.0	9.391	19	10 8 45.46	1.9575	5 48 49.8	11.138
20	8 32 12.22	2.1723	14 1 6.7	9.453	20	10 10 42.82	1.9543	5 37 41.1	11.153
21	8 34 22.38	2.1665	13 51 37.7	9.512	21	10 12 39.98	1.9513	5 26 31.5	11.166
22	8 36 32.20	2.1608	13 42 5.3	9.570	22	10 14 36.97	1.9483	5 15 21.2	11.178
23	8 38 41.68	2.1551	+13 32 29.3	-9.628	23	10 16 33.77	1.9453	+5 4 10.1	-11.191
MAY 6.					MAY 8.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	8 40 50.81	2.1493	+13 22 50.0	-9.683	0	10 18 30.40	1.9424	+4 52 58.3	-11.202
1	8 42 59.60	2.1438	13 13 7.3	9.738	1	10 20 26.86	1.9396	4 41 45.9	11.212
2	8 45 8.06	2.1383	13 3 21.4	9.792	2	10 22 23.15	1.9368	4 30 32.9	11.222
3	8 47 16.19	2.1327	12 53 32.3	9.845	3	10 24 19.28	1.9342	4 19 19.3	11.231
4	8 49 23.98	2.1272	12 43 40.0	9.898	4	10 26 15.25	1.9315	4 8 5.2	11.239
5	8 51 31.45	2.1218	12 33 44.6	9.948	5	10 28 11.06	1.9288	3 56 50.6	11.246
6	8 53 38.59	2.1163	12 23 46.3	9.997	6	10 30 6.71	1.9263	3 45 35.7	11.252
7	8 55 45.41	2.1110	12 13 45.0	10.046	7	10 32 2.22	1.9239	3 34 20.4	11.258
8	8 57 51.91	2.1058	12 3 40.8	10.093	8	10 33 57.58	1.9215	3 23 4.7	11.263
9	8 59 58.10	2.1006	11 53 33.9	10.138	9	10 35 52.80	1.9192	3 11 48.8	11.268
10	9 2 3.98	2.0953	11 43 24.2	10.185	10	10 37 47.88	1.9169	3 0 32.6	11.271
11	9 4 9.54	2.0902	11 33 11.7	10.229	11	10 39 42.83	1.9148	2 49 16.3	11.273
12	9 6 14.80	2.0852	11 22 56.7	10.272	12	10 41 37.65	1.9126	2 37 59.8	11.276
13	9 8 19.76	2.0802	11 12 39.1	10.314	13	10 43 32.34	1.9105	2 26 43.2	11.278
14	9 10 24.42	2.0753	11 2 19.0	10.355	14	10 45 26.91	1.9085	2 15 26.5	11.278
15	9 12 28.79	2.0703	10 51 56.5	10.395	15	10 47 21.36	1.9065	2 4 9.8	11.278
16	9 14 32.86	2.0655	10 41 31.6	10.434	16	10 49 15.69	1.9046	1 52 53.1	11.278
17	9 16 36.65	2.0608	10 31 4.4	10.472	17	10 51 9.91	1.9028	1 41 36.4	11.277
18	9 18 40.15	2.0560	10 20 35.0	10.509	18	10 53 4.02	1.9009	1 30 19.9	11.274
19	9 20 43.37	2.0513	10 10 3.3	10.546	19	10 54 58.02	1.8992	1 19 3.5	11.272
20	9 22 46.31	2.0467	9 59 29.5	10.581	20	10 56 51.92	1.8976	1 7 47.3	11.268
21	9 24 48.97	2.0422	9 48 53.6	10.615	21	10 58 45.73	1.8960	0 56 31.3	11.265
22	9 26 51.37	2.0378	9 38 15.7	10.648	22	11 0 39.44	1.8944	0 45 15.5	11.260
23	9 28 53.50	2.0333	9 27 35.9	10.680	23	11 2 33.06	1.8929	0 34 0.1	11.254
24	9 30 55.36	2.0288	+9 16 54.1	-10.712	24	11 4 26.59	1.8915	+0 22 45.0	-11.248

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MAY 9.					MAY 11.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	11 4 26.59	1.8915	+0 22 45.0	-11.248	0	12 34 38.41	1.8865	- 8 18 3.9	-10.212
1	11 6 20.04	1.8901	0 11 30.3	11.242	1	12 36 31.63	1.8876	8 28 15.5	10.175
2	11 8 13.40	1.8888	+0 0 16.0	11.234	2	12 38 24.92	1.8888	8 38 24.9	10.138
3	11 10 6.69	1.8876	-0 10 57.8	11.226	3	12 40 18.28	1.8899	8 48 32.1	10.100
4	11 11 59.91	1.8864	0 22 11.1	11.218	4	12 42 11.71	1.8911	8 58 36.9	10.061
5	11 13 53.06	1.8853	0 33 23.9	11.208	5	12 44 5.21	1.8923	9 8 39.4	10.023
6	11 15 46.14	1.8841	0 44 36.1	11.198	6	12 45 58.79	1.8937	9 18 39.6	9.983
7	11 17 39.15	1.8831	0 55 47.7	11.188	7	12 47 52.45	1.8950	9 28 37.3	9.942
8	11 19 32.11	1.8822	1 6 58.6	11.177	8	12 49 46.19	1.8963	9 38 32.6	9.901
9	11 21 25.01	1.8812	1 18 8.9	11.165	9	12 51 40.01	1.8978	9 48 25.4	9.859
10	11 23 17.85	1.8803	1 29 18.4	11.153	10	12 53 33.92	1.8992	9 58 15.7	9.817
11	11 25 10.65	1.8796	1 40 27.2	11.139	11	12 55 27.91	1.9007	10 8 3.4	9.773
12	11 27 3.40	1.8788	1 51 35.1	11.125	12	12 57 22.00	1.9023	10 17 48.5	9.730
13	11 28 56.11	1.8782	2 2 42.2	11.111	13	12 59 16.18	1.9038	10 27 31.0	9.686
14	11 30 48.78	1.8775	2 13 48.4	11.095	14	13 1 10.45	1.9053	10 37 10.8	9.641
15	11 32 41.41	1.8769	2 24 53.6	11.080	15	13 3 4.82	1.9070	10 46 47.9	9.596
16	11 34 34.01	1.8763	2 35 58.0	11.064	16	13 4 59.29	1.9087	10 56 22.3	9.550
17	11 36 26.57	1.8759	2 47 1.3	11.046	17	13 6 53.86	1.9103	11 5 53.9	9.503
18	11 38 19.12	1.8756	2 58 3.5	11.028	18	13 8 48.53	1.9121	11 15 22.6	9.455
19	11 40 11.64	1.8752	3 9 4.7	11.011	19	13 10 43.31	1.9138	11 24 48.5	9.408
20	11 42 4.14	1.8748	3 20 4.8	10.993	20	13 12 38.19	1.9156	11 34 11.5	9.359
21	11 43 56.62	1.8746	3 31 3.8	10.973	21	13 14 33.18	1.9174	11 43 31.6	9.310
22	11 45 49.09	1.8744	3 42 1.5	10.952	22	13 16 28.28	1.9193	11 52 48.7	9.260
23	11 47 41.55	1.8743	-3 52 58.0	-10.932	23	13 18 23.49	1.9212	-12 2 2.8	-9.209
MAY 10.					MAY 12.				
0	11 49 34.00	1.8742	-4 3 53.3	-10.911	0	13 20 18.82	1.9231	-12 11 13.8	-9.158
1	11 51 26.45	1.8742	4 14 47.3	10.888	1	13 22 14.26	1.9250	12 20 21.8	9.107
2	11 53 18.90	1.8741	4 25 39.9	10.865	2	13 24 9.82	1.9270	12 29 26.6	9.054
3	11 55 11.34	1.8742	4 36 31.1	10.842	3	13 26 5.50	1.9291	12 38 28.3	9.002
4	11 57 3.80	1.8742	4 47 20.9	10.818	4	13 28 1.31	1.9311	12 47 26.8	8.948
5	11 58 56.26	1.8744	4 58 9.3	10.794	5	13 29 57.23	1.9331	12 56 22.1	8.894
6	12 0 48.73	1.8747	5 8 56.2	10.768	6	13 31 53.28	1.9352	13 5 14.1	8.839
7	12 2 41.22	1.8749	5 19 41.5	10.743	7	13 33 49.45	1.9373	13 14 2.8	8.783
8	12 4 33.72	1.8752	5 30 25.3	10.717	8	13 35 45.76	1.9395	13 22 48.1	8.728
9	12 6 26.24	1.8756	5 41 7.5	10.690	9	13 37 42.19	1.9416	13 31 30.1	8.670
10	12 8 18.79	1.8760	5 51 48.1	10.663	10	13 39 38.75	1.9438	13 40 8.5	8.613
11	12 10 11.36	1.8764	6 2 27.0	10.634	11	13 41 35.44	1.9460	13 48 43.6	8.556
12	12 12 3.96	1.8769	6 13 4.2	10.605	12	13 43 32.27	1.9483	13 57 15.2	8.498
13	12 13 56.59	1.8775	6 23 39.6	10.576	13	13 45 29.23	1.9505	14 5 43.3	8.438
14	12 15 49.26	1.8781	6 34 13.3	10.547	14	13 47 26.33	1.9528	14 14 7.8	8.378
15	12 17 41.96	1.8787	6 44 45.2	10.516	15	13 49 23.57	1.9551	14 22 28.6	8.318
16	12 19 34.70	1.8794	6 55 15.2	10.484	16	13 51 20.94	1.9574	14 30 45.9	8.257
17	12 21 27.49	1.8802	7 5 43.3	10.451	17	13 53 18.46	1.9598	14 38 59.4	8.194
18	12 23 20.32	1.8809	7 16 9.4	10.419	18	13 55 16.12	1.9621	14 47 9.2	8.133
19	12 25 13.20	1.8818	7 26 33.6	10.388	19	13 57 13.91	1.9644	14 55 15.3	8.070
20	12 27 6.13	1.8826	7 36 55.9	10.353	20	13 59 11.85	1.9669	15 3 17.6	8.006
21	12 28 59.11	1.8835	7 47 16.0	10.318	21	14 1 9.94	1.9693	15 11 16.0	7.942
22	12 30 52.15	1.8845	7 57 34.1	10.284	22	14 3 8.17	1.9717	15 19 10.6	7.877
23	12 32 45.25	1.8855	8 7 50.1	10.248	23	14 5 6.54	1.9741	15 27 1.2	7.811
24	12 34 38.41	1.8865	-8 18 3.9	-10.212	24	14 7 5.06	1.9766	-15 34 47.9	-7.745

MOON, 1919.

59

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MAY 13.					MAY 15.				
	h m s	s	" ' "	"		h m s	s	" ' "	"
0	14 7 5.06	1.9768	-15 34 47.9	-7.745	0	15 44 51.52	2.0951	-20 19 12.0	-3.891
1	14 9 3.73	1.9790	15 42 30.6	7.678	1	15 46 57.29	2.0973	20 23 2.7	3.798
2	14 11 2.54	1.9815	15 50 9.3	7.612	2	15 49 3.19	2.0994	20 26 47.7	3.704
3	14 13 1.51	1.9840	15 57 44.0	7.544	3	15 51 9.22	2.1015	20 30 27.2	3.611
4	14 15 0.62	1.9865	16 5 14.6	7.475	4	15 53 15.37	2.1035	20 34 1.0	3.516
5	14 16 59.89	1.9890	16 12 41.0	7.406	5	15 55 21.64	2.1057	20 37 29.1	3.421
6	14 18 59.30	1.9915	16 20 3.3	7.336	6	15 57 28.04	2.1077	20 40 51.5	3.326
7	14 20 58.87	1.9940	16 27 21.3	7.266	7	15 59 34.56	2.1096	20 44 8.2	3.230
8	14 22 58.58	1.9965	16 34 35.2	7.195	8	16 1 41.19	2.1116	20 47 19.1	3.134
9	14 24 58.45	1.9992	16 41 44.7	7.123	9	16 3 47.95	2.1136	20 50 24.3	3.038
10	14 26 58.48	2.0017	16 48 50.0	7.052	10	16 5 54.82	2.1154	20 53 23.7	2.941
11	14 28 58.65	2.0042	16 55 50.9	6.978	11	16 8 1.80	2.1173	20 56 17.2	2.843
12	14 30 58.98	2.0068	17 2 47.4	6.905	12	16 10 8.89	2.1191	20 59 4.9	2.747
13	14 32 59.46	2.0093	17 9 39.5	6.831	13	16 12 16.09	2.1209	21 1 46.8	2.648
14	14 35 0.10	2.0119	17 16 27.1	6.757	14	16 14 23.40	2.1228	21 4 22.7	2.550
15	14 37 0.89	2.0145	17 23 10.3	6.682	15	16 16 30.82	2.1245	21 6 52.8	2.452
16	14 39 1.84	2.0171	17 29 48.9	6.605	16	16 18 38.34	2.1262	21 9 16.9	2.353
17	14 41 2.94	2.0196	17 36 22.9	6.529	17	16 20 45.96	2.1278	21 11 35.1	2.253
18	14 43 4.19	2.0222	17 42 52.4	6.453	18	16 22 53.68	2.1295	21 13 47.3	2.154
19	14 45 5.60	2.0248	17 49 17.2	6.375	19	16 25 1.50	2.1311	21 15 53.6	2.055
20	14 47 7.16	2.0273	17 55 37.4	6.297	20	16 27 9.41	2.1326	21 17 53.9	1.954
21	14 49 8.88	2.0299	18 1 52.8	6.218	21	16 29 17.41	2.1342	21 19 48.1	1.853
22	14 51 10.75	2.0324	18 8 3.5	6.139	22	16 31 25.51	2.1357	21 21 36.3	1.753
23	14 53 12.77	2.0349	-18 14 9.5	-6.059	23	16 33 33.69	2.1371	-21 23 18.5	-1.653
MAY 14.					MAY 16.				
	h m s	s	" ' "	"		h m s	s	" ' "	"
0	14 55 14.94	2.0375	-18 20 10.6	-5.978	0	16 35 41.96	2.1385	-21 24 54.6	-1.551
1	14 57 17.27	2.0401	18 26 6.9	5.898	1	16 37 50.31	2.1399	21 26 24.6	1.449
2	14 59 19.75	2.0426	18 31 58.3	5.817	2	16 39 58.75	2.1413	21 27 48.5	1.348
3	15 1 22.38	2.0452	18 37 44.9	5.735	3	16 42 7.26	2.1425	21 29 6.4	1.247
4	15 3 25.17	2.0477	18 43 26.5	5.652	4	16 44 15.85	2.1438	21 30 18.1	1.143
5	15 5 28.10	2.0502	18 49 3.1	5.568	5	16 46 24.51	2.1450	21 31 23.6	1.041
6	15 7 31.19	2.0528	18 54 34.7	5.484	6	16 48 33.25	2.1462	21 32 23.0	0.939
7	15 9 34.43	2.0552	19 0 1.2	5.400	7	16 50 42.05	2.1473	21 33 16.3	0.836
8	15 11 37.81	2.0576	19 5 22.7	5.316	8	16 52 50.93	2.1484	21 34 3.3	0.733
9	15 13 41.34	2.0602	19 10 39.1	5.231	9	16 54 59.86	2.1494	21 34 44.2	0.630
10	15 15 45.03	2.0627	19 15 50.4	5.145	10	16 57 8.86	2.1505	21 35 18.9	0.527
11	15 17 48.86	2.0650	19 20 56.5	5.058	11	16 59 17.92	2.1515	21 35 47.4	0.423
12	15 19 52.83	2.0674	19 25 57.4	4.972	12	17 1 27.04	2.1524	21 36 9.7	0.320
13	15 21 56.95	2.0698	19 30 53.1	4.884	13	17 3 36.21	2.1533	21 36 25.8	0.216
14	15 24 1.21	2.0723	19 35 43.5	4.797	14	17 5 45.44	2.1542	21 36 35.6	0.111
15	15 26 5.62	2.0747	19 40 28.7	4.708	15	17 7 54.71	2.1550	21 36 39.1	-0.008
16	15 28 10.17	2.0770	19 45 8.5	4.618	16	17 10 4.04	2.1558	21 36 36.5	+0.097
17	15 30 14.86	2.0793	19 49 42.9	4.529	17	17 12 13.40	2.1564	21 36 27.5	0.202
18	15 32 19.68	2.0816	19 54 12.0	4.440	18	17 14 22.81	2.1572	21 36 12.3	0.305
19	15 34 24.65	2.0840	19 58 35.7	4.350	19	17 16 32.26	2.1578	21 35 50.9	0.410
20	15 36 29.76	2.0863	20 2 54.0	4.258	20	17 18 41.75	2.1583	21 35 23.1	0.515
21	15 38 35.00	2.0884	20 7 6.7	4.167	21	17 20 51.26	2.1589	21 34 49.1	0.619
22	15 40 40.37	2.0907	20 11 14.0	4.076	22	17 23 0.82	2.1595	21 34 8.8	0.723
23	15 42 45.88	2.0929	20 15 15.8	3.983	23	17 25 10.40	2.1599	21 33 22.3	0.826
24	15 44 51.52	2.0951	-20 19 12.0	-3.891	24	17 27 20.01	2.1604	-21 32 29.4	+0.928

MOON, 1919.

61

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MAY 21.					MAY 23.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	20 52 23.47	2.0944	-12 27 39.4	+ 9.850	0	22 32 59.40	2.1152	-3 26 58.1	+12.378
1	20 54 29.12	2.0938	12 17 46.3	9.920	1	22 35 6.36	2.1169	3 14 34.4	12.411
2	20 56 34.73	2.0933	12 7 49.0	9.989	2	22 37 13.43	2.1187	3 2 8.8	12.442
3	20 58 40.31	2.0928	11 57 47.6	10.058	3	22 39 20.60	2.1204	2 49 41.4	12.473
4	21 0 45.87	2.0924	11 47 42.1	10.126	4	22 41 27.88	2.1223	2 37 12.1	12.502
5	21 2 51.40	2.0919	11 37 32.5	10.193	5	22 43 35.27	2.1242	2 24 41.2	12.530
6	21 4 56.90	2.0915	11 27 18.9	10.260	6	22 45 42.78	2.1262	2 12 8.5	12.558
7	21 7 2.38	2.0913	11 17 1.3	10.326	7	22 47 50.41	2.1283	1 59 34.3	12.583
8	21 9 7.85	2.0909	11 6 39.8	10.391	8	22 49 58.17	2.1303	1 46 58.5	12.609
9	21 11 13.29	2.0906	10 56 14.4	10.456	9	22 52 6.05	2.1325	1 34 21.2	12.633
10	21 13 18.72	2.0904	10 45 45.1	10.520	10	22 54 14.07	2.1348	1 21 42.5	12.656
11	21 15 24.14	2.0902	10 35 12.0	10.583	11	22 56 22.22	2.1370	1 9 2.5	12.678
12	21 17 29.54	2.0900	10 24 35.2	10.645	12	22 58 30.51	2.1393	0 56 21.1	12.700
13	21 19 34.94	2.0899	10 13 54.6	10.707	13	23 0 38.94	2.1418	0 43 38.5	12.719
14	21 21 40.33	2.0898	10 3 10.4	10.768	14	23 2 47.52	2.1443	0 30 54.8	12.738
15	21 23 45.71	2.0898	9 52 22.4	10.829	15	23 4 56.25	2.1468	0 18 9.9	12.757
16	21 25 51.10	2.0898	9 41 30.9	10.888	16	23 7 5.14	2.1494	-0 5 24.0	12.773
17	21 27 56.48	2.0898	9 30 35.8	10.948	17	23 9 14.18	2.1520	+0 7 22.8	12.788
18	21 30 1.87	2.0899	9 19 37.2	11.005	18	23 11 23.38	2.1547	0 20 10.6	12.803
19	21 32 7.27	2.0900	9 8 35.2	11.063	19	23 13 32.74	2.1575	0 32 59.2	12.817
20	21 34 12.67	2.0902	8 57 29.7	11.119	20	23 15 42.28	2.1604	0 45 48.6	12.829
21	21 36 18.09	2.0904	8 46 20.9	11.175	21	23 17 51.99	2.1633	0 58 38.7	12.841
22	21 38 23.52	2.0906	8 35 8.7	11.231	22	23 20 1.87	2.1662	1 11 29.5	12.851
23	21 40 28.96	2.0909	- 8 23 53.2	+11.285	23	23 22 11.93	2.1693	+1 24 20.8	+12.859
MAY 22.					MAY 24.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	21 42 34.43	2.0913	- 8 12 34.5	+11.338	0	23 24 22.18	2.1724	+1 37 12.6	+12.867
1	21 44 39.92	2.0918	8 1 12.6	11.392	1	23 26 32.62	2.1755	1 50 4.8	12.873
2	21 46 45.44	2.0922	7 49 47.5	11.444	2	23 28 43.24	2.1787	2 2 57.4	12.878
3	21 48 50.98	2.0926	7 38 19.3	11.496	3	23 30 54.06	2.1820	2 15 50.2	12.882
4	21 50 56.55	2.0932	7 26 48.0	11.546	4	23 33 5.08	2.1853	2 28 43.2	12.885
5	21 53 2.16	2.0938	7 15 13.8	11.595	5	23 35 16.30	2.1888	2 41 36.4	12.887
6	21 55 7.81	2.0945	7 3 36.6	11.645	6	23 37 27.73	2.1923	2 54 29.6	12.887
7	21 57 13.50	2.0952	6 51 56.4	11.693	7	23 39 39.37	2.1958	3 7 22.8	12.886
8	21 59 19.23	2.0958	6 40 13.4	11.740	8	23 41 51.22	2.1993	3 20 15.9	12.883
9	22 1 25.00	2.0967	6 28 27.6	11.787	9	23 44 3.28	2.2029	3 33 8.8	12.879
10	22 3 30.83	2.0976	6 16 39.0	11.833	10	23 46 15.57	2.2067	3 46 1.4	12.875
11	22 5 36.71	2.0984	6 4 47.7	11.877	11	23 48 28.08	2.2103	3 58 53.8	12.869
12	22 7 42.64	2.0993	5 52 53.8	11.920	12	23 50 40.81	2.2142	4 11 45.7	12.861
13	22 9 48.63	2.1004	5 40 57.3	11.964	13	23 52 53.78	2.2181	4 24 37.1	12.853
14	22 11 54.69	2.1015	5 28 58.1	12.007	14	23 55 6.98	2.2219	4 37 28.0	12.843
15	22 14 0.81	2.1026	5 16 56.5	12.048	15	23 57 20.41	2.2259	4 50 18.2	12.831
16	22 16 7.00	2.1038	5 4 52.4	12.088	16	23 59 34.09	2.2301	5 3 7.7	12.818
17	22 18 13.26	2.1050	4 52 46.0	12.127	17	0 1 48.02	2.2342	5 15 56.3	12.803
18	22 20 19.60	2.1063	4 40 37.2	12.166	18	0 4 2.19	2.2383	5 28 44.1	12.788
19	22 22 26.02	2.1076	4 28 26.1	12.204	19	0 6 16.61	2.2425	5 41 30.9	12.771
20	22 24 32.51	2.1090	4 16 12.7	12.241	20	0 8 31.29	2.2468	5 54 16.6	12.753
21	22 26 39.10	2.1105	4 3 57.2	12.277	21	0 10 46.23	2.2512	6 7 1.2	12.733
22	22 28 45.77	2.1120	3 51 39.5	12.312	22	0 13 1.43	2.2555	6 19 44.5	12.711
23	22 30 52.54	2.1136	3 39 19.8	12.345	23	0 15 16.89	2.2599	6 32 26.5	12.688
24	22 32 59.40	2.1152	- 3 26 58.1	+12.378	24	0 17 32.62	2.2644	+6 45 7.1	+12.664

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MAY 25.					MAY 27.				
	h m s	s	" ' "	"		h m s	s	" ' "	"
0	0 17 32.62	2.2644	+ 6 45 7.1	+12.664	0	2 12 9.11	2.5188	+15 55 1.8	+9.608
1	0 19 48.62	2.2690	6 57 46.2	12.638	1	2 14 40.40	2.5241	16 4 35.2	9.503
2	0 22 4.90	2.2736	7 10 23.7	12.611	2	2 17 12.00	2.5294	16 14 2.2	9.397
3	0 24 21.45	2.2782	7 22 59.5	12.583	3	2 19 43.93	2.5348	16 23 22.8	9.289
4	0 26 38.28	2.2829	7 35 33.6	12.553	4	2 22 16.18	2.5401	16 32 36.9	9.179
5	0 28 55.40	2.2877	7 48 5.8	12.521	5	2 24 48.74	2.5453	16 41 44.3	9.067
6	0 31 12.80	2.2924	8 0 36.1	12.488	6	2 27 21.62	2.5506	16 50 44.9	8.953
7	0 33 30.49	2.2973	8 13 4.3	12.453	7	2 29 54.80	2.5557	16 59 38.7	8.839
8	0 35 48.48	2.3023	8 25 30.5	12.417	8	2 32 28.30	2.5608	17 8 25.6	8.723
9	0 38 6.76	2.3071	8 37 54.3	12.378	9	2 35 2.10	2.5658	17 17 5.5	8.605
10	0 40 25.33	2.3121	8 50 15.9	12.340	10	2 37 36.20	2.5708	17 25 38.2	8.485
11	0 42 44.21	2.3171	9 2 35.1	12.298	11	2 40 10.60	2.5758	17 34 3.7	8.364
12	0 45 3.38	2.3221	9 14 51.7	12.255	12	2 42 45.29	2.5807	17 42 21.9	8.242
13	0 47 22.86	2.3273	9 27 5.7	12.211	13	2 45 20.28	2.5855	17 50 32.7	8.118
14	0 49 42.65	2.3324	9 39 17.0	12.166	14	2 47 55.55	2.5902	17 58 36.0	7.992
15	0 52 2.75	2.3376	9 51 25.6	12.118	15	2 50 31.10	2.5949	18 6 31.7	7.864
16	0 54 23.16	2.3428	10 3 31.2	12.068	16	2 53 6.94	2.5996	18 14 19.7	7.735
17	0 56 43.88	2.3480	10 15 33.8	12.018	17	2 55 43.05	2.6041	18 21 59.9	7.605
18	0 59 4.92	2.3533	10 27 33.4	11.967	18	2 58 19.43	2.6085	18 29 32.3	7.474
19	1 1 26.28	2.3587	10 39 29.8	11.912	19	3 0 56.07	2.6128	18 36 56.8	7.342
20	1 3 47.96	2.3639	10 51 22.8	11.856	20	3 3 32.97	2.6172	18 44 13.3	7.208
21	1 6 9.95	2.3693	11 3 12.5	11.800	21	3 6 10.13	2.6214	18 51 21.7	7.072
22	1 8 32.27	2.3748	11 14 58.8	11.741	22	3 8 47.54	2.6255	18 58 21.9	6.935
23	1 10 54.92	2.3802	+11 26 41.4	+11.679	23	3 11 25.19	2.6295	+19 5 13.9	+6.797
MAY 26.					MAY 28.				
	h m s	s	" ' "	"		h m s	s	" ' "	"
0	1 13 17.89	2.3856	+11 38 20.3	+11.617	0	3 14 3.08	2.6335	+19 11 57.5	+6.657
1	1 15 41.19	2.3911	11 49 55.4	11.553	1	3 16 41.21	2.6373	19 18 32.7	6.517
2	1 18 4.82	2.3966	12 1 26.7	11.488	2	3 19 19.56	2.6410	19 24 59.5	6.374
3	1 20 28.78	2.4021	12 12 53.9	11.420	3	3 21 58.13	2.6447	19 31 17.6	6.231
4	1 22 53.07	2.4077	12 24 17.1	11.351	4	3 24 36.92	2.6482	19 37 27.2	6.088
5	1 25 17.70	2.4132	12 35 36.0	11.280	5	3 27 15.91	2.6516	19 43 28.1	5.942
6	1 27 42.65	2.4187	12 46 50.7	11.208	6	3 29 55.11	2.6549	19 49 20.2	5.795
7	1 30 7.94	2.4243	12 58 0.9	11.133	7	3 32 34.50	2.6581	19 55 3.5	5.648
8	1 32 33.57	2.4299	13 9 6.7	11.058	8	3 35 14.08	2.6612	20 0 37.9	5.499
9	1 34 59.53	2.4355	13 20 7.8	10.980	9	3 37 53.84	2.6642	20 6 3.4	5.349
10	1 37 25.83	2.4411	13 31 4.3	10.901	10	3 40 33.78	2.6671	20 11 19.8	5.198
11	1 39 52.46	2.4467	13 41 55.9	10.819	11	3 43 13.89	2.6698	20 16 27.2	5.048
12	1 42 19.43	2.4523	13 52 42.6	10.737	12	3 45 54.15	2.6723	20 21 25.5	4.895
13	1 44 46.73	2.4578	14 3 24.3	10.652	13	3 48 34.57	2.6748	20 26 14.6	4.741
14	1 47 14.37	2.4635	14 14 0.8	10.566	14	3 51 15.13	2.6772	20 30 54.4	4.587
15	1 49 42.35	2.4691	14 24 32.2	10.478	15	3 53 55.83	2.6794	20 35 25.0	4.432
16	1 52 10.66	2.4747	14 34 58.2	10.388	16	3 56 36.66	2.6815	20 39 46.2	4.276
17	1 54 39.31	2.4802	14 45 18.7	10.296	17	3 59 17.61	2.6834	20 43 58.1	4.119
18	1 57 8.28	2.4858	14 55 33.7	10.203	18	4 1 58.67	2.6853	20 48 0.5	3.962
19	1 59 37.60	2.4913	15 5 43.1	10.108	19	4 4 39.84	2.6870	20 51 53.5	3.805
20	2 2 7.24	2.4968	15 15 46.7	10.012	20	4 7 21.11	2.6885	20 55 37.1	3.647
21	2 4 37.21	2.5023	15 25 44.5	9.914	21	4 10 2.46	2.6898	20 59 11.1	3.487
22	2 7 7.52	2.5078	15 35 30.4	9.814	22	4 12 43.89	2.6912	21 2 35.5	3.328
23	2 9 38.15	2.5133	15 45 22.2	9.712	23	4 15 25.40	2.6923	21 5 50.4	3.168
24	2 12 9.11	2.5188	+15 55 1.8	+9.608	24	4 18 6.97	2.6933	+21 8 55.6	+3.007

MOON, 1919.

63

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
MAY 29.					MAY 31.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	4 18 6.97	2.6933	+21 8 55.6	+3.007	0	6 25 47.08	2.5747	+20 29 10.3	-4.468
1	4 20 48.60	2.6942	21 11 51.2	2.846	1	6 28 21.40	2.5692	20 24 38.1	4.605
2	4 23 30.27	2.6948	21 14 37.1	2.684	2	6 30 55.38	2.5637	20 19 57.7	4.740
3	4 26 11.98	2.6954	21 17 13.3	2.523	3	6 33 29.04	2.5581	20 15 9.3	4.873
4	4 28 53.72	2.6958	21 19 39.8	2.361	4	6 36 2.35	2.5524	20 10 12.9	5.007
5	4 31 35.47	2.6960	21 21 56.6	2.199	5	6 38 35.33	2.5467	20 5 8.5	5.139
6	4 34 17.24	2.6962	21 24 3.7	2.037	6	6 41 7.96	2.5408	19 59 56.2	5.268
7	4 36 59.01	2.6962	21 26 1.0	1.874	7	6 43 40.23	2.5350	19 54 36.3	5.397
8	4 39 40.78	2.6960	21 27 48.6	1.712	8	6 46 12.16	2.5291	19 49 8.6	5.525
9	4 42 22.53	2.6956	21 29 26.4	1.548	9	6 48 43.72	2.5230	19 43 33.3	5.652
10	4 45 4.25	2.6951	21 30 54.4	1.385	10	6 51 14.92	2.5170	19 37 50.4	5.777
11	4 47 45.94	2.6945	21 32 12.6	1.223	11	6 53 45.76	2.5108	19 32 0.1	5.899
12	4 50 27.59	2.6938	21 33 21.1	1.060	12	6 56 16.22	2.5046	19 26 2.5	6.021
13	4 53 9.19	2.6928	21 34 19.8	0.897	13	6 58 46.31	2.4984	19 19 57.6	6.142
14	4 55 50.72	2.6917	21 35 8.7	0.733	14	7 1 16.03	2.4922	19 13 45.5	6.261
15	4 58 32.19	2.6905	21 35 47.8	0.571	15	7 3 45.37	2.4858	19 7 26.3	6.378
16	5 1 13.58	2.6891	21 36 17.2	0.409	16	7 6 14.32	2.4793	19 1 0.1	6.495
17	5 3 54.88	2.6875	21 36 36.9	0.247	17	7 8 42.89	2.4730	18 54 26.9	6.610
18	5 6 36.08	2.6858	21 36 46.8	+0.085	18	7 11 11.08	2.4666	18 47 46.9	6.723
19	5 9 17.18	2.6841	21 36 47.1	-0.076	19	7 13 38.88	2.4600	18 41 0.1	6.836
20	5 11 58.17	2.6822	21 36 37.7	0.238	20	7 16 6.28	2.4534	18 34 6.6	6.946
21	5 14 39.04	2.6801	21 36 18.6	0.398	21	7 18 33.29	2.4469	18 27 6.6	7.055
22	5 17 19.78	2.6778	21 35 49.9	0.559	22	7 20 59.91	2.4403	18 20 0.0	7.163
23	5 20 0.38	2.6754	+21 35 11.5	-0.719	23	7 23 26.13	2.4337	+18 12 47.1	-7.268
MAY 30.					JUNE 1.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	5 22 40.83	2.6729	+21 34 23.6	-0.878	0	7 25 51.95	2.4270	+18 5 27.8	-7.373
1	5 25 21.13	2.6703	21 33 26.1	1.038	1	7 28 17.37	2.4203	17 58 2.3	7.476
2	5 28 1.26	2.6674	21 32 19.1	1.196	2	7 30 42.39	2.4137	17 50 30.7	7.578
3	5 30 41.22	2.6644	21 31 2.6	1.353	3	7 33 7.01	2.4070	17 42 53.0	7.678
4	5 33 20.99	2.6613	21 29 36.7	1.510	4	7 35 31.23	2.4003	17 35 9.3	7.777
5	5 36 0.58	2.6582	21 28 1.4	1.667	5	7 37 55.05	2.3936	17 27 19.8	7.873
6	5 38 39.97	2.6548	21 26 16.7	1.823	6	7 40 18.46	2.3868	17 19 24.5	7.969
7	5 41 19.16	2.6513	21 24 22.7	1.977	7	7 42 41.46	2.3801	17 11 23.5	8.064
8	5 43 58.13	2.6477	21 22 19.5	2.131	8	7 45 4.07	2.3733	17 3 16.8	8.157
9	5 46 36.88	2.6440	21 20 7.0	2.285	9	7 47 26.26	2.3666	16 55 4.7	8.248
10	5 49 15.41	2.6402	21 17 45.3	2.438	10	7 49 48.06	2.3599	16 46 47.1	8.338
11	5 51 53.70	2.6362	21 15 14.5	2.589	11	7 52 9.45	2.3531	16 38 24.1	8.427
12	5 54 31.75	2.6321	21 12 34.6	2.740	12	7 54 30.43	2.3463	16 29 55.9	8.513
13	5 57 9.55	2.6279	21 9 45.7	2.889	13	7 56 51.01	2.3397	16 21 22.5	8.598
14	5 59 47.10	2.6237	21 6 47.9	3.038	14	7 59 11.19	2.3330	16 12 44.1	8.682
15	6 2 24.39	2.6192	21 3 41.1	3.187	15	8 1 30.97	2.3263	16 4 0.7	8.765
16	6 5 1.40	2.6146	21 0 25.5	3.333	16	8 3 50.34	2.3196	15 55 12.3	8.847
17	6 7 38.14	2.6100	20 57 1.2	3.478	17	8 6 9.32	2.3129	15 46 19.1	8.926
18	6 10 14.60	2.6053	20 53 28.1	3.623	18	8 8 27.89	2.3062	15 37 21.2	9.003
19	6 12 50.77	2.6003	20 49 46.4	3.767	19	8 10 46.06	2.2996	15 28 18.7	9.080
20	6 15 26.64	2.5954	20 45 56.1	3.910	20	8 13 3.84	2.2930	15 19 11.6	9.156
21	6 18 2.22	2.5903	20 41 57.2	4.051	21	8 15 21.22	2.2863	15 10 0.0	9.230
22	6 20 37.48	2.5852	20 37 50.0	4.191	22	8 17 38.20	2.2797	15 0 44.0	9.303
23	6 23 12.44	2.5800	20 33 34.3	4.331	23	8 19 54.78	2.2732	14 51 23.7	9.373
24	6 25 47.08	2.5747	+20 29 10.3	-4.468	24	8 22 10.98	2.2667	+14 41 59.2	-9.443

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JUNE 2.					JUNE 4.				
	<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>		<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>
0	8 22 10.98	2.2667	+14 41 59.2	-9.443	0	10 4 17.67	2.0088	+6 12 35.6	-11.343
1	8 24 26.78	2.2602	14 32 30.6	9.511	1	10 6 18.08	2.0049	6 1 14.6	11.356
2	8 26 42.20	2.2538	14 22 57.9	9.578	2	10 8 18.26	2.0010	5 49 52.9	11.368
3	8 28 57.23	2.2473	14 13 21.2	9.643	3	10 10 18.20	1.9972	5 38 30.4	11.382
4	8 31 11.88	2.2409	14 3 40.7	9.708	4	10 12 17.92	1.9935	5 27 7.1	11.393
5	8 33 26.14	2.2345	13 53 56.3	9.771	5	10 14 17.42	1.9898	5 15 43.3	11.402
6	8 35 40.02	2.2283	13 44 8.2	9.833	6	10 16 16.70	1.9862	5 4 18.9	11.412
7	8 37 53.53	2.2220	13 34 16.4	9.893	7	10 18 15.76	1.9827	4 52 53.9	11.421
8	8 40 6.66	2.2157	13 24 21.1	9.951	8	10 20 14.62	1.9793	4 41 23.4	11.428
9	8 42 19.41	2.2095	13 14 22.3	10.009	9	10 22 13.27	1.9758	4 30 2.5	11.435
10	8 44 31.80	2.2033	13 4 20.0	10.065	10	10 24 11.72	1.9725	4 18 36.2	11.441
11	8 46 43.81	2.1972	12 54 14.4	10.121	11	10 26 9.97	1.9692	4 7 9.6	11.446
12	8 48 55.46	2.1912	12 44 5.5	10.174	12	10 28 8.02	1.9659	3 55 42.7	11.450
13	8 51 6.75	2.1851	12 33 53.5	10.227	13	10 30 5.88	1.9628	3 44 15.6	11.454
14	8 53 17.67	2.1791	12 23 38.3	10.278	14	10 32 3.56	1.9598	3 32 48.2	11.458
15	8 55 28.24	2.1733	12 13 20.1	10.328	15	10 34 1.05	1.9568	3 21 20.7	11.459
16	8 57 38.46	2.1673	12 2 59.0	10.377	16	10 35 58.37	1.9538	3 9 53.1	11.461
17	8 59 48.32	2.1615	11 52 34.9	10.424	17	10 37 55.51	1.9509	2 58 25.4	11.461
18	9 1 57.84	2.1558	11 42 8.1	10.469	18	10 39 52.48	1.9482	2 46 57.8	11.461
19	9 4 7.01	2.1500	11 31 38.6	10.515	19	10 41 49.29	1.9454	2 35 30.1	11.460
20	9 6 15.84	2.1443	11 21 6.3	10.559	20	10 43 45.93	1.9427	2 24 2.6	11.458
21	9 8 24.32	2.1387	11 10 31.5	10.601	21	10 45 42.41	1.9400	2 12 35.1	11.456
22	9 10 32.48	2.1331	10 59 54.2	10.643	22	10 47 38.73	1.9375	2 1 7.9	11.453
23	9 12 40.29	2.1275	+10 49 14.4	-10.683	23	10 49 34.91	1.9351	+1 49 40.8	-11.449
JUNE 3.					JUNE 5.				
0	9 14 47.78	2.1221	+10 38 32.2	-10.723	0	10 51 30.94	1.9327	+1 38 14.0	-11.444
1	9 16 54.94	2.1167	10 27 47.7	10.760	1	10 53 26.83	1.9303	1 26 47.5	11.439
2	9 19 1.78	2.1113	10 17 1.0	10.797	2	10 55 22.57	1.9280	1 15 21.3	11.433
3	9 21 8.29	2.1059	10 6 12.1	10.833	3	10 57 18.19	1.9258	1 3 55.6	11.426
4	9 23 14.49	2.1008	9 55 21.1	10.868	4	10 59 13.66	1.9236	0 52 30.2	11.418
5	9 25 20.38	2.0955	9 44 28.0	10.901	5	11 1 9.02	1.9215	0 41 5.4	11.410
6	9 27 25.95	2.0904	9 33 33.0	10.933	6	11 3 4.24	1.9194	0 29 41.0	11.402
7	9 29 31.23	2.0854	9 22 36.1	10.964	7	11 4 59.35	1.9175	0 18 17.2	11.393
8	9 31 36.20	2.0803	9 11 37.3	10.994	8	11 6 54.34	1.9156	+0 6 53.9	11.383
9	9 33 40.87	2.0754	9 0 36.8	11.023	9	11 8 49.22	1.9137	-0 4 28.7	11.371
10	9 35 45.25	2.0705	8 49 34.5	11.053	10	11 10 43.98	1.9119	0 15 50.6	11.359
11	9 37 49.33	2.0657	8 38 30.5	11.079	11	11 12 38.65	1.9103	0 27 11.8	11.347
12	9 39 53.13	2.0610	8 27 25.0	11.105	12	11 14 33.21	1.9086	0 38 32.2	11.334
13	9 41 56.65	2.0563	8 16 17.9	11.130	13	11 16 27.68	1.9070	0 49 51.9	11.321
14	9 43 59.88	2.0516	8 5 9.4	11.154	14	11 18 22.05	1.9054	1 1 10.7	11.307
15	9 46 2.84	2.0471	7 53 59.4	11.178	15	11 20 16.33	1.9040	1 12 28.7	11.292
16	9 48 5.53	2.0426	7 42 48.1	11.199	16	11 22 10.53	1.9026	1 23 45.7	11.277
17	9 50 7.95	2.0381	7 31 35.5	11.221	17	11 24 4.64	1.9012	1 35 1.9	11.261
18	9 52 10.10	2.0337	7 20 21.6	11.241	18	11 25 58.67	1.8999	1 46 17.0	11.243
19	9 54 11.99	2.0293	7 9 6.6	11.260	19	11 27 52.63	1.8988	1 57 31.1	11.227
20	9 56 13.62	2.0252	6 57 50.4	11.278	20	11 29 46.52	1.8976	2 8 44.2	11.208
21	9 58 15.01	2.0210	6 46 33.2	11.296	21	11 31 40.34	1.8964	2 19 56.1	11.190
22	10 0 16.14	2.0168	6 35 14.9	11.313	22	11 33 34.09	1.8953	2 31 7.0	11.171
23	10 2 17.02	2.0128	6 23 55.7	11.328	23	11 35 27.78	1.8944	2 42 16.6	11.151
24	10 4 17.67	2.0088	+ 6 12 35.6	-11.343	24	11 37 21.42	1.8935	-2 53 25.1	-11.131

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JUNE 6.					JUNE 8.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	11 37 21.42	1.8935	- 2 53 25.1	-11.131	0	13 8 14.23	1.9128	-11 13 4.8	-9.468
1	11 39 15.00	1.8927	3 4 32.3	11.110	1	13 10 9.04	1.9143	11 22 31.4	9.419
2	11 41 8.54	1.8918	3 15 38.3	11.088	2	13 12 3.94	1.9158	11 31 55.1	9.370
3	11 43 2.02	1.8911	3 26 42.9	11.066	3	13 13 58.94	1.9175	11 41 15.8	9.320
4	11 44 55.47	1.8904	3 37 46.2	11.044	4	13 15 54.04	1.9192	11 50 33.5	9.269
5	11 46 48.87	1.8898	3 48 48.2	11.020	5	13 17 49.24	1.9209	11 59 48.1	9.218
6	11 48 42.24	1.8893	3 59 48.6	10.996	6	13 19 44.55	1.9227	12 8 59.7	9.168
7	11 50 35.58	1.8887	4 10 47.7	10.972	7	13 21 39.96	1.9244	12 18 8.2	9.115
8	11 52 28.88	1.8882	4 21 45.2	10.948	8	13 23 35.48	1.9262	12 27 13.5	9.063
9	11 54 22.16	1.8878	4 32 41.2	10.921	9	13 25 31.10	1.9280	12 36 15.7	9.009
10	11 56 15.42	1.8875	4 43 35.7	10.894	10	13 27 26.84	1.9300	12 45 14.6	8.955
11	11 58 8.66	1.8873	4 54 28.5	10.867	11	13 29 22.70	1.9319	12 54 10.3	8.901
12	12 0 1.89	1.8870	5 5 19.7	10.839	12	13 31 18.67	1.9338	13 3 2.7	8.846
13	12 1 55.10	1.8868	5 16 9.2	10.812	13	13 33 14.76	1.9358	13 11 51.8	8.790
14	12 3 48.31	1.8868	5 26 57.1	10.783	14	13 35 10.97	1.9378	13 20 37.5	8.734
15	12 5 41.51	1.8866	5 37 43.2	10.753	15	13 37 7.30	1.9398	13 29 19.9	8.678
16	12 7 34.70	1.8866	5 48 27.5	10.723	16	13 39 3.75	1.9419	13 37 58.8	8.620
17	12 9 27.90	1.8867	5 59 10.0	10.693	17	13 41 0.33	1.9441	13 46 34.3	8.563
18	12 11 21.10	1.8868	6 9 50.7	10.663	18	13 42 57.04	1.9463	13 55 6.3	8.503
19	12 13 14.31	1.8869	6 20 29.5	10.631	19	13 44 53.88	1.9483	14 3 34.7	8.444
20	12 15 7.53	1.8872	6 31 6.4	10.599	20	13 46 50.84	1.9506	14 11 59.6	8.385
21	12 17 0.77	1.8874	6 41 41.4	10.567	21	13 48 47.95	1.9528	14 20 20.9	8.324
22	12 18 54.02	1.8877	6 52 14.4	10.533	22	13 50 45.18	1.9550	14 28 33.5	8.263
23	12 20 47.29	1.8880	- 7 2 45.3	-10.498	23	13 52 42.55	1.9573	-14 36 52.5	-8.202
JUNE 7.					JUNE 9.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	12 22 40.58	1.8884	- 7 13 14.2	-10.464	0	13 54 40.06	1.9597	-14 45 2.7	-8.139
1	12 24 33.90	1.8888	7 23 41.0	10.429	1	13 56 37.71	1.9619	14 53 9.2	8.078
2	12 26 27.25	1.8894	7 34 5.7	10.394	2	13 58 35.49	1.9643	15 1 12.0	8.014
3	12 28 20.63	1.8900	7 44 28.3	10.358	3	14 0 33.42	1.9667	15 9 10.9	7.950
4	12 30 14.05	1.8907	7 54 48.7	10.321	4	14 2 31.49	1.9691	15 17 6.0	7.886
5	12 32 7.51	1.8913	8 5 6.8	10.283	5	14 4 29.71	1.9715	15 24 57.2	7.821
6	12 34 1.00	1.8920	8 15 22.7	10.247	6	14 6 28.07	1.9739	15 32 44.5	7.755
7	12 35 54.55	1.8928	8 25 36.4	10.208	7	14 8 26.58	1.9763	15 40 27.8	7.689
8	12 37 48.14	1.8935	8 35 47.7	10.168	8	14 10 25.23	1.9788	15 48 7.2	7.623
9	12 39 41.77	1.8944	8 45 56.6	10.129	9	14 12 24.04	1.9813	15 55 42.5	7.555
10	12 41 35.47	1.8954	8 56 3.2	10.089	10	14 14 22.99	1.9838	16 3 13.8	7.488
11	12 43 29.22	1.8963	9 6 7.3	10.048	11	14 16 22.10	1.9864	16 10 41.0	7.418
12	12 45 23.02	1.8973	9 16 9.0	10.008	12	14 18 21.36	1.9889	16 18 4.0	7.349
13	12 47 16.89	1.8983	9 26 8.2	9.965	13	14 20 20.77	1.9915	16 25 22.9	7.280
14	12 49 10.82	1.8993	9 36 4.8	9.923	14	14 22 20.34	1.9941	16 32 37.6	7.209
15	12 51 4.81	1.9005	9 45 58.9	9.880	15	14 24 20.06	1.9967	16 39 48.0	7.138
16	12 52 58.88	1.9018	9 55 50.4	9.836	16	14 26 19.94	1.9993	16 46 54.2	7.068
17	12 54 53.02	1.9029	10 5 39.2	9.792	17	14 28 19.97	2.0018	16 53 56.1	6.995
18	12 56 47.23	1.9042	10 15 25.4	9.748	18	14 30 20.16	2.0045	17 0 53.6	6.923
19	12 58 41.52	1.9055	10 25 9.0	9.703	19	14 32 20.51	2.0072	17 7 46.8	6.849
20	13 0 35.80	1.9069	10 34 49.7	9.656	20	14 34 21.02	2.0098	17 14 35.5	6.775
21	13 2 30.35	1.9083	10 44 27.7	9.610	21	14 36 21.68	2.0123	17 21 19.8	6.701
22	13 4 24.89	1.9097	10 54 2.9	9.563	22	14 38 22.50	2.0151	17 27 59.6	6.626
23	13 6 19.51	1.9112	11 3 35.3	9.516	23	14 40 23.49	2.0178	17 34 34.9	6.550
24	13 8 14.23	1.9128	-11 13 4.8	-9.468	24	14 42 24.63	2.0204	-17 41 5.6	-6.476

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JUNE 10.					JUNE 12.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	14 42 24.63	2.0204	-17 41 5.6	-6.473	0	16 22 21.42	2.1377	-21 13 45.1	-2.197
1	14 44 25.94	2.0231	17 47 31.7	6.398	1	16 24 29.74	2.1395	21 15 53.9	2.096
2	14 46 27.40	2.0258	17 53 53.3	6.320	2	16 26 38.16	2.1413	21 17 56.6	1.995
3	14 48 29.03	2.0285	18 0 10.1	6.242	3	16 28 46.69	2.1431	21 19 53.3	1.894
4	14 50 30.82	2.0311	18 6 22.3	6.164	4	16 30 55.33	2.1449	21 21 43.9	1.793
5	14 52 32.76	2.0338	18 12 29.8	6.085	5	16 33 4.08	2.1466	21 23 28.5	1.693
6	14 54 34.87	2.0365	18 18 32.5	6.005	6	16 35 12.92	2.1483	21 25 7.0	1.590
7	14 56 37.14	2.0392	18 24 30.4	5.924	7	16 37 21.87	2.1499	21 26 39.3	1.488
8	14 58 39.57	2.0418	18 30 23.4	5.843	8	16 39 30.91	2.1514	21 28 5.6	1.386
9	15 0 42.16	2.0445	18 36 11.6	5.763	9	16 41 40.04	2.1530	21 29 25.6	1.283
10	15 2 44.91	2.0472	18 41 55.0	5.682	10	16 43 49.27	2.1546	21 30 39.5	1.181
11	15 4 47.82	2.0498	18 47 33.4	5.598	11	16 45 58.59	2.1560	21 31 47.3	1.078
12	15 6 50.89	2.0525	18 53 6.8	5.516	12	16 48 7.99	2.1574	21 32 48.8	0.973
13	15 8 54.12	2.0553	18 58 35.3	5.433	13	16 50 17.48	2.1588	21 33 44.1	0.870
14	15 10 57.52	2.0579	19 3 58.7	5.348	14	16 52 27.05	2.1602	21 34 33.2	0.767
15	15 13 1.07	2.0605	19 9 17.0	5.263	15	16 54 36.70	2.1615	21 35 16.1	0.663
16	15 15 4.78	2.0632	19 14 30.3	5.179	16	16 56 46.43	2.1628	21 35 52.7	0.558
17	15 17 8.65	2.0658	19 19 38.5	5.093	17	16 58 56.23	2.1639	21 36 23.1	0.454
18	15 19 12.67	2.0683	19 24 41.4	5.006	18	17 1 6.10	2.1651	21 36 47.2	0.349
19	15 21 16.85	2.0710	19 29 39.2	4.920	19	17 3 16.04	2.1663	21 37 5.0	0.244
20	15 23 21.19	2.0736	19 34 31.8	4.833	20	17 5 26.05	2.1673	21 37 16.5	0.139
21	15 25 25.68	2.0762	19 39 19.1	4.745	21	17 7 36.12	2.1683	21 37 21.7	-0.033
22	15 27 30.33	2.0788	19 44 1.2	4.657	22	17 9 46.25	2.1693	21 37 20.5	+0.072
23	15 29 35.13	2.0813	-19 48 37.9	-4.568	23	17 11 56.44	2.1703	-21 37 13.1	+0.177
JUNE 11.					JUNE 13.				
0	15 31 40.08	2.0838	-19 53 9.3	-4.478	0	17 14 6.68	2.1712	-21 36 59.3	+0.283
1	15 33 45.19	2.0863	19 57 35.3	4.388	1	17 16 16.98	2.1720	21 36 39.2	0.388
2	15 35 50.44	2.0888	20 1 55.9	4.298	2	17 18 27.32	2.1728	21 36 12.8	0.493
3	15 37 55.85	2.0913	20 6 11.1	4.208	3	17 20 37.72	2.1736	21 35 40.0	0.600
4	15 40 1.40	2.0938	20 10 20.8	4.116	4	17 22 48.15	2.1743	21 35 0.8	0.706
5	15 42 7.10	2.0963	20 14 25.0	4.024	5	17 24 58.63	2.1750	21 34 15.3	0.812
6	15 44 12.95	2.0987	20 18 23.7	3.932	6	17 27 9.15	2.1756	21 33 23.4	0.918
7	15 46 18.94	2.1011	20 22 16.8	3.839	7	17 29 19.70	2.1761	21 32 25.1	1.024
8	15 48 25.08	2.1034	20 26 4.4	3.747	8	17 31 30.28	2.1767	21 31 20.5	1.130
9	15 50 31.35	2.1058	20 29 46.4	3.653	9	17 33 40.90	2.1772	21 30 9.5	1.237
10	15 52 37.77	2.1082	20 33 22.7	3.558	10	17 35 51.54	2.1775	21 28 52.1	1.343
11	15 54 44.33	2.1104	20 36 53.3	3.463	11	17 38 2.20	2.1779	21 27 28.3	1.450
12	15 56 51.02	2.1127	20 40 18.3	3.369	12	17 40 12.89	2.1783	21 25 58.1	1.556
13	15 58 57.85	2.1149	20 43 37.6	3.273	13	17 42 23.60	2.1786	21 24 21.6	1.662
14	16 1 4.81	2.1172	20 46 51.1	3.177	14	17 44 34.32	2.1788	21 22 38.7	1.768
15	16 3 11.91	2.1194	20 49 58.8	3.081	15	17 46 45.06	2.1791	21 20 49.4	1.875
16	16 5 19.14	2.1215	20 53 0.8	2.984	16	17 48 55.81	2.1792	21 18 53.7	1.981
17	16 7 26.49	2.1236	20 55 56.9	2.887	17	17 51 6.56	2.1793	21 16 51.7	2.087
18	16 9 33.97	2.1258	20 58 47.2	2.790	18	17 53 17.32	2.1794	21 14 43.3	2.193
19	16 11 41.58	2.1278	21 1 31.7	2.692	19	17 55 28.09	2.1794	21 12 28.6	2.298
20	16 13 49.31	2.1298	21 4 10.2	2.593	20	17 57 38.85	2.1793	21 10 7.5	2.405
21	16 15 57.16	2.1318	21 6 42.9	2.495	21	17 59 49.61	2.1793	21 7 40.0	2.511
22	16 18 5.13	2.1338	21 9 9.6	2.395	22	18 2 0.37	2.1792	21 5 6.2	2.616
23	16 20 13.22	2.1358	21 11 30.3	2.296	23	18 4 11.11	2.1790	21 2 26.1	2.721
24	16 22 21.42	2.1377	-21 13 45.1	-2.197	24	18 6 21.85	2.1789	-20 59 39.7	+2.826

MOON, 1919.

67

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JUNE 14.					JUNE 16.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 6 21.85	2.1789	-20 59 39.7	+2.826	0	19 50 3.06	2.1314	-16 47 42.3	+ 7.523
1	18 8 32.58	2.1787	20 56 47.0	2.932	1	19 52 10.90	2.1300	16 40 8.3	7.610
2	18 10 43.29	2.1783	20 53 47.9	3.038	2	19 54 18.66	2.1285	16 32 29.1	7.696
3	18 12 53.98	2.1780	20 50 42.5	3.142	3	19 56 26.32	2.1271	16 24 44.8	7.782
4	18 15 4.65	2.1776	20 47 30.9	3.246	4	19 58 33.91	2.1257	16 16 55.3	7.867
5	18 17 15.29	2.1773	20 44 13.0	3.351	5	20 0 41.40	2.1242	16 9 0.8	7.951
6	18 19 25.92	2.1768	20 40 48.8	3.455	6	20 2 48.81	2.1228	16 1 1.2	8.034
7	18 21 36.51	2.1763	20 37 18.4	3.559	7	20 4 56.13	2.1213	15 52 56.7	8.117
8	18 23 47.07	2.1758	20 33 41.7	3.663	8	20 7 3.36	2.1198	15 44 47.2	8.200
9	18 25 57.61	2.1753	20 29 58.8	3.767	9	20 9 10.51	2.1184	15 36 32.7	8.283
10	18 28 8.10	2.1746	20 26 9.7	3.870	10	20 11 17.57	2.1170	15 28 13.3	8.363
11	18 30 18.56	2.1740	20 22 14.4	3.973	11	20 13 24.55	2.1156	15 19 49.1	8.443
12	18 32 28.98	2.1733	20 18 12.9	4.077	12	20 15 31.44	2.1142	15 11 20.1	8.523
13	18 34 39.36	2.1726	20 14 5.2	4.179	13	20 17 38.25	2.1128	15 2 46.3	8.603
14	18 36 49.69	2.1718	20 9 51.4	4.281	14	20 19 44.97	2.1113	14 54 7.8	8.681
15	18 38 59.98	2.1711	20 5 31.5	4.383	15	20 21 51.60	2.1099	14 45 24.6	8.759
16	18 41 10.22	2.1703	20 1 5.5	4.485	16	20 23 58.16	2.1086	14 36 36.7	8.837
17	18 43 20.41	2.1694	19 56 33.3	4.587	17	20 26 4.63	2.1072	14 27 44.2	8.913
18	18 45 30.55	2.1686	19 51 55.1	4.687	18	20 28 11.02	2.1058	14 18 47.1	8.989
19	18 47 40.64	2.1677	19 47 10.9	4.788	19	20 30 17.33	2.1045	14 9 45.5	9.065
20	18 49 50.67	2.1667	19 42 20.6	4.888	20	20 32 23.56	2.1032	14 0 39.3	9.140
21	18 52 0.64	2.1658	19 37 24.3	4.988	21	20 34 29.71	2.1018	13 51 28.7	9.213
22	18 54 10.56	2.1648	19 32 22.0	5.088	22	20 36 35.78	2.1005	13 42 13.7	9.286
23	18 56 20.42	2.1638	-19 27 13.7	+5.188	23	20 38 41.77	2.0993	-13 32 54.4	+ 9.358
JUNE 15.					JUNE 17.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 58 30.21	2.1627	-19 21 59.5	+5.286	0	20 40 47.69	2.0980	-13 23 30.7	+ 9.431
1	19 0 39.94	2.1616	19 16 39.4	5.385	1	20 42 53.53	2.0968	13 14 2.7	9.502
2	19 2 49.60	2.1604	19 11 13.3	5.483	2	20 44 59.30	2.0956	13 4 30.5	9.573
3	19 4 59.19	2.1593	19 5 41.4	5.581	3	20 47 5.00	2.0943	12 54 54.0	9.643
4	19 7 8.72	2.1583	19 0 3.6	5.678	4	20 49 10.62	2.0932	12 45 13.4	9.711
5	19 9 18.18	2.1570	18 54 20.0	5.775	5	20 51 16.18	2.0920	12 35 28.7	9.779
6	19 11 27.56	2.1558	18 48 30.6	5.872	6	20 53 21.66	2.0908	12 25 39.9	9.847
7	19 13 36.87	2.1546	18 42 35.4	5.968	7	20 55 27.08	2.0896	12 15 47.1	9.913
8	19 15 46.11	2.1533	18 36 34.5	6.063	8	20 57 32.43	2.0887	12 5 50.3	9.980
9	19 17 55.27	2.1521	18 30 27.9	6.158	9	20 59 37.72	2.0877	11 55 49.5	10.045
10	19 20 4.36	2.1508	18 24 15.6	6.253	10	21 1 42.95	2.0867	11 45 44.9	10.109
11	19 22 13.37	2.1495	18 17 57.6	6.347	11	21 3 48.12	2.0856	11 35 36.4	10.173
12	19 24 22.30	2.1482	18 11 34.0	6.440	12	21 5 53.22	2.0846	11 25 24.1	10.237
13	19 26 31.15	2.1469	18 5 4.8	6.533	13	21 7 58.27	2.0837	11 15 8.0	10.298
14	19 28 39.93	2.1456	17 58 30.0	6.627	14	21 10 3.26	2.0828	11 4 48.3	10.360
15	19 30 48.62	2.1442	17 51 49.6	6.718	15	21 12 8.20	2.0819	10 54 24.8	10.422
16	19 32 57.23	2.1428	17 45 3.8	6.810	16	21 14 13.09	2.0810	10 43 57.7	10.481
17	19 35 5.75	2.1414	17 38 12.4	6.902	17	21 16 17.92	2.0802	10 33 27.1	10.540
18	19 37 14.20	2.1400	17 31 15.6	6.992	18	21 18 22.71	2.0795	10 22 52.9	10.599
19	19 39 22.55	2.1386	17 24 13.4	7.082	19	21 20 27.46	2.0788	10 12 15.2	10.657
20	19 41 30.83	2.1373	17 17 5.8	7.171	20	21 22 32.16	2.0780	10 1 34.1	10.713
21	19 43 39.02	2.1358	17 9 52.9	7.259	21	21 24 36.82	2.0773	9 50 49.6	10.770
22	19 45 47.12	2.1343	17 2 34.7	7.348	22	21 26 41.44	2.0767	9 40 1.7	10.826
23	19 47 55.13	2.1328	16 55 11.1	7.437	23	21 28 46.02	2.0761	9 29 10.5	10.880
24	19 50 3.06	2.1314	-16 47 42.3	+7.523	24	21 30 50.57	2.0756	- 9 18 16.1	+10.933

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JUNE 18.					JUNE 20.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	21 30 50.57	2.0756	-9 18 16.1	+10.933	0	23 10 42.03	2.1055	+ 0 12 32.1	+12.505
1	21 32 55.09	2.0750	9 7 18.5	10.987	1	23 12 48.42	2.1074	0 25 2.7	12.515
2	21 34 59.57	2.0745	8 56 17.7	11.039	2	23 14 54.92	2.1094	0 37 33.9	12.523
3	21 37 4.03	2.0742	8 45 13.8	11.090	3	23 17 1.55	2.1116	0 50 5.5	12.531
4	21 39 8.47	2.0738	8 34 6.9	11.141	4	23 19 8.31	2.1138	1 2 37.6	12.538
5	21 41 12.88	2.0733	8 22 56.9	11.191	5	23 21 15.21	2.1161	1 15 10.0	12.543
6	21 43 17.27	2.0730	8 11 44.0	11.240	6	23 23 22.24	2.1183	1 27 42.8	12.548
7	21 45 21.64	2.0728	8 0 28.1	11.288	7	23 25 29.41	2.1207	1 40 15.7	12.551
8	21 47 26.00	2.0726	7 49 9.4	11.335	8	23 27 36.72	2.1231	1 52 48.9	12.554
9	21 49 30.35	2.0723	7 37 47.9	11.382	9	23 29 44.18	2.1256	2 5 22.2	12.555
10	21 51 34.68	2.0722	7 26 23.6	11.428	10	23 31 51.79	2.1282	2 17 55.5	12.555
11	21 53 39.01	2.0721	7 14 56.6	11.473	11	23 33 59.56	2.1308	2 30 28.8	12.555
12	21 55 43.33	2.0720	7 3 26.9	11.517	12	23 36 7.48	2.1334	2 43 2.0	12.552
13	21 57 47.65	2.0721	6 51 54.6	11.559	13	23 38 15.57	2.1360	2 55 35.0	12.549
14	21 59 51.98	2.0721	6 40 19.8	11.601	14	23 40 23.82	2.1389	3 8 7.9	12.545
15	22 1 56.30	2.0722	6 28 42.5	11.643	15	23 42 32.24	2.1418	3 20 40.4	12.539
16	22 4 0.64	2.0723	6 17 2.7	11.684	16	23 44 40.84	2.1448	3 33 12.6	12.533
17	22 6 4.98	2.0725	6 5 20.4	11.724	17	23 46 49.61	2.1477	3 45 44.4	12.525
18	22 8 9.34	2.0728	5 53 35.8	11.763	18	23 48 58.56	2.1508	3 58 15.6	12.516
19	22 10 13.71	2.0731	5 41 48.9	11.800	19	23 51 7.70	2.1538	4 10 46.3	12.507
20	22 12 18.11	2.0734	5 29 59.8	11.838	20	23 53 17.02	2.1570	4 23 16.4	12.496
21	22 14 22.52	2.0738	5 18 8.4	11.874	21	23 55 26.54	2.1603	4 35 45.8	12.483
22	22 16 26.96	2.0743	5 6 14.9	11.909	22	23 57 36.25	2.1635	4 48 14.4	12.469
23	22 18 31.43	2.0748	-4 54 19.3	+11.944	23	23 59 46.16	2.1668	+ 5 0 42.1	+12.455
JUNE 19.					JUNE 21.				
0	22 20 35.93	2.0753	-4 42 21.6	+11.978	0	0 1 56.27	2.1703	+ 5 13 9.0	+12.439
1	22 22 40.46	2.0759	4 30 22.0	12.010	1	0 4 6.59	2.1738	5 25 34.8	12.422
2	22 24 45.04	2.0766	4 18 20.4	12.043	2	0 6 17.12	2.1773	5 37 59.6	12.404
3	22 26 49.65	2.0773	4 6 16.9	12.073	3	0 8 27.86	2.1808	5 50 23.3	12.384
4	22 28 54.31	2.0780	3 54 11.6	12.103	4	0 10 38.82	2.1845	6 2 45.7	12.363
5	22 30 59.01	2.0788	3 42 4.5	12.133	5	0 12 50.00	2.1882	6 15 6.9	12.342
6	22 33 3.76	2.0798	3 29 55.7	12.161	6	0 15 1.40	2.1919	6 27 26.7	12.318
7	22 35 8.58	2.0808	3 17 45.2	12.188	7	0 17 13.03	2.1958	6 39 45.0	12.293
8	22 37 13.45	2.0817	3 5 33.2	12.214	8	0 19 24.89	2.1996	6 52 1.9	12.268
9	22 39 18.38	2.0827	2 53 19.5	12.240	9	0 21 36.98	2.2035	7 4 17.2	12.241
10	22 41 23.37	2.0838	2 41 4.4	12.264	10	0 23 49.31	2.2075	7 16 30.8	12.213
11	22 43 28.44	2.0850	2 28 47.8	12.288	11	0 26 1.88	2.2116	7 28 42.7	12.183
12	22 45 33.57	2.0862	2 16 29.9	12.309	12	0 28 14.70	2.2157	7 40 52.8	12.153
13	22 47 38.78	2.0875	2 4 10.7	12.332	13	0 30 27.76	2.2198	7 53 1.0	12.120
14	22 49 44.07	2.0888	1 51 50.1	12.353	14	0 32 41.08	2.2241	8 5 7.2	12.087
15	22 51 49.43	2.0902	1 39 28.4	12.372	15	0 34 54.65	2.2283	8 17 11.4	12.052
16	22 53 54.89	2.0917	1 27 5.5	12.391	16	0 37 8.47	2.2326	8 29 13.4	12.016
17	22 56 0.43	2.0932	1 14 41.5	12.408	17	0 39 22.56	2.2369	8 41 13.3	11.978
18	22 58 6.07	2.0948	1 2 16.5	12.425	18	0 41 36.90	2.2413	8 53 10.8	11.939
19	23 0 11.80	2.0963	0 49 50.5	12.441	19	0 43 51.52	2.2458	9 5 6.0	11.900
20	23 2 17.63	2.0981	0 37 23.6	12.456	20	0 46 6.40	2.2503	9 16 58.8	11.858
21	23 4 23.57	2.0998	0 24 55.8	12.470	21	0 48 21.56	2.2549	9 28 49.0	11.815
22	23 6 29.61	2.1016	-0 12 27.2	12.483	22	0 50 36.99	2.2594	9 40 36.6	11.771
23	23 8 35.76	2.1035	+0 0 2.1	12.494	23	0 52 52.69	2.2641	9 52 21.5	11.725
24	23 10 42.03	2.1055	+0 12 32.1	+12.505	24	0 55 8.68	2.2688	+10 4 3.6	+11.678

MOON, 1919.
GREENWICH MEAN TIME.

69

Hour.	Right Ascension.			Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.			Var. per Min.	Declination.	Var. per Min.
JUNE 22.							JUNE 24.						
0	h	m	s	s	°	'	0	h	m	s	s	°	'
0	0	55	8.68	2.2688	+10	4 3.6	0	2	49	59.86	2.5193	+18	2 45.1
1	0	57	24.95	2.2736	10	15 42.9	1	2	52	31.17	2.5243	18	10 23.4
2	0	59	41.51	2.2783	10	27 19.2	2	2	55	2.77	2.5292	18	17 54.4
3	1	1	58.35	2.2832	10	38 52.5	3	2	57	34.67	2.5341	18	25 18.3
4	1	4	15.49	2.2881	10	50 22.6	4	3	0	6.86	2.5388	18	32 34.7
5	1	6	32.92	2.2930	11	1 49.6	5	3	2	39.33	2.5436	18	39 43.8
6	1	8	50.65	2.2979	11	13 13.3	6	3	5	12.09	2.5483	18	46 45.4
7	1	11	8.67	2.3029	11	24 33.6	7	3	7	45.12	2.5529	18	53 39.4
8	1	13	26.99	2.3079	11	35 50.4	8	3	10	18.44	2.5575	19	0 25.7
9	1	15	45.62	2.3130	11	47 3.7	9	3	12	52.02	2.5619	19	7 4.3
10	1	18	4.55	2.3181	11	58 13.3	10	3	15	25.87	2.5663	19	13 35.1
11	1	20	23.79	2.3232	12	9 19.3	11	3	17	59.98	2.5707	19	19 58.1
12	1	22	43.33	2.3283	12	20 21.4	12	3	20	34.35	2.5749	19	26 13.1
13	1	25	3.18	2.3335	12	31 19.6	13	3	23	8.97	2.5792	19	32 20.1
14	1	27	23.35	2.3388	12	42 13.9	14	3	25	43.85	2.5833	19	38 18.9
15	1	29	43.83	2.3440	12	53 4.0	15	3	28	18.96	2.5873	19	44 9.7
16	1	32	4.63	2.3493	13	3 50.0	16	3	30	54.32	2.5913	19	49 52.1
17	1	34	25.74	2.3545	13	14 31.7	17	3	33	29.91	2.5951	19	55 26.3
18	1	36	47.17	2.3598	13	25 9.1	18	3	36	5.73	2.5988	20	0 52.1
19	1	39	8.92	2.3652	13	35 42.1	19	3	38	41.77	2.6024	20	6 9.5
20	1	41	30.99	2.3705	13	46 10.5	20	3	41	18.02	2.6060	20	11 18.5
21	1	43	53.38	2.3758	13	56 34.4	21	3	43	54.49	2.6095	20	16 18.8
22	1	46	16.09	2.3812	14	6 53.5	22	3	46	31.16	2.6129	20	21 10.6
23	1	48	39.12	2.3866	+14	17 7.8	23	3	49	8.04	2.6162	+20	25 53.7
JUNE 23.							JUNE 25.						
0	1	51	2.48	2.3921	+14	27 17.3	0	3	51	45.10	2.6193	+20	30 28.1
1	1	53	26.17	2.3974	14	37 21.8	1	3	54	22.35	2.6224	20	34 53.7
2	1	55	50.17	2.4028	14	47 21.2	2	3	56	59.79	2.6253	20	39 10.5
3	1	58	14.51	2.4083	14	57 15.4	3	3	59	37.39	2.6281	20	43 18.4
4	2	0	39.17	2.4137	15	7 4.4	4	4	2	15.16	2.6308	20	47 17.3
5	2	3	4.15	2.4191	15	16 48.1	5	4	4	53.09	2.6335	20	51 7.3
6	2	5	29.46	2.4246	15	26 26.4	6	4	7	31.18	2.6360	20	54 48.3
7	2	7	55.10	2.4300	15	35 59.1	7	4	10	9.41	2.6383	20	58 20.2
8	2	10	21.06	2.4353	15	45 26.2	8	4	12	47.78	2.6406	21	1 43.0
9	2	12	47.34	2.4408	15	54 47.7	9	4	15	26.28	2.6428	21	4 56.7
10	2	15	13.95	2.4463	16	4 3.3	10	4	18	4.91	2.6448	21	8 1.2
11	2	17	40.89	2.4516	16	13 13.1	11	4	20	43.65	2.6466	21	10 56.5
12	2	20	8.14	2.4569	16	22 16.9	12	4	23	22.50	2.6483	21	13 42.5
13	2	22	35.72	2.4623	16	31 14.7	13	4	26	1.45	2.6500	21	16 19.3
14	2	25	3.61	2.4676	16	40 6.3	14	4	28	40.50	2.6515	21	18 46.7
15	2	27	31.83	2.4729	16	48 51.6	15	4	31	19.63	2.6528	21	21 4.8
16	2	30	0.36	2.4782	16	57 30.7	16	4	33	58.84	2.6541	21	23 13.6
17	2	32	29.21	2.4835	17	6 3.3	17	4	36	38.12	2.6552	21	25 13.0
18	2	34	58.38	2.4888	17	14 29.5	18	4	39	17.46	2.6561	21	27 2.9
19	2	37	27.86	2.4938	17	22 49.0	19	4	41	56.85	2.6569	21	28 43.5
20	2	39	57.64	2.4990	17	31 1.9	20	4	44	36.29	2.6577	21	30 14.6
21	2	42	27.74	2.5042	17	39 8.1	21	4	47	15.77	2.6582	21	31 36.3
22	2	44	58.14	2.5093	17	47 7.4	22	4	49	55.27	2.6586	21	32 48.4
23	2	47	28.85	2.5143	17	54 59.7	23	4	52	34.80	2.6589	21	33 51.2
24	2	49	59.88	2.5198	+18	2 45.1	24	4	55	14.34	2.6590	+21	34 44.4

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JUNE 26.					JUNE 28.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	4 55 14.34	2.6590	+21 34 44.4	+0.808	0	7 0 31.13	2.5162	+19 17 48.3	-6.228
1	4 57 53.88	2.6590	21 35 28.1	0.650	1	7 3 1.94	2.5107	19 11 30.9	6.352
2	5 0 33.42	2.6589	21 36 2.4	0.492	2	7 5 32.41	2.5052	19 5 6.1	6.473
3	5 3 12.95	2.6586	21 36 27.1	0.333	3	7 8 2.56	2.4997	18 58 34.1	6.593
4	5 5 52.45	2.6582	21 36 42.4	0.175	4	7 10 32.37	2.4940	18 51 55.0	6.712
5	5 8 31.93	2.6577	21 36 48.1	+0.017	5	7 13 1.84	2.4883	18 45 8.7	6.829
6	5 11 11.37	2.6569	21 36 44.4	-0.141	6	7 15 30.97	2.4826	18 38 15.5	6.945
7	5 13 50.76	2.6561	21 36 31.2	0.299	7	7 17 59.75	2.4768	18 31 15.3	7.060
8	5 16 30.10	2.6552	21 36 8.5	0.457	8	7 20 28.19	2.4710	18 24 8.3	7.173
9	5 19 9.38	2.6541	21 35 36.4	0.614	9	7 22 56.27	2.4651	18 16 54.6	7.284
10	5 21 48.59	2.6528	21 34 54.8	0.772	10	7 25 24.00	2.4592	18 9 34.2	7.395
11	5 24 27.72	2.6514	21 34 3.8	0.928	11	7 27 51.37	2.4533	18 2 7.2	7.504
12	5 27 6.76	2.6499	21 33 3.4	1.085	12	7 30 18.39	2.4473	17 54 33.7	7.612
13	5 29 45.71	2.6483	21 31 53.6	1.241	13	7 32 45.05	2.4413	17 46 53.8	7.717
14	5 32 24.55	2.6464	21 30 34.5	1.397	14	7 35 11.34	2.4352	17 39 7.7	7.821
15	5 35 3.28	2.6445	21 29 6.0	1.553	15	7 37 37.27	2.4292	17 31 15.3	7.925
16	5 37 41.89	2.6424	21 27 28.2	1.708	16	7 40 2.84	2.4231	17 23 16.7	8.026
17	5 40 20.37	2.6403	21 25 41.1	1.862	17	7 42 28.04	2.4168	17 15 12.2	8.126
18	5 42 58.72	2.6379	21 23 44.8	2.015	18	7 44 52.86	2.4107	17 7 1.6	8.225
19	5 45 36.92	2.6355	21 21 39.3	2.168	19	7 47 17.32	2.4046	16 58 45.2	8.322
20	5 48 14.98	2.6330	21 19 24.6	2.322	20	7 49 41.41	2.3983	16 50 23.0	8.417
21	5 50 52.88	2.6303	21 17 0.7	2.474	21	7 52 5.12	2.3921	16 41 55.2	8.511
22	5 53 30.61	2.6273	21 14 27.7	2.625	22	7 54 28.46	2.3859	16 33 21.7	8.604
23	5 56 8.16	2.6244	+21 11 45.7	-2.775	23	7 56 51.43	2.3797	+16 24 42.7	-8.696
JUNE 27.					JUNE 29.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	5 58 45.54	2.6214	+21 8 54.7	-2.925	0	7 59 14.02	2.3734	+16 15 58.2	-8.785
1	6 1 22.73	2.6182	21 5 54.7	3.074	1	8 1 36.24	2.3672	16 7 8.5	8.873
2	6 3 59.72	2.6148	21 2 45.8	3.223	2	8 3 58.08	2.3609	15 58 13.5	8.960
3	6 6 36.51	2.6114	20 59 28.0	3.370	3	8 6 19.55	2.3547	15 49 13.3	9.044
4	6 9 13.09	2.6078	20 56 1.4	3.517	4	8 8 40.64	2.3483	15 40 8.2	9.128
5	6 11 49.45	2.6042	20 52 26.0	3.663	5	8 11 1.35	2.3421	15 30 58.0	9.211
6	6 14 25.59	2.6004	20 48 41.9	3.808	6	8 13 21.69	2.3359	15 21 42.9	9.291
7	6 17 1.50	2.5966	20 44 49.1	3.952	7	8 15 41.66	2.3297	15 12 23.1	9.370
8	6 19 37.18	2.5926	20 40 47.7	4.094	8	8 18 1.25	2.3233	15 2 58.5	9.448
9	6 22 12.61	2.5885	20 36 37.8	4.236	9	8 20 20.46	2.3171	14 53 29.3	9.524
10	6 24 47.80	2.5843	20 32 19.4	4.377	10	8 22 39.30	2.3109	14 43 55.6	9.599
11	6 27 22.73	2.5800	20 27 52.6	4.517	11	8 24 57.77	2.3047	14 34 17.4	9.673
12	6 29 57.40	2.5756	20 23 17.4	4.656	12	8 27 15.86	2.2985	14 24 34.9	9.744
13	6 32 31.80	2.5711	20 18 33.9	4.793	13	8 29 33.59	2.2923	14 14 48.1	9.814
14	6 35 5.93	2.5665	20 13 42.2	4.929	14	8 31 50.94	2.2862	14 4 57.2	9.883
15	6 37 39.78	2.5618	20 8 42.4	5.065	15	8 34 7.93	2.2801	13 55 2.2	9.950
16	6 40 13.35	2.5572	20 3 34.4	5.200	16	8 36 24.55	2.2739	13 45 3.2	10.017
17	6 42 46.63	2.5523	19 58 18.4	5.333	17	8 38 40.80	2.2678	13 35 0.2	10.082
18	6 45 19.62	2.5473	19 52 54.5	5.464	18	8 40 56.69	2.2618	13 24 53.4	10.144
19	6 47 52.31	2.5423	19 47 22.7	5.594	19	8 43 12.21	2.2558	13 14 42.9	10.206
20	6 50 24.70	2.5373	19 41 43.2	5.724	20	8 45 27.38	2.2498	13 4 28.7	10.267
21	6 52 56.78	2.5321	19 35 55.8	5.853	21	8 47 42.18	2.2438	12 54 10.9	10.326
22	6 55 28.55	2.5268	19 30 0.9	5.979	22	8 49 56.63	2.2378	12 43 49.6	10.383
23	6 58 0.00	2.5215	19 23 58.3	6.105	23	8 52 10.71	2.2318	12 33 24.9	10.438
24	7 0 31.13	2.5162	+19 17 48.3	-6.228	24	8 54 24.45	2.2260	+12 22 56.9	-10.494

MOON, 1919.

71

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JUNE 30.					JULY 2.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	8 54 24.45	2.2260	+12 22 56.9	-10.494	0	10 35 20.99	2.0008	+3 19 50.9	-11.705
1	8 56 37.83	2.2202	12 12 25.6	10.548	1	10 37 20.94	1.9976	3 8 8.6	11.705
2	8 58 50.87	2.2143	12 1 51.2	10.599	2	10 39 20.70	1.9944	2 56 26.3	11.703
3	9 1 3.55	2.2085	11 51 13.7	10.650	3	10 41 20.27	1.9912	2 44 44.2	11.702
4	9 3 15.89	2.2028	11 40 33.2	10.700	4	10 43 19.64	1.9881	2 33 2.1	11.700
5	9 5 27.89	2.1972	11 29 49.7	10.748	5	10 45 18.84	1.9852	2 21 20.2	11.696
6	9 7 39.55	2.1915	11 19 3.5	10.794	6	10 47 17.86	1.9822	2 9 38.6	11.692
7	9 9 50.87	2.1858	11 8 14.4	10.840	7	10 49 16.70	1.9793	1 57 57.2	11.687
8	9 12 1.85	2.1803	10 57 22.7	10.884	8	10 51 15.37	1.9764	1 46 16.2	11.681
9	9 14 12.50	2.1748	10 46 28.3	10.927	9	10 53 13.87	1.9736	1 34 35.5	11.674
10	9 16 22.82	2.1693	10 35 31.5	10.968	10	10 55 12.20	1.9709	1 22 55.3	11.667
11	9 18 32.81	2.1638	10 24 32.1	11.009	11	10 57 10.38	1.9683	1 11 15.5	11.658
12	9 20 42.48	2.1585	10 13 30.4	11.048	12	10 59 8.40	1.9658	0 59 36.3	11.648
13	9 22 51.83	2.1531	10 2 26.4	11.086	13	11 1 6.27	1.9633	0 47 57.7	11.639
14	9 25 0.85	2.1478	9 51 20.1	11.123	14	11 3 3.99	1.9608	0 36 19.6	11.629
15	9 27 9.56	2.1426	9 40 11.7	11.158	15	11 5 1.56	1.9583	0 24 42.2	11.617
16	9 29 17.96	2.1373	9 29 1.2	11.192	16	11 6 58.99	1.9560	0 13 5.6	11.605
17	9 31 26.04	2.1322	9 17 48.7	11.224	17	11 8 56.28	1.9538	+0 1 29.6	11.593
18	9 33 33.82	2.1272	9 6 34.3	11.256	18	11 10 53.44	1.9515	-0 10 5.5	11.578
19	9 35 41.30	2.1221	8 55 18.0	11.287	19	11 12 50.46	1.9493	0 21 39.8	11.564
20	9 37 48.47	2.1171	8 43 59.9	11.316	20	11 14 47.36	1.9473	0 33 13.2	11.549
21	9 39 55.35	2.1122	8 32 40.1	11.344	21	11 16 44.14	1.9453	0 44 45.7	11.533
22	9 42 1.93	2.1073	8 21 18.6	11.372	22	11 18 40.79	1.9433	0 56 17.2	11.517
23	9 44 8.23	2.1025	+ 8 9 55.5	-11.398	23	11 20 37.33	1.9414	-1 7 47.7	-11.499
JULY 1.					JULY 3.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	9 46 14.23	2.0977	+ 7 58 30.9	-11.422	0	11 22 33.76	1.9396	-1 19 17.1	-11.481
1	9 48 19.95	2.0930	7 47 4.9	11.445	1	11 24 30.08	1.9378	1 30 45.4	11.463
2	9 50 25.39	2.0883	7 35 37.5	11.468	2	11 26 26.29	1.9361	1 42 12.6	11.444
3	9 52 30.55	2.0838	7 24 8.8	11.489	3	11 28 22.41	1.9344	1 53 38.7	11.424
4	9 54 35.44	2.0792	7 12 38.8	11.510	4	11 30 18.42	1.9328	2 5 3.5	11.403
5	9 56 40.05	2.0747	7 1 7.6	11.529	5	11 32 14.34	1.9313	2 16 27.0	11.382
6	9 58 44.40	2.0703	6 49 35.3	11.548	6	11 34 10.18	1.9298	2 27 49.3	11.360
7	10 0 48.48	2.0659	6 38 1.9	11.564	7	11 36 5.92	1.9283	2 39 10.2	11.337
8	10 2 52.31	2.0616	6 26 27.6	11.580	8	11 38 1.58	1.9270	2 50 29.7	11.314
9	10 4 55.87	2.0573	6 14 52.3	11.596	9	11 39 57.16	1.9258	3 1 47.9	11.290
10	10 6 59.18	2.0531	6 3 16.1	11.610	10	11 41 52.67	1.9245	3 13 4.5	11.265
11	10 9 2.24	2.0490	5 51 39.1	11.623	11	11 43 48.10	1.9233	3 24 19.7	11.241
12	10 11 5.06	2.0450	5 40 1.3	11.635	12	11 45 43.46	1.9222	3 35 33.4	11.215
13	10 13 7.64	2.0409	5 28 22.9	11.646	13	11 47 38.76	1.9211	3 46 45.5	11.188
14	10 15 9.97	2.0369	5 16 43.8	11.656	14	11 49 33.99	1.9201	3 57 56.0	11.161
15	10 17 12.07	2.0331	5 5 4.2	11.665	15	11 51 29.17	1.9193	4 9 4.8	11.133
16	10 19 13.94	2.0293	4 53 24.0	11.673	16	11 53 24.30	1.9183	4 20 12.0	11.105
17	10 21 15.58	2.0254	4 41 43.4	11.681	17	11 55 19.37	1.9174	4 31 17.4	11.076
18	10 23 16.99	2.0218	4 30 2.3	11.687	18	11 57 14.39	1.9167	4 42 21.1	11.047
19	10 25 18.19	2.0182	4 18 21.0	11.692	19	11 59 9.37	1.9160	4 53 23.0	11.016
20	10 27 19.17	2.0145	4 6 39.3	11.697	20	12 1 4.31	1.9153	5 4 23.0	10.985
21	10 29 19.93	2.0110	3 54 57.4	11.699	21	12 2 59.21	1.9147	5 15 21.2	10.954
22	10 31 20.49	2.0076	3 43 15.4	11.702	22	12 4 54.07	1.9141	5 26 17.5	10.923
23	10 33 20.84	2.0042	3 31 33.2	11.704	23	12 6 48.90	1.9137	5 37 11.9	10.890
24	10 35 20.99	2.0008	+ 3 19 50.9	-11.705	24	12 8 43.71	1.9133	-5 48 4.3	-10.857

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JULY 4.					JULY 6.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	12 8 43.71	1.9133	- 5 48 4.3	-10.857	0	13 41 1.98	1.9505	-13 40 23.3	-8.613
1	12 10 38.49	1.9128	5 58 54.7	10.823	1	13 42 59.06	1.9523	13 48 58.3	8.554
2	12 12 33.25	1.9125	6 9 43.1	10.788	2	13 44 56.26	1.9542	13 57 29.8	8.493
3	12 14 27.99	1.9123	6 20 29.3	10.753	3	13 46 53.56	1.9560	14 5 57.5	8.432
4	12 16 22.72	1.9121	6 31 13.5	10.718	4	13 48 50.98	1.9579	14 14 21.6	8.371
5	12 18 17.44	1.9119	6 41 55.5	10.683	5	13 50 48.51	1.9598	14 22 42.0	8.309
6	12 20 12.15	1.9118	6 52 35.4	10.646	6	13 52 46.16	1.9618	14 30 58.7	8.247
7	12 22 6.85	1.9117	7 3 13.0	10.608	7	13 54 43.93	1.9638	14 39 11.6	8.183
8	12 24 1.55	1.9117	7 13 48.4	10.572	8	13 56 41.82	1.9658	14 47 20.6	8.118
9	12 25 56.25	1.9118	7 24 21.6	10.533	9	13 58 39.83	1.9679	14 55 25.8	8.055
10	12 27 50.96	1.9119	7 34 52.4	10.493	10	14 0 37.97	1.9700	15 3 27.2	7.990
11	12 29 45.68	1.9120	7 45 20.8	10.454	11	14 2 36.23	1.9721	15 11 24.6	7.924
12	12 31 40.40	1.9122	7 55 46.9	10.415	12	14 4 34.62	1.9743	15 19 18.1	7.858
13	12 33 35.14	1.9125	8 6 10.6	10.374	13	14 6 33.14	1.9764	15 27 7.6	7.793
14	12 35 29.90	1.9128	8 16 31.8	10.333	14	14 8 31.79	1.9786	15 34 53.2	7.726
15	12 37 24.68	1.9131	8 26 50.5	10.291	15	14 10 30.57	1.9808	15 42 34.7	7.658
16	12 39 19.47	1.9135	8 37 6.7	10.249	16	14 12 29.49	1.9831	15 50 12.1	7.589
17	12 41 14.30	1.9141	8 47 20.4	10.207	17	14 14 28.54	1.9853	15 57 45.4	7.521
18	12 43 9.16	1.9145	8 57 31.5	10.163	18	14 16 27.73	1.9877	16 5 14.6	7.452
19	12 45 4.04	1.9150	9 7 39.9	10.119	19	14 18 27.06	1.9900	16 12 39.6	7.382
20	12 46 58.96	1.9158	9 17 45.8	10.075	20	14 20 26.53	1.9923	16 20 0.4	7.312
21	12 48 53.93	1.9164	9 27 48.9	10.029	21	14 22 26.13	1.9946	16 27 17.0	7.242
22	12 50 48.93	1.9170	9 37 49.3	9.984	22	14 24 25.88	1.9970	16 34 29.4	7.170
23	12 52 43.97	1.9178	- 9 47 47.0	- 9.938	23	14 26 25.77	1.9994	-16 41 37.4	-7.098
JULY 5.					JULY 7.				
0	12 54 39.06	1.9186	- 9 57 41.9	- 9.892	0	14 28 25.81	2.0018	-16 48 41.1	-7.026
1	12 56 34.20	1.9194	10 7 34.0	9.845	1	14 30 25.99	2.0043	16 55 40.5	6.953
2	12 58 29.39	1.9203	10 17 23.3	9.798	2	14 32 26.32	2.0067	17 2 35.4	6.878
3	13 0 24.64	1.9213	10 27 9.7	9.749	3	14 34 26.79	2.0091	17 9 25.9	6.805
4	13 2 19.94	1.9223	10 36 53.2	9.700	4	14 36 27.41	2.0116	17 16 12.0	6.731
5	13 4 15.31	1.9233	10 46 33.7	9.651	5	14 38 28.18	2.0141	17 22 53.6	6.655
6	13 6 10.73	1.9243	10 56 11.3	9.602	6	14 40 29.10	2.0166	17 29 30.6	6.579
7	13 8 6.22	1.9254	11 5 45.9	9.552	7	14 42 30.17	2.0191	17 36 3.1	6.503
8	13 10 1.78	1.9266	11 15 17.5	9.501	8	14 44 31.39	2.0217	17 42 31.0	6.427
9	13 11 57.41	1.9278	11 24 46.0	9.448	9	14 46 32.77	2.0242	17 48 54.3	6.350
10	13 13 53.12	1.9291	11 34 11.3	9.397	10	14 48 34.29	2.0267	17 55 13.0	6.273
11	13 15 48.90	1.9303	11 43 33.6	9.345	11	14 50 35.97	2.0293	18 1 27.0	6.193
12	13 17 44.75	1.9316	11 52 52.7	9.292	12	14 52 37.80	2.0318	18 7 36.2	6.114
13	13 19 40.69	1.9329	12 2 8.6	9.238	13	14 54 39.79	2.0344	18 13 40.7	6.035
14	13 21 36.70	1.9343	12 11 21.3	9.184	14	14 56 41.93	2.0370	18 19 40.4	5.956
15	13 23 32.81	1.9358	12 20 30.7	9.129	15	14 58 44.23	2.0396	18 25 35.4	5.875
16	13 25 29.00	1.9373	12 29 36.8	9.074	16	15 0 46.68	2.0422	18 31 25.4	5.793
17	13 27 25.29	1.9388	12 38 39.6	9.018	17	15 2 49.29	2.0448	18 37 10.6	5.713
18	13 29 21.66	1.9403	12 47 39.0	8.963	18	15 4 52.05	2.0473	18 42 50.9	5.631
19	13 31 18.13	1.9420	12 56 35.1	8.906	19	15 6 54.97	2.0500	18 48 26.3	5.548
20	13 33 14.70	1.9437	13 5 27.7	8.848	20	15 8 58.05	2.0526	18 53 56.7	5.465
21	13 35 11.37	1.9453	13 14 16.9	8.790	21	15 11 1.28	2.0552	18 59 22.1	5.382
22	13 37 8.13	1.9469	13 23 2.5	8.732	22	15 13 4.67	2.0578	19 4 42.5	5.298
23	13 39 5.00	1.9488	13 31 44.7	8.673	23	15 15 8.21	2.0603	19 9 57.8	5.213
24	13 41 1.98	1.9505	-13 40 23.3	- 8.613	24	15 17 11.91	2.0630	-19 15 8.0	-5.128

MOON, 1919.

73

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JULY 8.					JULY 10.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	15 17 11.91	2.0630	-19 15 8.0	-5.128	0	16 58 58.12	2.1685	-21 34 14.6	-0.513
1	15 19 15.77	2.0656	19 20 13.1	5.042	1	17 1 8.28	2.1700	21 34 42.2	0.408
2	15 21 19.78	2.0681	19 25 13.0	4.955	2	17 3 18.52	2.1714	21 35 3.5	0.303
3	15 23 23.94	2.0707	19 30 7.7	4.869	3	17 5 28.85	2.1728	21 35 18.6	0.198
4	15 25 28.26	2.0733	19 34 57.3	4.782	4	17 7 39.26	2.1742	21 35 27.2	-0.092
5	15 27 32.74	2.0759	19 39 41.5	4.693	5	17 9 49.75	2.1755	21 35 29.6	+0.013
6	15 29 37.37	2.0785	19 44 20.5	4.606	6	17 12 0.32	2.1768	21 35 25.6	0.119
7	15 31 42.16	2.0810	19 48 54.2	4.518	7	17 14 10.96	2.1780	21 35 15.3	0.225
8	15 33 47.09	2.0836	19 53 22.6	4.428	8	17 16 21.68	2.1793	21 34 58.6	0.332
9	15 35 52.19	2.0862	19 57 45.6	4.338	9	17 18 32.47	2.1803	21 34 35.5	0.438
10	15 37 57.43	2.0886	20 2 3.2	4.248	10	17 20 43.32	2.1814	21 34 6.1	0.544
11	15 40 2.82	2.0912	20 6 15.4	4.158	11	17 22 54.24	2.1825	21 33 30.2	0.651
12	15 42 8.37	2.0938	20 10 22.1	4.067	12	17 25 5.22	2.1835	21 32 48.0	0.758
13	15 44 14.07	2.0962	20 14 23.4	3.975	13	17 27 16.26	2.1845	21 31 59.3	0.864
14	15 46 19.91	2.0986	20 18 19.1	3.883	14	17 29 27.36	2.1854	21 31 4.3	0.971
15	15 48 25.90	2.1011	20 22 9.3	3.790	15	17 31 38.51	2.1863	21 30 2.8	1.079
16	15 50 32.04	2.1036	20 25 53.9	3.698	16	17 33 49.71	2.1872	21 28 54.8	1.186
17	15 52 38.33	2.1060	20 29 33.0	3.604	17	17 36 0.97	2.1879	21 27 40.5	1.293
18	15 54 44.76	2.1084	20 33 6.4	3.510	18	17 38 12.26	2.1887	21 26 19.7	1.400
19	15 56 51.34	2.1108	20 36 34.2	3.416	19	17 40 23.61	2.1894	21 24 52.5	1.508
20	15 58 58.06	2.1132	20 39 56.3	3.321	20	17 42 34.99	2.1900	21 23 18.8	1.615
21	16 1 4.92	2.1156	20 43 12.7	3.226	21	17 44 46.41	2.1906	21 21 38.7	1.722
22	16 3 11.93	2.1179	20 46 23.4	3.130	22	17 46 57.86	2.1912	21 19 52.2	1.829
23	16 5 19.07	2.1202	-20 49 28.3	-3.034	23	17 49 9.35	2.1918	-21 17 59.2	+1.937
JULY 9.					JULY 11.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	16 7 26.35	2.1225	-20 52 27.5	-2.938	0	17 51 20.87	2.1923	-21 15 59.8	+2.044
1	16 9 33.77	2.1248	20 55 20.9	2.841	1	17 53 32.42	2.1927	21 13 53.9	2.152
2	16 11 41.32	2.1269	20 58 8.4	2.743	2	17 55 43.99	2.1930	21 11 41.6	2.259
3	16 13 49.00	2.1292	21 0 50.1	2.646	3	17 57 55.58	2.1934	21 9 22.8	2.367
4	16 15 56.82	2.1314	21 3 25.9	2.548	4	18 0 7.20	2.1938	21 6 57.6	2.473
5	16 18 4.77	2.1335	21 5 55.8	2.449	5	18 2 18.83	2.1939	21 4 26.0	2.580
6	16 20 12.84	2.1357	21 8 19.8	2.350	6	18 4 30.47	2.1942	21 1 48.0	2.688
7	16 22 21.05	2.1378	21 10 37.8	2.251	7	18 6 42.13	2.1943	20 59 3.5	2.795
8	16 24 29.38	2.1398	21 12 49.9	2.151	8	18 8 53.79	2.1944	20 56 12.6	2.902
9	16 26 37.83	2.1418	21 14 55.9	2.051	9	18 11 5.46	2.1946	20 53 15.3	3.009
10	16 28 46.40	2.1439	21 16 56.0	1.951	10	18 13 17.14	2.1946	20 50 11.5	3.116
11	16 30 55.10	2.1459	21 18 50.0	1.850	11	18 15 28.81	2.1946	20 47 1.4	3.222
12	16 33 3.91	2.1478	21 20 38.0	1.749	12	18 17 40.49	2.1946	20 43 44.9	3.328
13	16 35 12.84	2.1498	21 22 19.9	1.648	13	18 19 52.16	2.1944	20 40 22.0	3.435
14	16 37 21.88	2.1517	21 23 55.7	1.546	14	18 22 3.82	2.1943	20 36 52.7	3.541
15	16 39 31.04	2.1535	21 25 25.4	1.443	15	18 24 15.48	2.1942	20 33 17.1	3.647
16	16 41 40.30	2.1553	21 26 48.9	1.342	16	18 26 27.12	2.1939	20 29 35.1	3.753
17	16 43 49.68	2.1572	21 28 6.4	1.239	17	18 28 38.75	2.1937	20 25 46.8	3.858
18	16 45 59.16	2.1588	21 29 17.6	1.136	18	18 30 50.36	2.1934	20 21 52.2	3.963
19	16 48 8.74	2.1605	21 30 22.7	1.033	19	18 33 1.96	2.1931	20 17 51.2	4.068
20	16 50 18.42	2.1622	21 31 21.5	0.928	20	18 35 13.53	2.1927	20 13 44.0	4.173
21	16 52 28.20	2.1638	21 32 14.1	0.825	21	18 37 25.08	2.1923	20 9 30.4	4.278
22	16 54 38.08	2.1655	21 33 0.5	0.722	22	18 39 36.60	2.1918	20 5 10.6	4.383
23	16 56 48.06	2.1670	21 33 40.7	0.618	23	18 41 48.10	2.1913	20 0 44.5	4.487
24	16 58 58.12	2.1685	-21 34 14.6	-0.513	24	18 43 59.56	2.1908	-19 56 12.2	+4.590

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JULY 12.					JULY 14.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 43 59.56	2.1908	-19 56 12.2	+4.590	0	20 28 0.99	2.1367	-14 24 10.4	+9.038
1	18 46 10.99	2.1903	19 51 33.7	4.693	1	20 30 9.15	2.1353	14 15 5.8	9.115
2	18 48 22.39	2.1897	19 46 49.0	4.797	2	20 32 17.23	2.1340	14 5 56.6	9.192
3	18 50 33.75	2.1890	19 41 58.1	4.900	3	20 34 25.23	2.1327	13 56 42.8	9.268
4	18 52 45.07	2.1883	19 37 1.0	5.003	4	20 36 33.15	2.1313	13 47 24.4	9.344
5	18 54 56.35	2.1876	19 31 57.8	5.105	5	20 38 40.99	2.1300	13 38 1.5	9.418
6	18 57 7.58	2.1868	19 26 48.4	5.207	6	20 40 48.75	2.1287	13 28 34.2	9.492
7	18 59 18.77	2.1862	19 21 33.0	5.308	7	20 42 56.43	2.1273	13 19 2.5	9.565
8	19 1 29.92	2.1853	19 16 11.5	5.409	8	20 45 4.03	2.1260	13 9 26.4	9.638
9	19 3 41.01	2.1845	19 10 43.9	5.510	9	20 47 11.55	2.1248	12 59 45.9	9.710
10	19 5 52.06	2.1837	19 5 10.3	5.611	10	20 49 19.00	2.1235	12 50 1.2	9.780
11	19 8 3.05	2.1828	18 59 30.6	5.711	11	20 51 26.37	2.1222	12 40 12.3	9.850
12	19 10 13.99	2.1818	18 53 45.0	5.810	12	20 53 33.66	2.1209	12 30 19.2	9.919
13	19 12 24.87	2.1809	18 47 53.4	5.909	13	20 55 40.88	2.1197	12 20 22.0	9.988
14	19 14 35.70	2.1800	18 41 55.9	6.008	14	20 57 48.02	2.1184	12 10 20.7	10.055
15	19 16 46.47	2.1789	18 35 52.5	6.107	15	20 59 55.09	2.1172	12 0 15.4	10.122
16	19 18 57.17	2.1778	18 29 43.1	6.204	16	21 2 2.08	2.1160	11 50 6.1	10.188
17	19 21 7.81	2.1768	18 23 28.0	6.302	17	21 4 9.01	2.1149	11 39 52.8	10.253
18	19 23 18.39	2.1758	18 17 6.9	6.399	18	21 6 15.87	2.1137	11 29 35.7	10.317
19	19 25 28.91	2.1747	18 10 40.1	6.495	19	21 8 22.65	2.1125	11 19 14.8	10.380
20	19 27 39.35	2.1735	18 4 7.5	6.591	20	21 10 29.37	2.1115	11 8 50.1	10.443
21	19 29 49.73	2.1724	17 57 29.2	6.686	21	21 12 36.03	2.1104	10 58 21.6	10.505
22	19 32 0.04	2.1713	17 50 45.2	6.781	22	21 14 42.62	2.1093	10 47 49.5	10.566
23	19 34 10.28	2.1701	-17 43 55.5	+6.876	23	21 16 49.15	2.1083	-10 37 13.7	+10.626
JULY 13.					JULY 15.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 36 20.45	2.1689	-17 37 0.1	+6.970	0	21 18 55.62	2.1073	-10 26 34.4	+10.684
1	19 38 30.55	2.1677	17 29 59.1	7.063	1	21 21 2.03	2.1063	10 15 51.6	10.743
2	19 40 40.57	2.1663	17 22 52.6	7.155	2	21 23 8.38	2.1053	10 5 5.3	10.801
3	19 42 50.51	2.1651	17 15 40.5	7.248	3	21 25 14.67	2.1044	9 54 15.5	10.858
4	19 45 0.38	2.1639	17 8 22.9	7.339	4	21 27 20.91	2.1035	9 43 22.4	10.912
5	19 47 10.18	2.1627	17 0 59.8	7.430	5	21 29 27.09	2.1026	9 32 26.1	10.967
6	19 49 19.90	2.1613	16 53 31.3	7.520	6	21 31 33.22	2.1018	9 21 26.4	11.022
7	19 51 29.54	2.1600	16 45 57.4	7.610	7	21 33 39.31	2.1010	9 10 23.5	11.073
8	19 53 39.10	2.1587	16 38 18.1	7.700	8	21 35 45.34	2.1002	8 59 17.6	11.125
9	19 55 48.58	2.1574	16 30 33.4	7.788	9	21 37 51.33	2.0995	8 48 8.5	11.178
10	19 57 57.99	2.1561	16 22 43.5	7.876	10	21 39 57.28	2.0988	8 36 56.3	11.228
11	20 0 7.31	2.1547	16 14 48.3	7.963	11	21 42 3.18	2.0980	8 25 41.2	11.276
12	20 2 16.55	2.1533	16 6 47.9	8.050	12	21 44 9.04	2.0973	8 14 23.2	11.324
13	20 4 25.71	2.1519	15 58 42.3	8.136	13	21 46 14.86	2.0968	8 3 2.3	11.372
14	20 6 34.78	2.1506	15 50 31.6	8.222	14	21 48 20.65	2.0963	7 51 38.6	11.418
15	20 8 43.78	2.1493	15 42 15.7	8.307	15	21 50 26.41	2.0957	7 40 12.1	11.464
16	20 10 52.69	2.1478	15 33 54.8	8.390	16	21 52 32.13	2.0951	7 28 42.9	11.509
17	20 13 1.52	2.1465	15 25 28.9	8.473	17	21 54 37.82	2.0947	7 17 11.0	11.553
18	20 15 10.27	2.1451	15 16 58.0	8.556	18	21 56 43.49	2.0943	7 5 36.6	11.595
19	20 17 18.93	2.1437	15 8 22.2	8.638	19	21 58 49.13	2.0938	6 53 59.6	11.638
20	20 19 27.51	2.1423	14 59 41.4	8.720	20	22 0 54.75	2.0934	6 42 20.1	11.678
21	20 21 36.01	2.1409	14 50 55.8	8.800	21	22 3 0.34	2.0931	6 30 38.2	11.718
22	20 23 44.42	2.1395	14 42 5.4	8.879	22	22 5 5.92	2.0929	6 18 54.0	11.757
23	20 25 52.75	2.1381	14 33 10.3	8.958	23	22 7 11.49	2.0927	6 7 7.4	11.795
24	20 28 0.99	2.1367	-14 24 10.4	+9.038	24	22 9 17.04	2.0924	-5 55 18.6	+11.832

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JULY 16.					JULY 18.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	22 9 17.04	2.0924	-5 55 18.6	+11.832	0	23 50 23.95	2.1405	+ 3 56 16.5	+12.415
1	22 11 22.58	2.0923	5 43 27.6	11.868	1	23 52 32.45	2.1428	4 8 41.0	12.401
2	22 13 28.12	2.0922	5 31 34.4	11.903	2	23 54 41.09	2.1452	4 21 4.6	12.386
3	22 15 33.64	2.0921	5 19 39.2	11.938	3	23 56 49.87	2.1475	4 33 27.3	12.369
4	22 17 39.17	2.0921	5 7 41.9	11.971	4	23 58 58.79	2.1500	4 45 48.9	12.351
5	22 19 44.69	2.0921	4 55 42.7	12.003	5	0 1 7.87	2.1526	4 58 9.4	12.333
6	22 21 50.22	2.0922	4 43 41.6	12.034	6	0 3 17.10	2.1552	5 10 28.8	12.313
7	22 23 55.75	2.0923	4 31 38.6	12.065	7	0 5 26.49	2.1578	5 22 46.9	12.291
8	22 26 1.30	2.0925	4 19 33.8	12.094	8	0 7 36.03	2.1604	5 35 3.7	12.269
9	22 28 6.85	2.0926	4 7 27.3	12.122	9	0 9 45.74	2.1632	5 47 19.2	12.246
10	22 30 12.41	2.0929	3 55 19.2	12.149	10	0 11 55.61	2.1660	5 59 33.2	12.220
11	22 32 18.00	2.0933	3 43 9.4	12.176	11	0 14 5.66	2.1688	6 11 45.6	12.194
12	22 34 23.60	2.0936	3 30 58.1	12.201	12	0 16 15.87	2.1717	6 23 56.5	12.168
13	22 36 29.23	2.0940	3 18 45.3	12.225	13	0 18 26.26	2.1747	6 36 5.7	12.139
14	22 38 34.88	2.0943	3 6 31.1	12.248	14	0 20 36.83	2.1777	6 48 13.2	12.110
15	22 40 40.55	2.0948	2 54 15.5	12.271	15	0 22 47.58	2.1808	7 0 18.9	12.080
16	22 42 46.26	2.0955	2 41 58.6	12.292	16	0 24 58.52	2.1838	7 12 22.8	12.048
17	22 44 52.01	2.0961	2 29 40.5	12.313	17	0 27 9.64	2.1869	7 24 24.7	12.014
18	22 46 57.79	2.0967	2 17 21.1	12.332	18	0 29 20.95	2.1902	7 36 24.5	11.980
19	22 49 3.61	2.0973	2 5 0.7	12.349	19	0 31 32.46	2.1934	7 48 22.3	11.945
20	22 51 9.47	2.0981	1 52 39.2	12.367	20	0 33 44.16	2.1968	8 0 17.9	11.909
21	22 53 15.38	2.0989	1 40 16.7	12.383	21	0 35 56.07	2.2001	8 12 11.4	11.872
22	22 55 21.34	2.0998	1 27 53.3	12.398	22	0 38 8.17	2.2034	8 24 2.5	11.832
23	22 57 27.35	2.1007	-1 15 28.9	+12.413	23	0 40 20.48	2.2069	+ 8 35 51.2	+11.792
JULY 17.					JULY 19.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	22 59 33.42	2.1017	-1 3 3.8	+12.425	0	0 42 33.00	2.2104	+ 8 47 37.5	+11.750
1	23 1 39.55	2.1026	0 50 37.9	12.437	1	0 44 45.73	2.2139	8 59 21.2	11.708
2	23 3 45.73	2.1037	0 38 11.4	12.448	2	0 46 58.67	2.2175	9 11 2.4	11.663
3	23 5 51.99	2.1048	0 25 44.2	12.458	3	0 49 11.83	2.2212	9 22 40.8	11.618
4	23 7 58.31	2.1059	0 13 16.4	12.467	4	0 51 25.21	2.2248	9 34 16.5	11.572
5	23 10 4.70	2.1071	-0 0 48.2	12.474	5	0 53 38.81	2.2285	9 45 49.4	11.524
6	23 12 11.16	2.1084	+0 11 40.5	12.481	6	0 55 52.63	2.2323	9 57 19.4	11.475
7	23 14 17.71	2.1098	0 24 9.5	12.487	7	0 58 6.69	2.2362	10 8 46.4	11.424
8	23 16 24.33	2.1111	0 36 38.9	12.492	8	1 0 20.97	2.2399	10 20 10.3	11.373
9	23 18 31.04	2.1126	0 49 8.5	12.494	9	1 2 35.48	2.2438	10 31 31.1	11.321
10	23 20 37.84	2.1140	1 1 38.2	12.497	10	1 4 50.23	2.2478	10 42 48.8	11.267
11	23 22 44.72	2.1155	1 14 8.1	12.498	11	1 7 5.22	2.2518	10 54 3.1	11.211
12	23 24 51.70	2.1171	1 26 38.0	12.498	12	1 9 20.44	2.2558	11 5 14.1	11.155
13	23 26 58.77	2.1188	1 39 7.9	12.498	13	1 11 35.91	2.2598	11 16 21.7	11.097
14	23 29 5.95	2.1205	1 51 37.7	12.498	14	1 13 51.62	2.2638	11 27 25.7	11.038
15	23 31 13.23	2.1222	2 4 7.4	12.493	15	1 16 7.57	2.2679	11 38 26.2	10.977
16	23 33 20.61	2.1240	2 16 36.8	12.488	16	1 18 23.77	2.2722	11 49 22.9	10.915
17	23 35 28.11	2.1259	2 29 5.9	12.483	17	1 20 40.23	2.2763	12 0 16.0	10.853
18	23 37 35.72	2.1278	2 41 34.7	12.477	18	1 22 56.93	2.2805	12 11 5.3	10.788
19	23 39 43.45	2.1298	2 54 3.1	12.469	19	1 25 13.89	2.2848	12 21 50.6	10.723
20	23 41 51.29	2.1318	3 6 31.0	12.461	20	1 27 31.11	2.2891	12 32 32.0	10.656
21	23 43 59.26	2.1339	3 18 58.4	12.451	21	1 29 48.58	2.2933	12 43 9.3	10.588
22	23 46 7.36	2.1361	3 31 25.1	12.440	22	1 32 6.31	2.2978	12 53 42.5	10.519
23	23 48 15.59	2.1383	3 43 51.2	12.428	23	1 34 24.31	2.3021	13 4 11.6	10.448
24	23 50 23.95	2.1405	+3 56 16.5	+12.415	24	1 36 42.56	2.3064	+13 14 36.3	+10.376

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JULY 20.					JULY 22.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	1 36 42.56	2.3064	+13 14 36.3	+10.376	0	3 32 34.09	2.5146	+19 45 33.9	+5.448
1	1 39 1.08	2.3108	13 24 56.7	10.303	1	3 35 5.07	2.5181	19 50 56.9	5.318
2	1 41 19.86	2.3153	13 35 12.7	10.228	2	3 37 36.26	2.5215	19 56 12.0	5.187
3	1 43 38.91	2.3198	13 45 24.1	10.152	3	3 40 7.65	2.5248	20 1 19.3	5.054
4	1 45 58.23	2.3243	13 55 30.9	10.075	4	3 42 39.24	2.5282	20 6 18.5	4.921
5	1 48 17.82	2.3287	14 5 33.1	9.997	5	3 45 11.03	2.5314	20 11 9.8	4.788
6	1 50 37.67	2.3332	14 15 30.5	9.918	6	3 47 43.01	2.5346	20 15 53.0	4.652
7	1 52 57.80	2.3378	14 25 23.2	9.837	7	3 50 15.18	2.5377	20 20 28.0	4.516
8	1 55 18.20	2.3422	14 35 10.9	9.753	8	3 52 47.53	2.5407	20 24 54.9	4.380
9	1 57 38.86	2.3468	14 44 53.6	9.670	9	3 55 20.06	2.5438	20 29 13.6	4.243
10	1 59 59.81	2.3513	14 54 31.3	9.586	10	3 57 52.76	2.5464	20 33 24.0	4.104
11	2 2 21.02	2.3558	15 4 3.9	9.499	11	4 0 25.63	2.5492	20 37 26.1	3.965
12	2 4 42.51	2.3605	15 13 31.2	9.412	12	4 2 58.66	2.5518	20 41 19.8	3.826
13	2 7 4.28	2.3650	15 22 53.3	9.323	13	4 5 31.85	2.5544	20 45 5.2	3.686
14	2 9 26.31	2.3696	15 32 9.9	9.233	14	4 8 5.19	2.5569	20 48 42.1	3.544
15	2 11 48.63	2.3743	15 41 21.2	9.142	15	4 10 38.68	2.5593	20 52 10.5	3.403
16	2 14 11.22	2.3788	15 50 26.9	9.048	16	4 13 12.31	2.5616	20 55 30.5	3.262
17	2 16 34.08	2.3833	15 59 27.0	8.955	17	4 15 46.07	2.5638	20 58 41.9	3.118
18	2 18 57.22	2.3880	16 8 21.5	8.860	18	4 18 19.96	2.5659	21 1 44.6	2.974
19	2 21 20.64	2.3926	16 17 10.2	8.763	19	4 20 53.98	2.5680	21 4 38.8	2.831
20	2 23 44.33	2.3971	16 25 53.1	8.665	20	4 23 28.12	2.5698	21 7 24.3	2.686
21	2 26 8.29	2.4017	16 34 30.0	8.566	21	4 26 2.36	2.5717	21 10 1.1	2.541
22	2 28 32.53	2.4063	16 43 1.0	8.467	22	4 28 36.72	2.5734	21 12 29.2	2.396
23	2 30 57.04	2.4108	+16 51 26.0	+ 8.365	23	4 31 11.17	2.5750	+21 14 48.6	+2.250
JULY 21.					JULY 23.				
0	2 33 21.82	2.4153	+16 59 44.8	+ 8.262	0	4 33 45.72	2.5766	+21 16 59.2	+2.103
1	2 35 46.87	2.4198	17 7 57.4	8.158	1	4 36 20.36	2.5779	21 19 1.0	1.957
2	2 38 12.20	2.4243	17 16 3.8	8.053	2	4 38 55.07	2.5792	21 20 54.0	1.809
3	2 40 37.79	2.4288	17 24 3.8	7.946	3	4 41 29.86	2.5804	21 22 38.1	1.662
4	2 43 3.65	2.4332	17 31 57.4	7.839	4	4 44 4.72	2.5816	21 24 13.4	1.515
5	2 45 29.77	2.4377	17 39 44.5	7.730	5	4 46 39.65	2.5825	21 25 39.9	1.367
6	2 47 56.17	2.4421	17 47 25.0	7.620	6	4 49 14.62	2.5833	21 26 57.4	1.218
7	2 50 22.82	2.4464	17 54 58.9	7.509	7	4 51 49.65	2.5841	21 28 6.0	1.070
8	2 52 49.74	2.4508	18 2 26.1	7.398	8	4 54 24.71	2.5847	21 29 5.8	0.922
9	2 55 16.91	2.4551	18 9 46.6	7.283	9	4 56 59.81	2.5853	21 29 56.6	0.773
10	2 57 44.35	2.4594	18 17 0.1	7.168	10	4 59 34.94	2.5858	21 30 38.5	0.623
11	3 0 12.04	2.4636	18 24 6.8	7.053	11	5 2 10.10	2.5860	21 31 11.4	0.474
12	3 2 39.98	2.4678	18 31 6.5	6.936	12	5 4 45.26	2.5862	21 31 35.4	0.325
13	3 5 8.18	2.4720	18 37 59.1	6.818	13	5 7 20.44	2.5863	21 31 50.4	0.176
14	3 7 36.62	2.4761	18 44 44.6	6.698	14	5 9 55.61	2.5862	21 31 56.5	+0.028
15	3 10 5.31	2.4802	18 51 22.9	6.578	15	5 12 30.78	2.5861	21 31 53.7	-0.122
16	3 12 34.24	2.4842	18 57 54.0	6.457	16	5 15 5.94	2.5858	21 31 41.9	0.272
17	3 15 3.41	2.4883	19 4 17.7	6.334	17	5 17 41.07	2.5853	21 31 21.1	0.421
18	3 17 32.83	2.4922	19 10 34.1	6.211	18	5 20 16.18	2.5849	21 30 51.4	0.569
19	3 20 2.47	2.4960	19 16 43.0	6.086	19	5 22 51.26	2.5843	21 30 12.8	0.718
20	3 22 32.35	2.4998	19 22 44.4	5.961	20	5 25 26.30	2.5837	21 29 25.2	0.867
21	3 25 2.45	2.5036	19 28 38.3	5.834	21	5 28 1.30	2.5828	21 28 28.8	1.015
22	3 27 32.78	2.5073	19 34 24.5	5.707	22	5 30 36.24	2.5818	21 27 23.4	1.163
23	3 30 3.32	2.5109	19 40 3.1	5.578	23	5 33 11.12	2.5808	21 26 9.2	1.312
24	3 32 34.09	2.5146	+19 45 33.9	+ 5.448	24	5 35 45.93	2.5796	+21 24 46.0	-1.460

MOON, 1919.

77

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JULY 24.					JULY 26.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	5 35 45.93	2.5796	+21 24 46.0	-1.460	0	7 36 20.64	2.4135	+17 36 32.9	-7.698
1	5 38 20.67	2.5783	21 23 14.0	1.607	1	7 38 45.30	2.4085	17 28 47.9	7.802
2	5 40 55.33	2.5760	21 21 33.2	1.753	2	7 41 9.66	2.4033	17 20 56.7	7.904
3	5 43 29.90	2.5753	21 19 43.6	1.900	3	7 43 33.70	2.3982	17 12 59.4	8.005
4	5 46 4.37	2.5738	21 17 45.2	2.047	4	7 45 57.44	2.3931	17 4 56.1	8.105
5	5 48 38.75	2.5721	21 15 38.0	2.193	5	7 48 20.87	2.3879	16 56 46.8	8.204
6	5 51 13.02	2.5703	21 13 22.1	2.338	6	7 50 43.99	2.3828	16 48 31.6	8.301
7	5 53 47.18	2.5683	21 10 57.5	2.482	7	7 53 6.80	2.3775	16 40 10.7	8.396
8	5 56 21.21	2.5662	21 8 24.3	2.626	8	7 55 29.29	2.3723	16 31 44.1	8.491
9	5 58 55.12	2.5641	21 5 42.4	2.771	9	7 57 51.47	2.3670	16 23 11.8	8.584
10	6 1 28.90	2.5618	21 2 51.8	2.914	10	8 0 13.33	2.3617	16 14 34.0	8.676
11	6 4 2.54	2.5595	20 59 52.7	3.056	11	8 2 34.87	2.3563	16 5 50.7	8.766
12	6 6 36.04	2.5570	20 56 45.1	3.198	12	8 4 56.09	2.3511	15 57 2.1	8.854
13	6 9 9.38	2.5544	20 53 29.0	3.339	13	8 7 17.00	2.3458	15 48 8.2	8.942
14	6 11 42.57	2.5518	20 50 4.4	3.481	14	8 9 37.58	2.3404	15 39 9.1	9.028
15	6 14 15.59	2.5489	20 46 31.3	3.621	15	8 11 57.85	2.3352	15 30 4.8	9.113
16	6 16 48.44	2.5461	20 42 49.9	3.759	16	8 14 17.80	2.3298	15 20 55.5	9.196
17	6 19 21.12	2.5432	20 39 0.2	3.898	17	8 16 37.42	2.3244	15 11 41.3	9.278
18	6 21 53.62	2.5401	20 35 2.2	4.036	18	8 18 56.73	2.3191	15 2 22.1	9.359
19	6 24 25.93	2.5369	20 30 55.9	4.173	19	8 21 15.71	2.3137	14 52 58.2	9.438
20	6 26 58.05	2.5338	20 26 41.5	4.308	20	8 23 34.37	2.3084	14 43 29.6	9.516
21	6 29 29.98	2.5304	20 22 19.0	4.443	21	8 25 52.72	2.3031	14 33 56.3	9.593
22	6 32 1.70	2.5269	20 17 48.3	4.578	22	8 28 10.74	2.2976	14 24 18.5	9.668
23	6 34 33.21	2.5234	+20 13 9.6	-4.711	23	8 30 28.43	2.2923	+14 14 36.2	-9.742
JULY 25.					JULY 27.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	6 37 4.51	2.5198	+20 8 23.0	-4.843	0	8 32 45.81	2.2870	+14 4 49.5	-9.813
1	6 39 35.59	2.5162	20 3 28.4	4.975	1	8 35 2.87	2.2817	13 54 58.6	9.884
2	6 42 6.45	2.5125	19 58 26.0	5.105	2	8 37 19.61	2.2764	13 45 3.4	9.954
3	6 44 37.09	2.5087	19 53 15.8	5.235	3	8 39 36.04	2.2712	13 35 4.1	10.022
4	6 47 7.49	2.5047	19 47 57.8	5.363	4	8 41 52.15	2.2658	13 25 0.8	10.088
5	6 49 37.65	2.5008	19 42 32.2	5.491	5	8 44 7.94	2.2605	13 14 53.5	10.154
6	6 52 7.58	2.4968	19 36 58.9	5.618	6	8 46 23.41	2.2553	13 4 42.3	10.218
7	6 54 37.26	2.4926	19 31 18.0	5.743	7	8 48 38.57	2.2501	12 54 27.3	10.281
8	6 57 6.69	2.4883	19 25 29.7	5.868	8	8 50 53.42	2.2449	12 44 8.6	10.342
9	6 59 35.86	2.4841	19 19 33.9	5.992	9	8 53 7.96	2.2397	12 33 46.3	10.402
10	7 2 4.78	2.4798	19 13 30.7	6.113	10	8 55 22.18	2.2344	12 23 20.4	10.461
11	7 4 33.44	2.4754	19 7 20.3	6.234	11	8 57 36.09	2.2293	12 12 51.0	10.518
12	7 7 1.83	2.4709	19 1 2.6	6.354	12	8 59 49.70	2.2243	12 2 18.2	10.574
13	7 9 29.95	2.4665	18 54 37.8	6.473	13	9 2 3.00	2.2191	11 51 42.1	10.628
14	7 11 57.81	2.4619	18 48 5.9	6.591	14	9 4 15.99	2.2140	11 41 2.8	10.681
15	7 14 25.38	2.4572	18 41 26.9	6.707	15	9 6 28.68	2.2090	11 30 20.4	10.733
16	7 16 52.67	2.4526	18 34 41.1	6.822	16	9 8 41.07	2.2039	11 19 34.9	10.783
17	7 19 19.69	2.4479	18 27 48.3	6.936	17	9 10 53.15	2.1989	11 8 46.4	10.833
18	7 21 46.42	2.4431	18 20 48.8	7.048	18	9 13 4.94	2.1940	10 57 54.9	10.881
19	7 24 12.86	2.4383	18 13 42.5	7.160	19	9 15 16.43	2.1891	10 47 0.7	10.928
20	7 26 39.01	2.4333	18 6 29.6	7.270	20	9 17 27.63	2.1843	10 36 3.6	10.973
21	7 29 4.86	2.4284	17 59 10.1	7.379	21	9 19 38.54	2.1793	10 25 3.9	11.017
22	7 31 30.42	2.4235	17 51 44.1	7.487	22	9 21 49.15	2.1744	10 14 1.6	11.059
23	7 33 55.68	2.4185	17 44 11.7	7.593	23	9 23 59.47	2.1697	10 2 56.8	11.101
24	7 36 20.64	2.4135	+17 36 32.9	-7.698	24	9 26 9.51	2.1650	+ 9 51 49.5	-11.142

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
JULY 28.					JULY 30.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	9 26 9.51	2.1650	+9 51 49.5	-11.142	0	11 5 27.00	1.9913	+0 32 49.6	-11.745
1	9 28 19.27	2.1603	9 40 39.8	11.180	1	11 7 26.41	1.9891	0 21 5.2	11.733
2	9 30 28.74	2.1555	9 29 27.9	11.218	2	11 9 25.69	1.9868	+0 9 21.6	11.721
3	9 32 37.93	2.1509	9 18 13.7	11.254	3	11 11 24.83	1.9846	-0 2 21.3	11.708
4	9 34 46.85	2.1463	9 6 57.4	11.290	4	11 13 23.84	1.9823	0 14 3.4	11.694
5	9 36 55.49	2.1418	8 55 38.9	11.324	5	11 15 22.71	1.9803	0 25 44.6	11.679
6	9 39 3.86	2.1373	8 44 18.5	11.356	6	11 17 21.47	1.9783	0 37 24.9	11.664
7	9 41 11.96	2.1328	8 32 56.2	11.388	7	11 19 20.10	1.9762	0 49 4.3	11.648
8	9 43 19.80	2.1284	8 21 32.0	11.418	8	11 21 18.61	1.9743	1 0 42.6	11.630
9	9 45 27.37	2.1239	8 10 6.0	11.448	9	11 23 17.01	1.9723	1 12 19.9	11.613
10	9 47 34.67	2.1196	7 58 38.3	11.475	10	11 25 15.29	1.9704	1 23 56.1	11.594
11	9 49 41.72	2.1153	7 47 9.0	11.502	11	11 27 13.46	1.9687	1 35 31.2	11.574
12	9 51 48.51	2.1111	7 35 38.1	11.528	12	11 29 11.53	1.9669	1 47 5.0	11.553
13	9 53 55.05	2.1069	7 24 5.7	11.552	13	11 31 9.49	1.9653	1 58 37.6	11.533
14	9 56 1.34	2.1027	7 12 31.9	11.575	14	11 33 7.36	1.9637	2 10 8.9	11.511
15	9 58 7.37	2.0986	7 0 56.7	11.598	15	11 35 5.13	1.9620	2 21 38.9	11.488
16	10 0 13.17	2.0946	6 49 20.2	11.618	16	11 37 2.80	1.9605	2 33 7.5	11.465
17	10 2 18.72	2.0905	6 37 42.5	11.638	17	11 39 0.39	1.9590	2 44 34.7	11.442
18	10 4 24.03	2.0865	6 26 3.6	11.658	18	11 40 57.88	1.9576	2 56 0.5	11.417
19	10 6 29.10	2.0826	6 14 23.6	11.675	19	11 42 55.30	1.9563	3 7 24.7	11.391
20	10 8 33.94	2.0788	6 2 42.6	11.692	20	11 44 52.63	1.9549	3 18 47.4	11.365
21	10 10 38.55	2.0749	5 51 0.6	11.707	21	11 46 49.89	1.9537	3 30 8.5	11.338
22	10 12 42.93	2.0712	5 39 17.8	11.721	22	11 48 47.07	1.9525	3 41 28.0	11.310
23	10 14 47.09	2.0674	+5 27 34.1	-11.735	23	11 50 44.19	1.9513	-3 52 45.7	-11.282
JULY 29.					JULY 31.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	10 16 51.02	2.0638	+5 15 49.6	-11.748	0	11 52 41.23	1.9502	-4 4 1.8	-11.253
1	10 18 54.74	2.0602	5 4 4.4	11.758	1	11 54 38.21	1.9492	4 15 16.1	11.223
2	10 20 58.24	2.0565	4 52 18.6	11.768	2	11 56 35.13	1.9482	4 26 28.6	11.193
3	10 23 1.52	2.0530	4 40 32.3	11.777	3	11 58 31.99	1.9473	4 37 39.3	11.163
4	10 25 4.60	2.0496	4 28 45.4	11.786	4	12 0 28.80	1.9463	4 48 48.1	11.130
5	10 27 7.47	2.0462	4 16 58.0	11.793	5	12 2 25.55	1.9455	4 59 54.9	11.098
6	10 29 10.14	2.0428	4 5 10.3	11.798	6	12 4 22.26	1.9448	5 10 59.9	11.066
7	10 31 12.60	2.0394	3 53 22.2	11.804	7	12 6 18.92	1.9439	5 22 2.8	11.031
8	10 33 14.87	2.0363	3 41 33.8	11.808	8	12 8 15.53	1.9433	5 33 3.6	10.997
9	10 35 16.95	2.0330	3 29 45.2	11.811	9	12 10 12.11	1.9427	5 44 2.4	10.963
10	10 37 18.83	2.0298	3 17 56.5	11.813	10	12 12 8.65	1.9421	5 54 59.1	10.928
11	10 39 20.53	2.0268	3 6 7.7	11.814	11	12 14 5.16	1.9415	6 5 53.7	10.891
12	10 41 22.04	2.0237	2 54 18.8	11.814	12	12 16 1.63	1.9410	6 16 46.0	10.853
13	10 43 23.37	2.0208	2 42 30.0	11.813	13	12 17 58.08	1.9406	6 27 36.1	10.816
14	10 45 24.53	2.0178	2 30 41.2	11.812	14	12 19 54.50	1.9402	6 38 23.9	10.778
15	10 47 25.51	2.0148	2 18 52.5	11.809	15	12 21 50.90	1.9398	6 49 9.4	10.739
16	10 49 26.31	2.0120	2 7 4.1	11.805	16	12 23 47.28	1.9395	6 59 52.6	10.700
17	10 51 26.95	2.0093	1 55 15.9	11.801	17	12 25 43.64	1.9393	7 10 33.4	10.660
18	10 53 27.43	2.0066	1 43 28.0	11.796	18	12 27 40.00	1.9392	7 21 11.8	10.619
19	10 55 27.74	2.0039	1 31 40.4	11.790	19	12 29 36.34	1.9389	7 31 47.7	10.578
20	10 57 27.90	2.0013	1 19 53.2	11.783	20	12 31 32.67	1.9388	7 42 21.1	10.536
21	10 59 27.90	1.9988	1 8 6.5	11.774	21	12 33 29.00	1.9388	7 52 52.0	10.494
22	11 1 27.75	1.9963	0 56 20.3	11.766	22	12 35 25.33	1.9388	8 3 20.4	10.452
23	11 3 27.45	1.9938	0 44 34.6	11.756	23	12 37 21.66	1.9388	8 13 46.2	10.408
24	11 5 27.00	1.9913	+0 32 49.6	-11.745	24	12 39 17.99	1.9389	-8 24 9.3	-10.363

MOON, 1919.

79

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
AUGUST 1.					AUGUST 3.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	12 39 17.99	1.9389	- 8 24 9.3	-10.363	0	14 13 15.93	1.9904	-15 40 19.6	-7.608
1	12 41 14.33	1.9391	8 34 29.8	10.318	1	14 15 15.41	1.9923	15 47 54.0	7.538
2	12 43 10.68	1.9393	8 44 47.5	10.273	2	14 17 15.00	1.9941	15 55 24.1	7.467
3	12 45 7.04	1.9394	8 55 2.6	10.228	3	14 19 14.70	1.9960	16 2 50.0	7.396
4	12 47 3.41	1.9398	9 5 14.8	10.181	4	14 21 14.52	1.9980	16 10 11.6	7.324
5	12 48 59.81	1.9401	9 15 24.3	10.135	5	14 23 14.46	1.9999	16 17 28.9	7.252
6	12 50 56.22	1.9404	9 25 31.0	10.087	6	14 25 14.51	2.0019	16 24 41.8	7.179
7	12 52 52.66	1.9408	9 35 34.7	10.038	7	14 27 14.69	2.0039	16 31 50.4	7.107
8	12 54 49.12	1.9413	9 45 35.6	9.990	8	14 29 14.98	2.0059	16 38 54.6	7.033
9	12 56 45.61	1.9418	9 55 33.5	9.941	9	14 31 15.40	2.0080	16 45 54.4	6.959
10	12 58 42.13	1.9423	10 5 28.5	9.892	10	14 33 15.94	2.0100	16 52 49.7	6.884
11	13 0 38.69	1.9429	10 15 20.5	9.841	11	14 35 16.60	2.0121	16 59 40.5	6.808
12	13 2 35.28	1.9435	10 25 9.4	9.790	12	14 37 17.39	2.0143	17 6 26.8	6.734
13	13 4 31.91	1.9442	10 34 55.3	9.738	13	14 39 18.31	2.0163	17 13 8.6	6.658
14	13 6 28.58	1.9448	10 44 38.0	9.687	14	14 41 19.35	2.0184	17 19 45.8	6.582
15	13 8 25.29	1.9456	10 54 17.7	9.634	15	14 43 20.52	2.0206	17 26 18.4	6.505
16	13 10 22.05	1.9464	11 3 54.1	9.581	16	14 45 21.82	2.0228	17 32 46.4	6.428
17	13 12 18.86	1.9473	11 13 27.4	9.528	17	14 47 23.25	2.0249	17 39 9.7	6.349
18	13 14 15.72	1.9481	11 22 57.4	9.473	18	14 49 24.81	2.0271	17 45 28.3	6.271
19	13 16 12.63	1.9490	11 32 24.2	9.419	19	14 51 26.50	2.0293	17 51 42.2	6.193
20	13 18 9.60	1.9499	11 41 47.7	9.363	20	14 53 28.32	2.0315	17 57 51.4	6.113
21	13 20 6.62	1.9509	11 51 7.8	9.308	21	14 55 30.28	2.0338	18 3 55.7	6.033
22	13 22 3.71	1.9520	12 0 24.6	9.252	22	14 57 32.37	2.0359	18 9 55.3	5.953
23	13 24 0.86	1.9530	-12 9 38.0	-9.195	23	14 59 34.59	2.0382	-18 15 50.0	-5.872
AUGUST 2.					AUGUST 4.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	13 25 58.07	1.9541	-12 18 48.0	-9.138	0	15 1 36.95	2.0404	-18 21 39.9	-5.791
1	13 27 55.35	1.9553	12 27 54.5	9.079	1	15 3 39.44	2.0427	18 27 24.9	5.709
2	13 29 52.70	1.9564	12 36 57.5	9.021	2	15 5 42.07	2.0450	18 33 5.0	5.627
3	13 31 50.12	1.9576	12 45 57.0	8.963	3	15 7 44.84	2.0473	18 38 40.1	5.544
4	13 33 47.61	1.9588	12 54 53.0	8.903	4	15 9 47.74	2.0495	18 44 10.3	5.461
5	13 35 45.18	1.9602	13 3 45.4	8.843	5	15 11 50.78	2.0518	18 49 35.4	5.378
6	13 37 42.83	1.9614	13 12 34.1	8.782	6	15 13 53.95	2.0541	18 54 55.6	5.293
7	13 39 40.55	1.9628	13 21 19.2	8.722	7	15 15 57.27	2.0564	19 0 10.6	5.208
8	13 41 38.36	1.9642	13 30 0.7	8.660	8	15 18 0.72	2.0586	19 5 20.6	5.124
9	13 43 36.25	1.9655	13 38 38.4	8.598	9	15 20 4.30	2.0609	19 10 25.5	5.038
10	13 45 34.22	1.9670	13 47 12.4	8.536	10	15 22 8.03	2.0633	19 15 25.2	4.952
11	13 47 32.29	1.9685	13 55 42.7	8.473	11	15 24 11.89	2.0655	19 20 19.7	4.866
12	13 49 30.44	1.9700	14 4 9.2	8.409	12	15 26 15.89	2.0678	19 25 9.1	4.779
13	13 51 28.69	1.9715	14 12 31.8	8.345	13	15 28 20.03	2.0702	19 29 53.2	4.692
14	13 53 27.02	1.9731	14 20 50.6	8.281	14	15 30 24.31	2.0724	19 34 32.1	4.604
15	13 55 25.46	1.9748	14 29 5.5	8.216	15	15 32 28.72	2.0747	19 39 5.7	4.517
16	13 57 23.99	1.9763	14 37 16.5	8.150	16	15 34 33.27	2.0770	19 43 34.1	4.428
17	13 59 22.62	1.9780	14 45 23.5	8.083	17	15 36 37.96	2.0793	19 47 57.0	4.338
18	14 1 21.35	1.9797	14 53 26.5	8.018	18	15 38 42.78	2.0815	19 52 14.7	4.249
19	14 3 20.18	1.9814	15 1 25.6	7.951	19	15 40 47.74	2.0839	19 56 26.9	4.158
20	14 5 19.12	1.9832	15 9 20.6	7.883	20	15 42 52.85	2.0863	20 0 33.7	4.068
21	14 7 18.16	1.9849	15 17 11.5	7.814	21	15 44 58.09	2.0884	20 4 35.1	3.978
22	14 9 17.31	1.9867	15 24 58.3	7.747	22	15 47 3.46	2.0907	20 8 31.1	3.887
23	14 11 16.56	1.9885	15 32 41.1	7.678	23	15 49 8.97	2.0929	20 12 21.5	3.795
24	14 13 15.93	1.9904	-15 40 19.6	-7.608	24	15 51 14.61	2.0951	-20 16 6.5	-3.703

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.
AUGUST 5.					AUGUST 7.			
	h m s	s	° ' "	"		h m s	s	° ' "
0	15 51 14.61	2.0951	-20 16 6.5	-3.703	0	17 34 3.44	2.1792	-21 21 0.5
1	15 53 20.38	2.0973	20 19 45.9	3.611	1	17 36 14.22	2.1802	21 19 50.7
2	15 55 26.29	2.0996	20 23 19.8	3.518	2	17 38 25.06	2.1812	21 18 34.6
3	15 57 32.33	2.1018	20 26 48.1	3.424	3	17 40 35.96	2.1822	21 17 12.0
4	15 59 38.51	2.1040	20 30 10.7	3.330	4	17 42 46.92	2.1831	21 15 43.1
5	16 1 44.81	2.1062	20 33 27.7	3.237	5	17 44 57.93	2.1839	21 14 7.9
6	16 3 51.25	2.1081	20 36 39.1	3.143	6	17 47 8.99	2.1848	21 12 26.2
7	16 5 57.82	2.1105	20 39 44.8	3.048	7	17 49 20.10	2.1856	21 10 38.1
8	16 8 4.51	2.1126	20 42 44.8	2.953	8	17 51 31.26	2.1864	21 8 43.7
9	16 10 11.33	2.1148	20 45 39.1	2.858	9	17 53 42.47	2.1872	21 6 42.9
10	16 12 18.29	2.1169	20 48 27.7	2.761	10	17 55 53.72	2.1878	21 4 35.6
11	16 14 25.36	2.1190	20 51 10.4	2.664	11	17 58 5.01	2.1885	21 2 22.0
12	16 16 32.57	2.1212	20 53 47.4	2.568	12	18 0 16.34	2.1892	21 0 2.0
13	16 18 39.90	2.1232	20 56 18.6	2.471	13	18 2 27.71	2.1898	20 57 35.6
14	16 20 47.35	2.1252	20 58 43.9	2.373	14	18 4 39.11	2.1903	20 55 2.8
15	16 22 54.92	2.1272	21 1 3.4	2.275	15	18 6 50.55	2.1909	20 52 23.6
16	16 25 2.61	2.1292	21 3 16.9	2.177	16	18 9 2.02	2.1913	20 49 38.0
17	16 27 10.42	2.1312	21 5 24.6	2.079	17	18 11 13.51	2.1918	20 46 46.1
18	16 29 18.35	2.1332	21 7 26.4	1.980	18	18 13 25.03	2.1923	20 43 47.7
19	16 31 26.40	2.1351	21 9 22.2	1.881	19	18 15 36.58	2.1926	20 40 43.0
20	16 33 34.56	2.1369	21 11 12.1	1.782	20	18 17 48.14	2.1929	20 37 31.8
21	16 35 42.83	2.1388	21 12 56.0	1.682	21	18 19 59.73	2.1933	20 34 14.3
22	16 37 51.22	2.1408	21 14 33.9	1.582	22	18 22 11.34	2.1936	20 30 50.4
23	16 39 59.72	2.1426	-21 16 5.8	-1.481	23	18 24 22.96	2.1938	-20 27 20.2
AUGUST 6.					AUGUST 8.			
0	16 42 8.33	2.1444	-21 17 31.6	-1.380	0	18 26 34.59	2.1940	-20 23 43.6
1	16 44 17.05	2.1462	21 18 51.4	1.279	1	18 28 46.24	2.1942	20 20 0.7
2	16 46 25.87	2.1479	21 20 5.1	1.178	2	18 30 57.89	2.1943	20 16 11.4
3	16 48 34.80	2.1498	21 21 12.8	1.077	3	18 33 9.56	2.1944	20 12 15.8
4	16 50 43.84	2.1514	21 22 14.3	0.974	4	18 35 21.22	2.1945	20 8 13.9
5	16 52 52.97	2.1531	21 23 9.7	0.873	5	18 37 32.90	2.1946	20 4 5.7
6	16 55 2.21	2.1548	21 23 59.0	0.770	6	18 39 44.57	2.1945	19 59 51.1
7	16 57 11.54	2.1563	21 24 42.1	0.667	7	18 41 56.24	2.1945	19 55 30.3
8	16 59 20.97	2.1579	21 25 19.0	0.564	8	18 44 7.91	2.1944	19 51 3.2
9	17 1 30.49	2.1595	21 25 49.8	0.461	9	18 46 19.57	2.1943	19 46 29.8
10	17 3 40.11	2.1610	21 26 14.3	0.358	10	18 48 31.23	2.1943	19 41 50.2
11	17 5 49.81	2.1625	21 26 32.7	0.254	11	18 50 42.88	2.1941	19 37 4.4
12	17 7 59.61	2.1641	21 26 44.8	0.150	12	18 52 54.52	2.1939	19 32 12.3
13	17 10 9.50	2.1655	21 26 50.7	-0.047	13	18 55 6.15	2.1938	19 27 14.0
14	17 12 19.47	2.1668	21 26 50.4	+0.058	14	18 57 17.77	2.1934	19 22 9.5
15	17 14 29.52	2.1683	21 26 43.7	0.163	15	18 59 29.36	2.1932	19 16 58.9
16	17 16 39.66	2.1696	21 26 30.8	0.267	16	19 1 40.95	2.1929	19 11 42.1
17	17 18 49.87	2.1709	21 26 11.7	0.372	17	19 3 52.51	2.1925	19 6 19.1
18	17 21 0.17	2.1723	21 25 46.2	0.478	18	19 6 4.05	2.1922	19 0 50.1
19	17 23 10.54	2.1734	21 25 14.4	0.583	19	19 8 15.57	2.1918	18 55 14.9
20	17 25 20.98	2.1746	21 24 36.3	0.688	20	19 10 27.07	2.1914	18 49 33.6
21	17 27 31.49	2.1758	21 23 51.9	0.793	21	19 12 38.54	2.1909	18 43 46.3
22	17 29 42.07	2.1769	21 23 1.1	0.899	22	19 14 49.98	2.1905	18 37 53.0
23	17 31 52.72	2.1781	21 22 4.0	1.005	23	19 17 1.40	2.1900	18 31 53.6
24	17 34 3.44	2.1792	-21 21 0.5	+1.111	24	19 19 12.78	2.1895	-18 25 48.2

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
AUGUST 9.					AUGUST 11.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 19 12.78	2.1895	-18 25 48.2	+ 6.139	0	21 3 26.08	2.1509	-11 45 57.5	+10.276
1	19 21 24.14	2.1890	18 19 36.9	6.238	1	21 5 35.11	2.1502	11 35 38.9	10.344
2	19 23 35.46	2.1883	18 13 19.6	6.338	2	21 7 44.10	2.1494	11 25 16.2	10.412
3	19 25 46.74	2.1878	18 6 56.3	6.437	3	21 9 53.04	2.1487	11 14 49.5	10.478
4	19 27 58.00	2.1873	18 0 27.2	6.534	4	21 12 1.94	2.1480	11 4 18.8	10.545
5	19 30 9.21	2.1866	17 53 52.2	6.632	5	21 14 10.80	2.1473	10 53 44.1	10.610
6	19 32 20.39	2.1860	17 47 11.4	6.729	6	21 16 19.61	2.1465	10 43 5.6	10.674
7	19 34 31.53	2.1853	17 40 24.7	6.827	7	21 18 28.38	2.1458	10 32 23.2	10.738
8	19 36 42.63	2.1847	17 33 32.2	6.923	8	21 20 37.11	2.1452	10 21 37.0	10.800
9	19 38 53.69	2.1839	17 26 34.0	7.018	9	21 22 45.80	2.1446	10 10 47.2	10.862
10	19 41 4.70	2.1832	17 19 30.0	7.113	10	21 24 54.46	2.1440	9 59 53.6	10.923
11	19 43 15.67	2.1825	17 12 20.4	7.208	11	21 27 3.08	2.1433	9 48 56.5	10.982
12	19 45 26.60	2.1818	17 5 5.0	7.303	12	21 29 11.66	2.1428	9 37 55.8	11.041
13	19 47 37.48	2.1810	16 57 44.0	7.397	13	21 31 20.21	2.1423	9 26 51.6	11.098
14	19 49 48.32	2.1803	16 50 17.4	7.490	14	21 33 28.73	2.1417	9 15 44.0	11.155
15	19 51 59.11	2.1794	16 42 45.2	7.583	15	21 35 37.21	2.1412	9 4 33.0	11.211
16	19 54 9.85	2.1786	16 35 7.5	7.674	16	21 37 45.67	2.1408	8 53 18.7	11.266
17	19 56 20.54	2.1778	16 27 24.3	7.767	17	21 39 54.10	2.1403	8 42 1.1	11.319
18	19 58 31.18	2.1769	16 19 35.5	7.858	18	21 42 2.50	2.1398	8 30 40.4	11.373
19	20 0 41.77	2.1762	16 11 41.3	7.948	19	21 44 10.87	2.1393	8 19 16.4	11.425
20	20 2 52.32	2.1753	16 3 41.7	8.038	20	21 46 19.22	2.1391	8 7 49.4	11.476
21	20 5 2.80	2.1743	15 55 36.7	8.128	21	21 48 27.56	2.1387	7 56 19.3	11.526
22	20 7 13.24	2.1736	15 47 26.4	8.216	22	21 50 35.86	2.1383	7 44 46.3	11.574
23	20 9 23.63	2.1727	-15 39 10.8	+ 8.304	23	21 52 44.16	2.1381	- 7 33 10.4	+11.623
AUGUST 10.					AUGUST 12.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	20 11 33.96	2.1718	-15 30 49.9	+ 8.392	0	21 54 52.43	2.1378	- 7 21 31.6	+11.669
1	20 13 44.24	2.1709	15 22 23.8	8.478	1	21 57 0.69	2.1375	7 9 50.1	11.715
2	20 15 54.47	2.1701	15 13 52.5	8.564	2	21 59 8.93	2.1373	6 58 5.8	11.760
3	20 18 4.65	2.1692	15 5 16.1	8.650	3	22 1 17.17	2.1372	6 46 18.9	11.804
4	20 20 14.77	2.1683	14 56 34.5	8.735	4	22 3 25.39	2.1370	6 34 29.3	11.847
5	20 22 24.84	2.1674	14 47 47.9	8.818	5	22 5 33.61	2.1369	6 22 37.3	11.888
6	20 24 34.86	2.1665	14 38 56.3	8.902	6	22 7 41.82	2.1368	6 10 42.7	11.929
7	20 26 44.82	2.1656	14 29 59.7	8.985	7	22 9 50.03	2.1368	5 58 45.8	11.968
8	20 28 54.73	2.1647	14 20 58.1	9.068	8	22 11 58.23	2.1368	5 46 46.5	12.007
9	20 31 4.58	2.1638	14 11 51.6	9.148	9	22 14 6.44	2.1368	5 34 45.0	12.044
10	20 33 14.38	2.1628	14 2 40.3	9.228	10	22 16 14.65	2.1369	5 22 41.2	12.082
11	20 35 24.12	2.1619	13 53 24.2	9.308	11	22 18 22.87	2.1370	5 10 35.2	12.117
12	20 37 33.81	2.1611	13 44 3.3	9.388	12	22 20 31.09	2.1371	4 58 27.2	12.150
13	20 39 43.45	2.1603	13 34 37.7	9.466	13	22 22 39.32	2.1373	4 46 17.2	12.184
14	20 41 53.04	2.1593	13 25 7.4	9.543	14	22 24 47.56	2.1375	4 34 5.1	12.217
15	20 44 2.57	2.1584	13 15 32.5	9.620	15	22 26 55.82	2.1378	4 21 51.2	12.247
16	20 46 12.05	2.1576	13 5 53.0	9.697	16	22 29 4.09	2.1380	4 9 35.5	12.277
17	20 48 21.48	2.1568	12 56 8.9	9.773	17	22 31 12.38	2.1383	3 57 18.0	12.305
18	20 50 30.86	2.1559	12 46 20.3	9.846	18	22 33 20.69	2.1387	3 44 58.9	12.333
19	20 52 40.19	2.1551	12 36 27.4	9.919	19	22 35 29.02	2.1391	3 32 38.1	12.360
20	20 54 49.47	2.1542	12 26 30.0	9.993	20	22 37 37.38	2.1395	3 20 15.7	12.385
21	20 56 58.69	2.1533	12 16 28.3	10.065	21	22 39 45.76	2.1400	3 7 51.9	12.409
22	20 59 7.87	2.1526	12 6 22.2	10.136	22	22 41 54.18	2.1405	2 55 26.6	12.433
23	21 1 17.00	2.1518	11 56 12.0	10.206	23	22 44 2.62	2.1410	2 43 0.0	12.454
24	21 3 26.08	2.1509	-11 45 57.5	+10.276	24	22 46 11.10	2.1417	- 2 30 32.1	+12.476

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
AUGUST 13.					AUGUST 15.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	22 46 11.10	2.1417	-2 30 32.1	+12.475	0	0 30 29.55	2.2213	+ 7 29 37.8	+12.050
1	22 48 19.62	2.1423	2 18 3.0	12.495	1	0 32 42.91	2.2241	7 41 40.2	12.020
2	22 50 28.18	2.1430	2 5 32.7	12.513	2	0 34 56.44	2.2268	7 53 40.2	11.979
3	22 52 36.78	2.1437	1 53 1.4	12.531	3	0 37 10.13	2.2296	8 5 37.7	11.938
4	22 54 45.42	2.1444	1 40 29.0	12.548	4	0 39 23.99	2.2324	8 17 32.7	11.895
5	22 56 54.11	2.1453	1 27 55.7	12.562	5	0 41 38.02	2.2353	8 29 25.1	11.851
6	22 59 2.85	2.1461	1 15 21.6	12.576	6	0 43 52.22	2.2382	8 41 14.8	11.805
7	23 1 11.64	2.1470	1 2 46.6	12.588	7	0 46 6.60	2.2411	8 53 1.7	11.758
8	23 3 20.49	2.1480	0 50 11.0	12.600	8	0 48 21.15	2.2440	9 4 45.7	11.709
9	23 5 29.40	2.1489	0 37 34.6	12.611	9	0 50 35.88	2.2471	9 16 26.8	11.661
10	23 7 38.36	2.1499	0 24 57.7	12.619	10	0 52 50.80	2.2501	9 28 5.0	11.610
11	23 9 47.39	2.1510	-0 12 20.3	12.628	11	0 55 5.89	2.2531	9 39 40.0	11.558
12	23 11 56.48	2.1521	+0 0 17.6	12.634	12	0 57 21.17	2.2563	9 51 11.9	11.504
13	23 14 5.64	2.1533	0 12 55.8	12.640	13	0 59 36.64	2.2593	10 2 40.5	11.450
14	23 16 14.87	2.1544	0 25 34.4	12.645	14	1 1 52.29	2.2625	10 14 5.9	11.394
15	23 18 24.17	2.1557	0 38 13.2	12.648	15	1 4 8.14	2.2658	10 25 27.8	11.337
16	23 20 33.55	2.1569	0 50 52.1	12.649	16	1 6 24.18	2.2689	10 36 46.3	11.278
17	23 22 43.00	2.1583	1 3 31.1	12.650	17	1 8 40.41	2.2722	10 48 1.2	11.218
18	23 24 52.54	2.1597	1 16 10.1	12.649	18	1 10 56.84	2.2755	10 59 12.5	11.158
19	23 27 2.16	2.1611	1 28 49.0	12.648	19	1 13 13.47	2.2788	11 10 20.2	11.096
20	23 29 11.87	2.1625	1 41 27.9	12.646	20	1 15 30.30	2.2821	11 21 24.0	11.032
21	23 31 21.66	2.1640	1 54 6.5	12.641	21	1 17 47.32	2.2854	11 32 24.0	10.968
22	23 33 31.55	2.1656	2 6 44.8	12.636	22	1 20 4.55	2.2888	11 43 20.1	10.902
23	23 35 41.53	2.1672	+2 19 22.8	+12.629	23	1 22 21.98	2.2923	+11 54 12.2	+10.834
AUGUST 14.					AUGUST 16.				
0	23 37 51.61	2.1688	+2 32 0.3	+12.621	0	1 24 39.62	2.2957	+12 5 0.2	+10.766
1	23 40 1.79	2.1705	2 44 37.3	12.613	1	1 26 57.46	2.2991	12 15 44.1	10.696
2	23 42 12.07	2.1723	2 57 13.8	12.603	2	1 29 15.51	2.3026	12 26 23.7	10.624
3	23 44 22.46	2.1741	3 9 49.6	12.590	3	1 31 33.77	2.3061	12 36 59.0	10.553
4	23 46 32.96	2.1758	3 22 24.6	12.578	4	1 33 52.24	2.3096	12 47 30.0	10.479
5	23 48 43.56	2.1777	3 34 58.9	12.564	5	1 36 10.92	2.3132	12 57 56.5	10.404
6	23 50 54.28	2.1797	3 47 32.3	12.548	6	1 38 29.82	2.3167	13 8 18.5	10.328
7	23 53 5.12	2.1816	4 0 4.7	12.533	7	1 40 48.92	2.3202	13 18 35.8	10.250
8	23 55 16.07	2.1836	4 12 36.2	12.515	8	1 43 8.24	2.3238	13 28 48.5	10.173
9	23 57 27.15	2.1856	4 25 6.5	12.495	9	1 45 27.77	2.3273	13 38 56.5	10.093
10	23 59 38.34	2.1877	4 37 35.6	12.475	10	1 47 47.52	2.3309	13 48 59.7	10.012
11	0 1 49.67	2.1898	4 50 3.5	12.454	11	1 50 7.48	2.3345	13 58 57.9	9.929
12	0 4 1.12	2.1919	5 2 30.1	12.432	12	1 52 27.66	2.3382	14 8 51.2	9.847
13	0 6 12.70	2.1942	5 14 55.3	12.408	13	1 54 48.06	2.3418	14 18 39.5	9.762
14	0 8 24.42	2.1965	5 27 19.0	12.382	14	1 57 8.67	2.3453	14 28 22.6	9.675
15	0 10 36.28	2.1988	5 39 41.1	12.355	15	1 59 29.50	2.3490	14 38 0.5	9.588
16	0 12 48.27	2.2011	5 52 1.6	12.328	16	2 1 50.55	2.3526	14 47 33.2	9.501
17	0 15 0.41	2.2035	6 4 20.4	12.298	17	2 4 11.81	2.3563	14 57 0.6	9.412
18	0 17 12.69	2.2059	6 16 37.4	12.268	18	2 6 33.30	2.3599	15 6 22.6	9.320
19	0 19 25.12	2.2083	6 28 52.6	12.237	19	2 8 55.00	2.3634	15 15 39.0	9.228
20	0 21 37.69	2.2109	6 41 5.8	12.203	20	2 11 16.91	2.3671	15 24 50.0	9.136
21	0 23 50.43	2.2135	6 53 17.0	12.169	21	2 13 39.05	2.3708	15 33 55.3	9.042
22	0 26 3.31	2.2160	7 5 26.1	12.134	22	2 16 1.40	2.3743	15 42 55.0	8.947
23	0 28 16.35	2.2187	7 17 33.1	12.098	23	2 18 23.97	2.3779	15 51 48.9	8.850
24	0 30 29.55	2.2213	+7 29 37.8	+12.050	24	2 20 46.75	2.3815	+16 0 37.0	+ 8.753

MOON, 1919.

83

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
AUGUST 17.					AUGUST 19.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
0	2 20 46.75	2.3815	+16 0 37.0	+8.753	0	4 18 42.66	2.5140	+20 49 14.7	+2.953
1	2 23 9.75	2.3852	16 9 19.2	8.654	1	4 21 13.54	2.5153	20 52 7.7	2.814
2	2 25 32.97	2.3888	16 17 55.5	8.554	2	4 23 44.50	2.5167	20 54 52.4	2.676
3	2 27 56.40	2.3923	16 26 25.7	8.453	3	4 26 15.54	2.5178	20 57 28.8	2.538
4	2 30 20.04	2.3958	16 34 49.9	8.352	4	4 28 46.63	2.5188	20 59 56.9	2.398
5	2 32 43.90	2.3994	16 43 7.9	8.248	5	4 31 17.79	2.5198	21 2 16.6	2.258
6	2 35 7.97	2.4029	16 51 19.7	8.144	6	4 33 49.00	2.5206	21 4 27.9	2.119
7	2 37 32.25	2.4064	16 59 25.2	8.038	7	4 36 20.26	2.5214	21 6 30.9	1.980
8	2 39 56.74	2.4099	17 7 24.3	7.932	8	4 38 51.57	2.5222	21 8 25.5	1.839
9	2 42 21.44	2.4133	17 15 17.0	7.825	9	4 41 22.92	2.5228	21 10 11.6	1.699
10	2 44 46.34	2.4168	17 23 3.3	7.717	10	4 43 54.31	2.5233	21 11 49.4	1.559
11	2 47 11.45	2.4202	17 30 43.0	7.607	11	4 46 25.72	2.5238	21 13 18.7	1.418
12	2 49 36.76	2.4236	17 38 16.1	7.497	12	4 48 57.16	2.5242	21 14 39.5	1.277
13	2 52 2.28	2.4270	17 45 42.6	7.385	13	4 51 28.62	2.5244	21 15 51.9	1.136
14	2 54 28.00	2.4303	17 53 2.3	7.272	14	4 54 0.09	2.5246	21 16 55.8	0.995
15	2 56 53.91	2.4335	18 0 15.2	7.158	15	4 56 31.57	2.5247	21 17 51.3	0.854
16	2 59 20.02	2.4368	18 7 21.3	7.045	16	4 59 3.05	2.5247	21 18 38.3	0.713
17	3 1 46.33	2.4401	18 14 20.6	6.929	17	5 1 34.53	2.5247	21 19 16.8	0.571
18	3 4 12.83	2.4433	18 21 12.8	6.812	18	5 4 6.01	2.5245	21 19 46.8	0.430
19	3 6 39.52	2.4463	18 27 58.0	6.695	19	5 6 37.47	2.5242	21 20 8.4	0.289
20	3 9 6.39	2.4494	18 34 36.2	6.577	20	5 9 8.91	2.5238	21 20 21.5	0.148
21	3 11 33.45	2.4526	18 41 7.2	6.458	21	5 11 40.33	2.5233	21 20 26.1	+0.007
22	3 14 0.70	2.4556	18 47 31.1	6.338	22	5 14 11.71	2.5228	21 20 22.3	-0.134
23	3 16 28.12	2.4585	+18 53 47.7	+6.216	23	5 16 43.07	2.5223	+21 20 10.0	-0.275
AUGUST 18.					AUGUST 20.				
0	3 18 55.72	2.4615	+18 59 57.0	+6.094	0	5 19 14.38	2.5215	+21 19 49.3	-0.416
1	3 21 23.50	2.4644	19 5 59.0	5.972	1	5 21 45.65	2.5207	21 19 20.1	0.557
2	3 23 51.45	2.4672	19 11 53.6	5.848	2	5 24 16.86	2.5198	21 18 42.5	0.698
3	3 26 19.56	2.4700	19 17 40.7	5.723	3	5 26 48.02	2.5188	21 17 56.4	0.838
4	3 28 47.85	2.4728	19 23 20.3	5.598	4	5 29 19.12	2.5178	21 17 2.0	0.978
5	3 31 16.29	2.4753	19 28 52.5	5.473	5	5 31 50.15	2.5166	21 15 59.1	1.118
6	3 33 44.89	2.4780	19 34 17.0	5.345	6	5 34 21.11	2.5153	21 14 47.9	1.257
7	3 36 13.65	2.4807	19 39 33.9	5.218	7	5 36 51.99	2.5140	21 13 28.3	1.396
8	3 38 42.57	2.4832	19 44 43.1	5.089	8	5 39 22.79	2.5126	21 12 0.4	1.535
9	3 41 11.63	2.4855	19 49 44.6	4.961	9	5 41 53.50	2.5110	21 10 24.1	1.673
10	3 43 40.83	2.4879	19 54 38.4	4.831	10	5 44 24.11	2.5094	21 8 39.6	1.812
11	3 46 10.18	2.4903	19 59 24.3	4.700	11	5 46 54.63	2.5078	21 6 46.7	1.949
12	3 48 39.66	2.4925	20 4 2.4	4.569	12	5 49 25.04	2.5059	21 4 45.7	2.086
13	3 51 9.28	2.4948	20 8 32.6	4.438	13	5 51 55.34	2.5041	21 2 36.4	2.223
14	3 53 39.03	2.4968	20 12 54.9	4.305	14	5 54 25.53	2.5022	21 0 18.9	2.360
15	3 56 8.90	2.4988	20 17 9.2	4.173	15	5 56 55.60	2.5002	20 57 53.2	2.497
16	3 58 38.89	2.5008	20 21 15.6	4.039	16	5 59 25.55	2.4980	20 55 19.3	2.633
17	4 1 9.00	2.5028	20 25 13.9	3.905	17	6 1 55.36	2.4958	20 52 37.3	2.767
18	4 3 39.22	2.5046	20 29 4.2	3.770	18	6 4 25.05	2.4936	20 49 47.3	2.901
19	4 6 9.55	2.5063	20 32 46.3	3.635	19	6 6 54.59	2.4912	20 46 49.2	3.035
20	4 8 39.98	2.5080	20 36 20.4	3.499	20	6 9 23.99	2.4888	20 43 43.1	3.168
21	4 11 10.51	2.5097	20 39 46.2	3.363	21	6 11 53.24	2.4863	20 40 29.0	3.301
22	4 13 41.14	2.5113	20 43 3.9	3.227	22	6 14 22.34	2.4837	20 37 7.0	3.433
23	4 16 11.86	2.5127	20 46 13.4	3.090	23	6 16 51.28	2.4810	20 33 37.0	3.565
24	4 18 42.66	2.5140	+20 49 14.7	+2.953	24	6 19 20.06	2.4783	+20 29 59.2	-3.698

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
AUGUST 21.					AUGUST 23.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	6 19 20.06	2.4783	+20 29 59.2	-3.695	0	8 14 4.73	2.2884	+15 18 28.6	-8.889
1	6 21 48.67	2.4755	20 26 13.6	3.826	1	8 16 21.90	2.2838	15 9 32.8	8.970
2	6 24 17.12	2.4727	20 22 20.1	3.955	2	8 18 38.79	2.2793	15 0 32.2	9.050
3	6 26 45.39	2.4697	20 18 19.0	4.083	3	8 20 55.41	2.2748	14 51 26.8	9.129
4	6 29 13.48	2.4666	20 14 10.1	4.212	4	8 23 11.76	2.2702	14 42 16.7	9.207
5	6 31 41.38	2.4635	20 9 53.6	4.338	5	8 25 27.83	2.2656	14 33 2.0	9.283
6	6 34 9.10	2.4604	20 5 29.5	4.465	6	8 27 43.63	2.2611	14 23 42.8	9.358
7	6 36 36.63	2.4573	20 0 57.8	4.591	7	8 29 59.16	2.2566	14 14 19.1	9.432
8	6 39 3.97	2.4540	19 56 18.6	4.716	8	8 32 14.42	2.2520	14 4 51.0	9.504
9	6 41 31.11	2.4506	19 51 31.9	4.839	9	8 34 29.40	2.2475	13 55 18.6	9.575
10	6 43 58.04	2.4472	19 46 37.9	4.963	10	8 36 44.12	2.2430	13 45 42.0	9.646
11	6 46 24.77	2.4438	19 41 36.4	5.085	11	8 38 58.56	2.2385	13 36 1.1	9.715
12	6 48 51.29	2.4403	19 36 27.7	5.206	12	8 41 12.74	2.2341	13 26 16.2	9.782
13	6 51 17.60	2.4367	19 31 11.7	5.327	13	8 43 26.65	2.2296	13 16 27.3	9.848
14	6 53 43.69	2.4330	19 25 48.5	5.447	14	8 45 40.29	2.2251	13 6 34.4	9.914
15	6 56 9.56	2.4293	19 20 18.1	5.565	15	8 47 53.66	2.2206	12 56 37.6	9.978
16	6 58 35.20	2.4256	19 14 40.7	5.683	16	8 50 6.76	2.2163	12 46 37.0	10.041
17	7 1 0.63	2.4218	19 8 56.2	5.800	17	8 52 19.61	2.2118	12 36 32.7	10.102
18	7 3 25.82	2.4179	19 3 4.7	5.916	18	8 54 32.18	2.2074	12 26 24.8	10.163
19	7 5 50.78	2.4141	18 57 6.3	6.030	19	8 56 44.50	2.2031	12 16 13.2	10.222
20	7 8 15.51	2.4103	18 51 1.1	6.144	20	8 58 56.55	2.1987	12 5 58.2	10.280
21	7 10 40.01	2.4063	18 44 49.0	6.257	21	9 1 8.34	2.1944	11 55 39.6	10.337
22	7 13 4.26	2.4022	18 38 30.2	6.368	22	9 3 19.88	2.1901	11 45 17.8	10.392
23	7 15 28.27	2.3982	+18 32 4.8	-6.479	23	9 5 31.15	2.1858	+11 34 52.6	-10.447
AUGUST 22.					AUGUST 24.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	7 17 52.04	2.3941	+18 25 32.7	-6.589	0	9 7 42.17	2.1816	+11 24 24.2	-10.499
1	7 20 15.56	2.3900	18 18 54.1	6.698	1	9 9 52.94	2.1773	11 13 52.7	10.551
2	7 22 38.84	2.3858	18 12 9.0	6.806	2	9 12 3.45	2.1731	11 3 18.1	10.602
3	7 25 1.86	2.3816	18 5 17.4	6.913	3	9 14 13.71	2.1689	10 52 40.5	10.651
4	7 27 24.63	2.3773	17 58 19.5	7.018	4	9 16 23.72	2.1648	10 42 0.0	10.700
5	7 29 47.14	2.3731	17 51 15.3	7.123	5	9 18 33.49	2.1607	10 31 16.5	10.748
6	7 32 9.40	2.3689	17 44 4.8	7.226	6	9 20 43.00	2.1566	10 20 30.3	10.793
7	7 34 31.41	2.3646	17 36 48.2	7.328	7	9 22 52.28	2.1526	10 9 41.4	10.837
8	7 36 53.15	2.3602	17 29 25.5	7.428	8	9 25 1.31	2.1485	9 58 49.9	10.881
9	7 39 14.63	2.3558	17 21 56.8	7.528	9	9 27 10.10	2.1445	9 47 55.7	10.923
10	7 41 35.85	2.3514	17 14 22.1	7.628	10	9 29 18.65	2.1405	9 36 59.1	10.964
11	7 43 56.80	2.3470	17 6 41.4	7.726	11	9 31 26.96	2.1366	9 26 0.0	11.005
12	7 46 17.49	2.3426	16 58 55.0	7.822	12	9 33 35.04	2.1328	9 14 58.5	11.043
13	7 48 37.91	2.3382	16 51 2.8	7.918	13	9 35 42.89	2.1288	9 3 54.8	11.081
14	7 50 58.07	2.3337	16 43 4.9	8.012	14	9 37 50.50	2.1250	8 52 48.8	11.118
15	7 53 17.95	2.3292	16 35 1.4	8.105	15	9 39 57.89	2.1213	8 41 40.7	11.152
16	7 55 37.57	2.3247	16 26 52.3	8.197	16	9 42 5.05	2.1175	8 30 30.6	11.186
17	7 57 56.91	2.3202	16 18 37.8	8.287	17	9 44 11.09	2.1138	8 19 18.4	11.220
18	8 0 15.99	2.3158	16 10 17.9	8.377	18	9 46 18.71	2.1102	8 8 4.2	11.252
19	8 2 34.80	2.3112	16 1 52.6	8.466	19	9 48 25.21	2.1065	7 56 48.2	11.283
20	8 4 53.33	2.3066	15 53 22.0	8.553	20	9 50 31.49	2.1029	7 45 30.3	11.313
21	8 7 11.59	2.3021	15 44 46.3	8.638	21	9 52 37.56	2.0993	7 34 10.7	11.341
22	8 9 29.58	2.2975	15 36 5.4	8.723	22	9 54 43.41	2.0958	7 22 49.4	11.368
23	8 11 47.29	2.2929	15 27 19.5	8.807	23	9 56 49.05	2.0923	7 11 26.5	11.395
24	8 14 4.73	2.2884	+15 18 28.6	-8.889	24	9 58 54.49	2.0889	+ 7 0 2.0	-11.420

MOON, 1919.

85

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
AUGUST 25.					AUGUST 27.				
0	h m s	s	" ' "	"	0	h m s	s	" ' "	"
0	9 58 54.49	2.0889	+7 0 2.0	-11.420	0	11 36 1.77	1.9753	- 2 17 35.3	-11.448
1	10 0 59.72	2.0854	6 48 36.1	11.443	1	11 38 0.25	1.9741	2 29 1.6	11.428
2	10 3 4.74	2.0821	6 37 8.8	11.467	2	11 39 58.66	1.9728	2 40 26.6	11.405
3	10 5 9.57	2.0788	6 25 40.1	11.488	3	11 41 56.99	1.9717	2 51 50.2	11.382
4	10 7 14.19	2.0754	6 14 10.2	11.509	4	11 43 55.26	1.9707	3 3 12.4	11.358
5	10 9 18.62	2.0723	6 2 39.0	11.529	5	11 45 53.47	1.9696	3 14 33.1	11.333
6	10 11 22.86	2.0691	5 51 6.7	11.548	6	11 47 51.61	1.9685	3 25 52.4	11.308
7	10 13 26.91	2.0659	5 39 33.2	11.566	7	11 49 49.69	1.9675	3 37 10.1	11.282
8	10 15 30.77	2.0628	5 27 58.8	11.583	8	11 51 47.71	1.9666	3 48 26.2	11.255
9	10 17 34.44	2.0597	5 16 23.3	11.598	9	11 53 45.68	1.9658	3 59 40.7	11.228
10	10 19 37.93	2.0567	5 4 47.0	11.613	10	11 55 43.60	1.9649	4 10 53.5	11.198
11	10 21 41.24	2.0537	4 53 9.8	11.626	11	11 57 41.47	1.9641	4 22 4.5	11.169
12	10 23 44.37	2.0508	4 41 31.9	11.638	12	11 59 39.29	1.9633	4 33 13.8	11.140
13	10 25 47.33	2.0478	4 29 53.3	11.649	13	12 1 37.07	1.9626	4 44 21.3	11.108
14	10 27 50.11	2.0450	4 18 14.0	11.660	14	12 3 34.80	1.9619	4 55 26.8	11.077
15	10 29 52.73	2.0422	4 6 34.1	11.669	15	12 5 32.50	1.9613	5 6 30.5	11.046
16	10 31 55.17	2.0394	3 54 53.7	11.678	16	12 7 30.16	1.9608	5 17 32.3	11.013
17	10 33 57.46	2.0368	3 43 12.8	11.685	17	12 9 27.79	1.9603	5 28 32.0	10.978
18	10 35 59.58	2.0340	3 31 31.5	11.691	18	12 11 25.39	1.9598	5 39 29.7	10.944
19	10 38 1.54	2.0314	3 19 49.9	11.696	19	12 13 22.96	1.9593	5 50 25.3	10.910
20	10 40 3.35	2.0288	3 8 8.0	11.701	20	12 15 20.50	1.9588	6 1 18.9	10.874
21	10 42 5.00	2.0263	2 56 25.8	11.704	21	12 17 18.02	1.9585	6 12 10.2	10.838
22	10 44 6.50	2.0238	2 44 43.5	11.706	22	12 19 15.52	1.9582	6 22 59.4	10.801
23	10 46 7.86	2.0214	+2 33 1.1	-11.708	23	12 21 13.00	1.9578	- 6 33 46.3	-10.763
AUGUST 26.					AUGUST 28.				
0	h m s	s	" ' "	"	0	h m s	s	" ' "	"
0	10 48 9.07	2.0190	+2 21 18.6	-11.708	0	12 23 10.46	1.9576	- 6 44 30.9	-10.724
1	10 50 10.14	2.0167	2 9 36.1	11.708	1	12 25 7.91	1.9574	6 55 13.2	10.685
2	10 52 11.07	2.0143	1 57 53.6	11.707	2	12 27 5.35	1.9573	7 5 53.1	10.646
3	10 54 11.86	2.0121	1 46 11.3	11.704	3	12 29 2.78	1.9571	7 16 30.7	10.605
4	10 56 12.52	2.0099	1 34 29.1	11.701	4	12 31 0.20	1.9570	7 27 5.7	10.563
5	10 58 13.05	2.0078	1 22 47.2	11.697	5	12 32 57.62	1.9569	7 37 38.3	10.523
6	11 0 13.45	2.0056	1 11 5.5	11.692	6	12 34 55.03	1.9569	7 48 8.4	10.480
7	11 2 13.72	2.0035	0 59 24.2	11.685	7	12 36 52.45	1.9570	7 58 35.9	10.437
8	11 4 13.87	2.0015	0 47 43.3	11.678	8	12 38 49.87	1.9571	8 9 0.8	10.393
9	11 6 13.90	1.9995	0 36 2.8	11.671	9	12 40 47.30	1.9572	8 19 23.1	10.349
10	11 8 13.81	1.9976	0 24 22.8	11.662	10	12 42 44.73	1.9573	8 29 42.7	10.303
11	11 10 13.61	1.9957	0 12 43.4	11.652	11	12 44 42.17	1.9575	8 39 59.5	10.258
12	11 12 13.29	1.9938	+0 1 4.6	11.642	12	12 46 39.63	1.9578	8 50 13.6	10.212
13	11 14 12.86	1.9920	-0 10 33.6	11.630	13	12 48 37.10	1.9580	9 0 24.9	10.164
14	11 16 12.33	1.9903	0 22 11.0	11.618	14	12 50 34.59	1.9583	9 10 33.3	10.117
15	11 18 11.69	1.9886	0 33 47.7	11.605	15	12 52 32.10	1.9587	9 20 38.9	10.069
16	11 20 10.96	1.9870	0 45 23.6	11.591	16	12 54 29.63	1.9590	9 30 41.6	10.020
17	11 22 10.13	1.9853	0 56 58.6	11.576	17	12 56 27.18	1.9594	9 40 41.3	9.970
18	11 24 9.19	1.9837	1 8 32.7	11.561	18	12 58 24.76	1.9598	9 50 38.0	9.921
19	11 26 8.17	1.9823	1 20 5.9	11.544	19	13 0 22.36	1.9603	10 0 31.8	9.870
20	11 28 7.06	1.9808	1 31 38.0	11.526	20	13 2 20.00	1.9608	10 10 22.4	9.818
21	11 30 5.86	1.9793	1 43 9.0	11.508	21	13 4 17.66	1.9614	10 20 10.0	9.768
22	11 32 4.58	1.9779	1 54 39.0	11.490	22	13 6 15.37	1.9620	10 29 54.5	9.715
23	11 34 3.21	1.9766	2 6 7.8	11.469	23	13 8 13.10	1.9626	10 39 35.8	9.662
24	11 36 1.77	1.9753	-2 17 35.3	-11.448	24	13 10 10.88	1.9633	-10 49 13.9	-9.608

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
AUGUST 29.					AUGUST 31.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	13 10 10.88	1.9633	-10 49 13.9	-9.608	0	14 45 42.52	2.0258	-17 18 22.3	-6.410
1	13 12 8.70	1.9639	10 58 48.8	9.554	1	14 47 44.12	2.0276	17 24 44.6	6.332
2	13 14 6.55	1.9647	11 8 20.4	9.499	2	14 49 45.83	2.0293	17 31 2.1	6.252
3	13 16 4.46	1.9655	11 17 48.7	9.444	3	14 51 47.64	2.0311	17 37 14.8	6.173
4	13 18 2.41	1.9662	11 27 13.7	9.388	4	14 53 49.56	2.0329	17 43 22.8	6.093
5	13 20 0.40	1.9670	11 36 35.3	9.332	5	14 55 51.59	2.0348	17 49 26.0	6.013
6	13 21 58.45	1.9678	11 45 53.5	9.275	6	14 57 53.73	2.0366	17 55 24.3	5.932
7	13 23 56.54	1.9688	11 55 8.3	9.218	7	14 59 55.98	2.0383	18 1 17.8	5.851
8	13 25 54.70	1.9697	12 4 19.6	9.159	8	15 1 58.33	2.0401	18 7 6.4	5.769
9	13 27 52.90	1.9706	12 13 27.4	9.100	9	15 4 0.79	2.0419	18 12 50.1	5.687
10	13 29 51.17	1.9716	12 22 31.6	9.041	10	15 6 3.36	2.0438	18 18 28.8	5.604
11	13 31 49.49	1.9725	12 31 32.3	8.982	11	15 8 6.05	2.0457	18 24 2.6	5.522
12	13 33 47.87	1.9736	12 40 29.4	8.921	12	15 10 8.84	2.0474	18 29 31.4	5.438
13	13 35 46.32	1.9746	12 49 22.8	8.860	13	15 12 11.74	2.0493	18 34 55.2	5.355
14	13 37 44.82	1.9757	12 58 12.6	8.799	14	15 14 14.76	2.0512	18 40 14.0	5.270
15	13 39 43.40	1.9768	13 6 58.7	8.737	15	15 16 17.88	2.0530	18 45 27.6	5.185
16	13 41 42.04	1.9779	13 15 41.0	8.674	16	15 18 21.12	2.0549	18 50 36.2	5.101
17	13 43 40.75	1.9791	13 24 19.6	8.612	17	15 20 24.47	2.0568	18 55 39.7	5.016
18	13 45 39.53	1.9803	13 32 54.4	8.548	18	15 22 27.93	2.0586	19 0 38.1	4.930
19	13 47 38.38	1.9815	13 41 25.4	8.484	19	15 24 31.50	2.0604	19 5 31.3	4.844
20	13 49 37.31	1.9828	13 49 52.5	8.419	20	15 26 35.18	2.0623	19 10 19.4	4.758
21	13 51 36.31	1.9840	13 58 15.7	8.354	21	15 28 38.97	2.0641	19 15 2.2	4.670
22	13 53 35.39	1.9853	14 6 35.0	8.288	22	15 30 42.87	2.0660	19 19 39.8	4.583
23	13 55 34.55	1.9867	-14 14 50.3	-8.223	23	15 32 46.89	2.0678	-19 24 12.1	-4.495
AUGUST 30.					SEPTEMBER 1.				
0	13 57 33.79	1.9880	-14 23 1.7	-8.156	0	15 34 51.01	2.0697	-19 28 39.2	-4.408
1	13 59 33.11	1.9893	14 31 9.0	8.088	1	15 36 55.25	2.0715	19 33 1.0	4.318
2	14 1 32.51	1.9907	14 39 12.3	8.022	2	15 38 59.59	2.0733	19 37 17.4	4.229
3	14 3 31.99	1.9921	14 47 11.6	7.953	3	15 41 4.05	2.0753	19 41 28.5	4.141
4	14 5 31.56	1.9936	14 55 6.7	7.884	4	15 43 8.62	2.0770	19 45 34.3	4.051
5	14 7 31.22	1.9950	15 2 57.7	7.815	5	15 45 13.29	2.0788	19 49 34.6	3.961
6	14 9 30.96	1.9964	15 10 44.5	7.745	6	15 47 18.08	2.0807	19 53 29.6	3.871
7	14 11 30.79	1.9979	15 18 27.1	7.675	7	15 49 22.97	2.0824	19 57 19.1	3.779
8	14 13 30.71	1.9995	15 26 5.5	7.605	8	15 51 27.97	2.0843	20 1 3.1	3.688
9	14 15 30.73	2.0010	15 33 39.7	7.534	9	15 53 33.08	2.0861	20 4 41.7	3.598
10	14 17 30.83	2.0025	15 41 9.6	7.463	10	15 55 38.30	2.0879	20 8 14.8	3.506
11	14 19 31.03	2.0041	15 48 35.2	7.390	11	15 57 43.63	2.0897	20 11 42.4	3.413
12	14 21 31.32	2.0057	15 55 56.4	7.318	12	15 59 49.06	2.0914	20 15 4.4	3.321
13	14 23 31.71	2.0073	16 3 13.3	7.244	13	16 1 54.60	2.0932	20 18 20.9	3.228
14	14 25 32.19	2.0088	16 10 25.7	7.171	14	16 4 0.24	2.0949	20 21 31.8	3.135
15	14 27 32.77	2.0105	16 17 33.8	7.097	15	16 6 5.99	2.0967	20 24 37.1	3.042
16	14 29 33.45	2.0122	16 24 37.3	7.022	16	16 8 11.84	2.0983	20 27 36.8	2.948
17	14 31 34.23	2.0138	16 31 36.4	6.948	17	16 10 17.79	2.1001	20 30 30.9	2.854
18	14 33 35.10	2.0154	16 38 31.0	6.873	18	16 12 23.85	2.1018	20 33 19.3	2.760
19	14 35 36.08	2.0172	16 45 21.1	6.797	19	16 14 30.01	2.1035	20 36 2.1	2.666
20	14 37 37.16	2.0189	16 52 6.6	6.720	20	16 16 36.27	2.1052	20 38 39.2	2.570
21	14 39 38.35	2.0206	16 58 47.5	6.643	21	16 18 42.63	2.1068	20 41 10.5	2.475
22	14 41 39.63	2.0223	17 5 23.7	6.566	22	16 20 49.09	2.1084	20 43 36.2	2.380
23	14 43 41.02	2.0241	17 11 55.4	6.488	23	16 22 55.64	2.1101	20 45 56.1	2.283
24	14 45 42.52	2.0258	-17 18 22.3	-6.410	24	16 25 2.30	2.1118	-20 48 10.2	-2.188

MOON, 1919.

87

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
SEPTEMBER 2.					SEPTEMBER 4.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	16 25 2.30	2.1118	-20 48 10.2	-2.188	0	18 7 53.53	2.1650	-20 38 11.9	+2.660
1	16 27 9.05	2.1133	20 50 18.6	2.091	1	18 10 3.45	2.1655	20 35 29.2	2.763
2	16 29 15.90	2.1150	20 52 21.1	1.993	2	18 12 13.39	2.1660	20 32 40.4	2.865
3	16 31 22.85	2.1165	20 54 17.8	1.897	3	18 14 23.37	2.1665	20 29 45.4	2.968
4	16 33 29.88	2.1181	20 56 8.8	1.800	4	18 16 33.37	2.1669	20 26 44.2	3.073
5	16 35 37.02	2.1197	20 57 53.8	1.702	5	18 18 43.40	2.1673	20 23 36.7	3.175
6	16 37 44.24	2.1211	20 59 33.0	1.605	6	18 20 53.45	2.1678	20 20 23.2	3.278
7	16 39 51.55	2.1226	21 1 6.4	1.508	7	18 23 3.53	2.1682	20 17 3.4	3.382
8	16 41 58.95	2.1242	21 2 33.9	1.408	8	18 25 13.63	2.1685	20 13 37.4	3.484
9	16 44 6.45	2.1257	21 3 55.4	1.309	9	18 27 23.75	2.1688	20 10 5.3	3.587
10	16 46 14.03	2.1270	21 5 11.0	1.211	10	18 29 33.89	2.1692	20 6 27.0	3.689
11	16 48 21.69	2.1284	21 6 20.7	1.113	11	18 31 44.05	2.1694	20 2 42.6	3.792
12	16 50 29.44	2.1298	21 7 24.5	1.013	12	18 33 54.22	2.1697	19 58 52.0	3.894
13	16 52 37.27	2.1313	21 8 22.3	0.913	13	18 36 4.41	2.1699	19 54 55.3	3.997
14	16 54 45.19	2.1327	21 9 14.1	0.814	14	18 38 14.61	2.1701	19 50 52.4	4.099
15	16 56 53.19	2.1339	21 10 0.0	0.714	15	18 40 24.82	2.1703	19 46 43.4	4.201
16	16 59 1.26	2.1353	21 10 39.8	0.614	16	18 42 35.04	2.1705	19 42 28.3	4.303
17	17 1 9.42	2.1366	21 11 13.7	0.513	17	18 44 45.28	2.1707	19 38 7.1	4.405
18	17 3 17.65	2.1378	21 11 41.4	0.413	18	18 46 55.52	2.1708	19 33 39.7	4.507
19	17 5 25.96	2.1391	21 12 3.2	0.313	19	18 49 5.77	2.1708	19 29 6.3	4.608
20	17 7 34.34	2.1403	21 12 19.0	0.212	20	18 51 16.02	2.1710	19 24 26.8	4.709
21	17 9 42.80	2.1416	21 12 28.6	0.110	21	18 53 26.29	2.1711	19 19 41.2	4.810
22	17 11 51.33	2.1427	21 12 32.2	-0.010	22	18 55 36.55	2.1711	19 14 49.6	4.911
23	17 13 59.92	2.1438	-21 12 29.8	+0.092	23	18 57 46.82	2.1712	-19 9 51.9	+5.012
SEPTEMBER 3.					SEPTEMBER 5.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	17 16 8.59	2.1451	-21 12 21.2	+0.193	0	18 59 57.09	2.1712	-19 4 48.2	+5.112
1	17 18 17.33	2.1462	21 12 6.6	0.295	1	19 2 7.36	2.1712	18 59 38.5	5.213
2	17 20 26.13	2.1472	21 11 45.8	0.398	2	19 4 17.63	2.1712	18 54 22.7	5.313
3	17 22 34.99	2.1483	21 11 18.9	0.499	3	19 6 27.90	2.1712	18 49 1.0	5.412
4	17 24 43.92	2.1493	21 10 45.9	0.601	4	19 8 38.17	2.1711	18 43 33.3	5.512
5	17 26 52.91	2.1504	21 10 6.8	0.703	5	19 10 48.43	2.1710	18 37 59.6	5.611
6	17 29 1.97	2.1514	21 9 21.6	0.805	6	19 12 58.69	2.1709	18 32 20.0	5.710
7	17 31 11.08	2.1523	21 8 30.2	0.908	7	19 15 8.94	2.1708	18 26 34.4	5.808
8	17 33 20.24	2.1533	21 7 32.6	1.011	8	19 17 19.19	2.1708	18 20 43.0	5.907
9	17 35 29.47	2.1542	21 6 28.9	1.113	9	19 19 29.43	2.1706	18 14 45.6	6.005
10	17 37 38.74	2.1551	21 5 19.0	1.216	10	19 21 39.66	2.1704	18 8 42.4	6.103
11	17 39 48.08	2.1560	21 4 3.0	1.318	11	19 23 49.88	2.1703	18 2 33.3	6.201
12	17 41 57.46	2.1568	21 2 40.8	1.422	12	19 26 0.10	2.1703	17 56 18.3	6.298
13	17 44 6.89	2.1577	21 1 12.4	1.524	13	19 28 10.31	2.1700	17 49 57.5	6.394
14	17 46 16.38	2.1584	20 59 37.9	1.627	14	19 30 20.50	2.1698	17 43 31.0	6.491
15	17 48 25.90	2.1592	20 57 57.2	1.731	15	19 32 30.69	2.1697	17 36 58.6	6.588
16	17 50 35.48	2.1600	20 56 10.2	1.834	16	19 34 40.86	2.1694	17 30 20.5	6.683
17	17 52 45.10	2.1607	20 54 17.1	1.937	17	19 36 51.02	2.1692	17 23 36.6	6.778
18	17 54 54.76	2.1613	20 52 17.8	2.040	18	19 39 1.16	2.1689	17 16 47.1	6.873
19	17 57 4.46	2.1620	20 50 12.3	2.143	19	19 41 11.29	2.1688	17 9 51.8	6.968
20	17 59 14.20	2.1627	20 48 0.6	2.247	20	19 43 21.41	2.1685	17 2 50.9	7.063
21	18 1 23.98	2.1633	20 45 42.7	2.349	21	19 45 31.51	2.1683	16 55 44.3	7.157
22	18 3 33.80	2.1639	20 43 18.7	2.453	22	19 47 41.60	2.1680	16 48 32.1	7.250
23	18 5 43.65	2.1644	20 40 48.4	2.557	23	19 49 51.67	2.1678	16 41 14.3	7.343
24	18 7 53.53	2.1650	-20 38 11.9	+2.660	24	19 52 1.73	2.1675	-16 33 51.0	+7.435

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
SEPTEMBER 6.					SEPTEMBER 8.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 52 1.73	2.1675	-16 33 51.0	+ 7.435	0	21 35 48.46	2.1606	-9 0 58.4	+11.172
1	19 54 11.77	2.1673	16 26 22.1	7.528	1	21 37 58.10	2.1608	8 49 46.3	11.231
2	19 56 21.80	2.1669	16 18 47.7	7.619	2	21 40 7.76	2.1612	8 38 30.7	11.289
3	19 58 31.80	2.1666	16 11 7.8	7.710	3	21 42 17.44	2.1614	8 27 11.6	11.347
4	20 0 41.79	2.1664	16 3 22.5	7.801	4	21 44 27.13	2.1617	8 15 49.1	11.403
5	20 2 51.77	2.1662	15 55 31.7	7.891	5	21 46 36.84	2.1621	8 4 23.2	11.458
6	20 5 1.73	2.1658	15 47 35.6	7.981	6	21 48 46.58	2.1625	7 52 54.1	11.513
7	20 7 11.66	2.1654	15 39 34.0	8.070	7	21 50 56.34	2.1628	7 41 21.7	11.566
8	20 9 21.58	2.1652	15 31 27.2	8.158	8	21 53 6.12	2.1633	7 29 46.2	11.618
9	20 11 31.49	2.1649	15 23 15.0	8.248	9	21 55 15.93	2.1638	7 18 7.5	11.670
10	20 13 41.37	2.1646	15 14 57.5	8.335	10	21 57 25.77	2.1642	7 6 25.8	11.720
11	20 15 51.24	2.1643	15 6 34.8	8.422	11	21 59 35.63	2.1647	6 54 41.1	11.769
12	20 18 1.09	2.1641	14 58 6.9	8.508	12	22 1 45.53	2.1653	6 42 53.5	11.818
13	20 20 10.93	2.1638	14 49 33.8	8.594	13	22 3 55.46	2.1658	6 31 3.0	11.865
14	20 22 20.75	2.1635	14 40 55.6	8.680	14	22 6 5.43	2.1664	6 19 9.7	11.911
15	20 24 30.55	2.1632	14 32 12.2	8.765	15	22 8 15.43	2.1670	6 7 13.7	11.956
16	20 26 40.33	2.1629	14 23 23.8	8.849	16	22 10 25.47	2.1678	5 55 15.0	12.000
17	20 28 50.10	2.1628	14 14 30.3	8.933	17	22 12 35.56	2.1684	5 43 13.7	12.043
18	20 30 59.86	2.1625	14 5 31.9	9.016	18	22 14 45.68	2.1691	5 31 9.8	12.085
19	20 33 9.60	2.1622	13 56 28.4	9.098	19	22 16 55.85	2.1699	5 19 3.5	12.126
20	20 35 19.32	2.1619	13 47 20.1	9.180	20	22 19 6.07	2.1708	5 6 54.7	12.166
21	20 37 29.03	2.1617	13 38 6.8	9.261	21	22 21 16.34	2.1715	4 54 43.6	12.205
22	20 39 38.72	2.1614	13 28 48.8	9.341	22	22 23 26.65	2.1723	4 42 30.1	12.243
23	20 41 48.40	2.1613	-13 19 25.9	+ 9.422	23	22 25 37.02	2.1733	-4 30 14.5	+12.278
SEPTEMBER 7.					SEPTEMBER 9.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	20 43 58.07	2.1611	-13 9 58.2	+ 9.501	0	22 27 47.45	2.1743	-4 17 56.7	+12.313
1	20 46 7.73	2.1609	13 0 25.8	9.579	1	22 29 57.93	2.1753	4 5 36.9	12.348
2	20 48 17.38	2.1608	12 50 48.7	9.657	2	22 32 8.48	2.1763	3 53 15.0	12.381
3	20 50 27.02	2.1605	12 41 7.0	9.733	3	22 34 19.08	2.1773	3 40 51.2	12.413
4	20 52 36.64	2.1603	12 31 20.7	9.810	4	22 36 29.75	2.1783	3 28 25.5	12.443
5	20 54 46.26	2.1603	12 21 29.8	9.886	5	22 38 40.48	2.1794	3 15 58.0	12.473
6	20 56 55.87	2.1601	12 11 34.4	9.961	6	22 40 51.28	2.1806	3 3 28.8	12.501
7	20 59 5.47	2.1599	12 1 34.5	10.035	7	22 43 2.15	2.1818	2 50 57.9	12.528
8	21 1 15.06	2.1598	11 51 30.2	10.108	8	22 45 13.09	2.1830	2 38 25.5	12.553
9	21 3 24.65	2.1598	11 41 21.5	10.181	9	22 47 24.11	2.1843	2 25 51.5	12.578
10	21 5 34.23	2.1597	11 31 8.5	10.253	10	22 49 35.20	2.1855	2 13 16.1	12.602
11	21 7 43.81	2.1596	11 20 51.2	10.323	11	22 51 46.37	2.1868	2 0 39.3	12.624
12	21 9 53.38	2.1595	11 10 29.7	10.393	12	22 53 57.62	2.1882	1 48 1.2	12.645
13	21 12 2.95	2.1596	11 0 4.0	10.463	13	22 56 8.95	2.1896	1 35 21.9	12.664
14	21 14 12.53	2.1596	10 49 34.1	10.533	14	22 58 20.37	2.1911	1 22 41.5	12.683
15	21 16 22.10	2.1595	10 39 0.1	10.600	15	23 0 31.88	2.1926	1 9 59.9	12.701
16	21 18 31.67	2.1596	10 28 22.1	10.667	16	23 2 43.48	2.1941	0 57 17.4	12.716
17	21 20 41.25	2.1597	10 17 40.1	10.733	17	23 4 55.17	2.1956	0 44 34.0	12.730
18	21 22 50.83	2.1597	10 6 54.1	10.798	18	23 7 6.95	2.1972	0 31 49.8	12.744
19	21 25 0.41	2.1598	9 56 4.3	10.863	19	23 9 18.83	2.1988	0 19 4.7	12.757
20	21 27 10.00	2.1599	9 45 10.6	10.927	20	23 11 30.81	2.2005	-0 6 19.0	12.767
21	21 29 19.60	2.1601	9 34 13.1	10.989	21	23 13 42.89	2.2023	+0 6 27.3	12.776
22	21 31 29.21	2.1603	9 23 11.9	11.052	22	23 15 55.08	2.2040	0 19 14.1	12.784
23	21 33 38.83	2.1604	9 12 6.9	11.113	23	23 18 7.37	2.2058	0 32 1.4	12.792
24	21 35 48.46	2.1606	-9 0 58.4	+11.172	24	23 20 19.77	2.2076	+0 44 49.1	+12.797

MOON, 1919.

89

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
SEPTEMBER 10.					SEPTEMBER 12.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	23 20 19.77	2.2076	+ 0 44 49.1	+12.797	0	1 9 4.49	2.3353	+10 38 59.1	+11.412
1	23 22 32.28	2.2094	0 57 37.0	12.801	1	1 11 24.71	2.3387	10 50 21.9	11.348
2	23 24 44.90	2.2113	1 10 25.2	12.803	2	1 13 45.13	2.3419	11 1 40.8	11.281
3	23 26 57.64	2.2133	1 23 13.4	12.805	3	1 16 5.74	2.3452	11 12 55.6	11.214
4	23 29 10.50	2.2153	1 36 1.8	12.806	4	1 18 26.56	2.3486	11 24 6.5	11.147
5	23 31 23.47	2.2173	1 48 50.1	12.803	5	1 20 47.58	2.3519	11 35 13.2	11.076
6	23 33 36.57	2.2193	2 1 38.2	12.801	6	1 23 8.79	2.3553	11 46 15.6	11.005
7	23 35 49.79	2.2214	2 14 26.2	12.798	7	1 25 30.21	2.3587	11 57 13.8	10.933
8	23 38 3.14	2.2236	2 27 13.9	12.792	8	1 27 51.83	2.3620	12 8 7.5	10.858
9	23 40 16.62	2.2258	2 40 1.2	12.785	9	1 30 13.65	2.3653	12 18 56.8	10.783
10	23 42 30.23	2.2279	2 52 48.1	12.778	10	1 32 35.67	2.3687	12 29 41.5	10.707
11	23 44 43.97	2.2302	3 5 34.5	12.768	11	1 34 57.89	2.3721	12 40 21.6	10.628
12	23 46 57.85	2.2324	3 18 20.3	12.758	12	1 37 20.32	2.3755	12 50 56.9	10.548
13	23 49 11.86	2.2347	3 31 5.4	12.745	13	1 39 42.95	2.3788	13 1 27.4	10.468
14	23 51 26.02	2.2372	3 43 49.7	12.731	14	1 42 5.78	2.3823	13 11 53.0	10.385
15	23 53 40.32	2.2395	3 56 33.1	12.716	15	1 44 28.82	2.3856	13 22 13.6	10.302
16	23 55 54.76	2.2418	4 9 15.6	12.699	16	1 46 52.05	2.3889	13 32 29.2	10.218
17	23 58 9.34	2.2443	4 21 57.0	12.681	17	1 49 15.49	2.3923	13 42 39.7	10.131
18	0 0 24.08	2.2469	4 34 37.3	12.662	18	1 51 39.13	2.3956	13 52 44.9	10.043
19	0 2 38.97	2.2493	4 47 16.4	12.642	19	1 54 2.96	2.3989	14 2 44.8	9.953
20	0 4 54.00	2.2519	4 59 54.3	12.619	20	1 56 27.00	2.4023	14 12 39.3	9.863
21	0 7 9.20	2.2546	5 12 30.7	12.595	21	1 58 51.24	2.4057	14 22 28.4	9.773
22	0 9 24.55	2.2572	5 25 5.7	12.571	22	2 1 15.68	2.4090	14 32 12.0	9.679
23	0 11 40.06	2.2598	+ 5 37 39.2	+12.544	23	2 3 40.32	2.4123	+14 41 49.9	+ 9.585
SEPTEMBER 11.					SEPTEMBER 13.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	0 13 55.73	2.2625	+ 5 50 11.0	+12.516	0	2 6 5.15	2.4155	+14 51 22.2	+ 9.490
1	0 16 11.56	2.2652	6 2 41.1	12.487	1	2 8 30.18	2.4188	15 0 48.7	9.393
2	0 18 27.55	2.2680	6 15 9.4	12.456	2	2 10 55.41	2.4221	15 10 9.4	9.296
3	0 20 43.72	2.2708	6 27 35.8	12.423	3	2 13 20.83	2.4253	15 19 24.2	9.197
4	0 23 0.05	2.2736	6 40 0.2	12.390	4	2 15 46.44	2.4285	15 28 33.0	9.096
5	0 25 16.55	2.2764	6 52 22.6	12.355	5	2 18 12.25	2.4318	15 37 35.7	8.995
6	0 27 33.22	2.2793	7 4 42.8	12.318	6	2 20 38.25	2.4348	15 46 32.4	8.893
7	0 29 50.06	2.2822	7 17 0.8	12.280	7	2 23 4.43	2.4379	15 55 22.8	8.788
8	0 32 7.08	2.2852	7 29 16.4	12.241	8	2 25 30.80	2.4411	16 4 6.9	8.683
9	0 34 24.28	2.2882	7 41 29.7	12.200	9	2 27 57.36	2.4442	16 12 44.7	8.578
10	0 36 41.66	2.2912	7 53 40.4	12.157	10	2 30 24.10	2.4472	16 21 16.2	8.470
11	0 38 59.22	2.2942	8 5 48.5	12.113	11	2 32 51.02	2.4502	16 29 41.1	8.361
12	0 41 16.96	2.2972	8 17 54.0	12.068	12	2 35 18.12	2.4532	16 37 59.5	8.252
13	0 43 34.88	2.3003	8 29 56.7	12.021	13	2 37 45.40	2.4562	16 46 11.3	8.141
14	0 45 52.99	2.3033	8 41 56.5	11.973	14	2 40 12.86	2.4591	16 54 16.4	8.028
15	0 48 11.28	2.3064	8 53 53.4	11.923	15	2 42 40.49	2.4619	17 2 14.7	7.916
16	0 50 29.76	2.3096	9 5 47.3	11.873	16	2 45 8.29	2.4648	17 10 6.3	7.803
17	0 52 48.43	2.3128	9 17 38.1	11.820	17	2 47 36.26	2.4676	17 17 51.0	7.688
18	0 55 7.29	2.3159	9 29 25.7	11.765	18	2 50 4.40	2.4703	17 25 28.8	7.572
19	0 57 26.34	2.3191	9 41 9.9	11.709	19	2 52 32.70	2.4730	17 32 59.6	7.454
20	0 59 45.58	2.3223	9 52 50.8	11.653	20	2 55 1.16	2.4757	17 40 23.3	7.336
21	1 2 5.02	2.3255	10 4 28.3	11.595	21	2 57 29.78	2.4783	17 47 39.9	7.218
22	1 4 24.64	2.3288	10 16 2.2	11.535	22	2 59 58.55	2.4808	17 54 49.4	7.098
23	1 6 44.47	2.3321	10 27 32.5	11.474	23	3 2 27.48	2.4834	18 1 51.6	6.977
24	1 9 4.49	2.3353	+10 38 59.1	+11.412	24	3 4 56.56	2.4858	+18 8 46.6	+ 6.855

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
SEPTEMBER 14.					SEPTEMBER 16.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	3 4 56.56	2.4858	+18 8 46.6	+6.855	0	5 5 50.30	2.5215	+21 5 14.6	+0.353
1	3 7 25.78	2.4883	18 15 34.2	6.733	1	5 8 21.55	2.5203	21 5 31.6	0.214
2	3 9 55.15	2.4907	18 22 14.5	6.609	2	5 10 52.73	2.5189	21 5 40.3	+0.075
3	3 12 24.66	2.4929	18 28 47.3	6.484	3	5 13 23.82	2.5174	21 5 40.6	-0.065
4	3 14 54.30	2.4952	18 35 12.6	6.359	4	5 15 54.82	2.5159	21 5 32.5	0.204
5	3 17 24.08	2.4974	18 41 30.4	6.233	5	5 18 25.73	2.5143	21 5 16.1	0.343
6	3 19 53.99	2.4995	18 47 40.6	6.107	6	5 20 56.54	2.5127	21 4 51.4	0.482
7	3 22 24.02	2.5015	18 53 43.2	5.979	7	5 23 27.25	2.5109	21 4 18.3	0.620
8	3 24 54.17	2.5036	18 59 38.1	5.851	8	5 25 57.85	2.5090	21 3 37.0	0.758
9	3 27 24.45	2.5056	19 5 25.3	5.722	9	5 28 28.33	2.5071	21 2 47.4	0.895
10	3 29 54.84	2.5073	19 11 4.7	5.592	10	5 30 58.70	2.5051	21 1 49.6	1.033
11	3 32 25.33	2.5092	19 16 36.3	5.462	11	5 33 28.94	2.5029	21 0 43.5	1.169
12	3 34 55.94	2.5110	19 22 0.1	5.331	12	5 35 59.05	2.5008	20 59 29.3	1.305
13	3 37 26.65	2.5127	19 27 16.0	5.198	13	5 38 29.03	2.4986	20 58 6.9	1.442
14	3 39 57.46	2.5143	19 32 23.9	5.066	14	5 40 58.88	2.4963	20 56 36.3	1.577
15	3 42 28.36	2.5158	19 37 23.9	4.933	15	5 43 28.58	2.4938	20 54 57.7	1.712
16	3 44 59.35	2.5173	19 42 15.9	4.800	16	5 45 58.13	2.4913	20 53 10.9	1.847
17	3 47 30.43	2.5187	19 46 59.9	4.666	17	5 48 27.54	2.4888	20 51 16.1	1.980
18	3 50 1.59	2.5199	19 51 35.8	4.531	18	5 50 56.79	2.4862	20 49 13.3	2.113
19	3 52 32.82	2.5212	19 56 3.6	4.396	19	5 53 25.88	2.4834	20 47 2.5	2.246
20	3 55 4.13	2.5224	20 0 23.3	4.260	20	5 55 54.80	2.4807	20 44 43.8	2.378
21	3 57 35.51	2.5234	20 4 34.8	4.123	21	5 58 23.56	2.4779	20 42 17.1	2.510
22	4 0 6.94	2.5244	20 8 38.1	3.987	22	6 0 52.15	2.4750	20 39 42.6	2.641
23	4 2 38.44	2.5254	+20 12 33.2	+3.850	23	6 3 20.56	2.4720	+20 37 0.2	-2.772
SEPTEMBER 15.					SEPTEMBER 17.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	4 5 9.99	2.5263	+20 16 20.1	+3.713	0	6 5 48.79	2.4690	+20 34 10.0	-2.901
1	4 7 41.59	2.5270	20 19 58.7	3.575	1	6 8 16.84	2.4658	20 31 12.1	3.030
2	4 10 13.23	2.5277	20 23 29.1	3.437	2	6 10 44.69	2.4627	20 28 6.4	3.159
3	4 12 44.91	2.5283	20 26 51.1	3.298	3	6 13 12.36	2.4595	20 24 53.0	3.287
4	4 15 16.63	2.5288	20 30 4.8	3.159	4	6 15 39.83	2.4562	20 21 32.0	3.413
5	4 17 48.37	2.5293	20 33 10.2	3.020	5	6 18 7.10	2.4528	20 18 3.4	3.540
6	4 20 20.14	2.5297	20 36 7.2	2.881	6	6 20 34.17	2.4494	20 14 27.2	3.665
7	4 22 51.93	2.5300	20 38 55.9	2.742	7	6 23 1.03	2.4459	20 10 43.6	3.789
8	4 25 23.74	2.5302	20 41 36.2	2.601	8	6 25 27.68	2.4424	20 6 52.5	3.914
9	4 27 55.55	2.5303	20 44 8.0	2.461	9	6 27 54.12	2.4389	20 2 53.9	4.038
10	4 30 27.37	2.5303	20 46 31.5	2.321	10	6 30 20.35	2.4353	19 58 48.0	4.159
11	4 32 59.18	2.5302	20 48 46.5	2.180	11	6 32 46.36	2.4316	19 54 34.8	4.281
12	4 35 30.99	2.5301	20 50 53.1	2.040	12	6 35 12.14	2.4278	19 50 14.3	4.402
13	4 38 2.79	2.5298	20 52 51.3	1.899	13	6 37 37.70	2.4241	19 45 46.6	4.522
14	4 40 34.57	2.5294	20 54 41.0	1.759	14	6 40 3.03	2.4203	19 41 11.7	4.641
15	4 43 6.32	2.5290	20 56 22.4	1.619	15	6 42 28.13	2.4164	19 36 29.7	4.759
16	4 45 38.05	2.5286	20 57 55.3	1.478	16	6 44 53.00	2.4126	19 31 40.6	4.877
17	4 48 9.75	2.5280	20 59 19.7	1.337	17	6 47 17.64	2.4086	19 26 44.5	4.993
18	4 50 41.41	2.5273	21 0 35.7	1.197	18	6 49 42.03	2.4046	19 21 41.5	5.108
19	4 53 13.03	2.5266	21 1 43.3	1.056	19	6 52 6.19	2.4006	19 16 31.6	5.223
20	4 55 44.60	2.5258	21 2 42.4	0.915	20	6 54 30.10	2.3964	19 11 14.8	5.337
21	4 58 16.12	2.5248	21 3 33.1	0.774	21	6 56 53.76	2.3923	19 5 51.2	5.450
22	5 0 47.58	2.5238	21 4 15.3	0.634	22	6 59 17.18	2.3883	19 0 20.8	5.562
23	5 3 18.97	2.5227	21 4 49.2	0.494	23	7 1 40.35	2.3841	18 54 43.8	5.672
24	5 5 50.30	2.5215	+21 5 14.6	+0.353	24	7 4 3.27	2.3798	+18 49 0.2	-5.782

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
SEPTEMBER 18.					SEPTEMBER 20.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	7 4 3.27	2.3798	+18 49 0.2	-5.782	0	8 53 11.95	2.1689	+12 24 33.5	-9.823
1	7 6 25.93	2.3756	18 43 10.0	5.800	1	8 55 21.96	2.1648	12 14 42.4	9.880
2	7 8 48.34	2.3714	18 37 13.4	5.998	2	8 57 31.73	2.1608	12 4 47.9	9.936
3	7 11 10.50	2.3671	18 31 10.2	6.106	3	8 59 41.25	2.1567	11 54 50.1	9.991
4	7 13 32.39	2.3628	18 25 0.7	6.211	4	9 1 50.53	2.1528	11 44 49.0	10.046
5	7 15 54.03	2.3584	18 18 44.9	6.316	5	9 3 59.58	2.1488	11 34 44.6	10.099
6	7 18 15.40	2.3541	18 12 22.8	6.421	6	9 6 8.38	2.1448	11 24 37.1	10.151
7	7 20 36.52	2.3498	18 5 54.4	6.523	7	9 8 16.95	2.1408	11 14 26.5	10.202
8	7 22 57.37	2.3453	17 59 20.0	6.625	8	9 10 25.28	2.1370	11 4 12.9	10.252
9	7 25 17.96	2.3409	17 52 39.4	6.727	9	9 12 33.39	2.1332	10 53 56.3	10.301
10	7 27 38.28	2.3365	17 45 52.8	6.826	10	9 14 41.26	2.1293	10 43 36.8	10.349
11	7 29 58.34	2.3321	17 39 0.3	6.925	11	9 16 48.90	2.1255	10 33 14.4	10.396
12	7 32 18.13	2.3276	17 32 1.8	7.023	12	9 18 56.32	2.1218	10 22 49.3	10.441
13	7 34 37.65	2.3231	17 24 57.5	7.119	13	9 21 3.52	2.1181	10 12 21.5	10.486
14	7 36 56.90	2.3187	17 17 47.5	7.215	14	9 23 10.49	2.1144	10 1 51.0	10.530
15	7 39 15.89	2.3142	17 10 31.7	7.310	15	9 25 17.25	2.1108	9 51 17.9	10.572
16	7 41 34.60	2.3097	17 3 10.3	7.403	16	9 27 23.78	2.1072	9 40 42.4	10.613
17	7 43 53.05	2.3052	16 55 43.3	7.496	17	9 29 30.11	2.1037	9 30 4.3	10.654
18	7 46 11.22	2.3007	16 48 10.8	7.587	18	9 31 36.22	2.1001	9 19 23.9	10.693
19	7 48 29.13	2.2962	16 40 32.9	7.678	19	9 33 42.12	2.0966	9 8 41.1	10.732
20	7 50 46.76	2.2916	16 32 49.5	7.768	20	9 35 47.81	2.0932	8 57 56.1	10.769
21	7 53 4.12	2.2871	16 25 0.8	7.856	21	9 37 53.30	2.0898	8 47 8.8	10.806
22	7 55 21.21	2.2826	16 17 6.8	7.943	22	9 39 58.59	2.0864	8 36 19.4	10.841
23	7 57 38.03	2.2781	+16 9 7.7	-8.028	23	9 42 3.67	2.0830	+ 8 25 27.9	-10.875
SEPTEMBER 19.					SEPTEMBER 21.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	7 59 54.58	2.2736	+16 1 3.4	-8.113	0	9 44 8.55	2.0798	+ 8 14 34.4	-10.908
1	8 2 10.86	2.2690	15 52 54.1	8.198	1	9 46 13.24	2.0765	8 3 38.9	10.940
2	8 4 26.86	2.2645	15 44 39.7	8.280	2	9 48 17.73	2.0733	7 52 41.6	10.971
3	8 6 42.60	2.2600	15 36 20.5	8.362	3	9 50 22.03	2.0701	7 41 42.4	11.002
4	8 8 58.06	2.2555	15 27 56.3	8.443	4	9 52 26.14	2.0670	7 30 41.4	11.031
5	8 11 13.26	2.2511	15 19 27.4	8.522	5	9 54 30.07	2.0639	7 19 38.7	11.058
6	8 13 28.19	2.2466	15 10 53.7	8.600	6	9 56 33.81	2.0608	7 8 34.4	11.086
7	8 15 42.85	2.2421	15 2 15.4	8.677	7	9 58 37.37	2.0579	6 57 28.4	11.112
8	8 17 57.24	2.2377	14 53 32.5	8.753	8	10 0 40.76	2.0549	6 46 21.0	11.137
9	8 20 11.37	2.2333	14 44 45.0	8.829	9	10 2 43.96	2.0520	6 35 12.0	11.162
10	8 22 25.23	2.2288	14 35 53.0	8.903	10	10 4 47.00	2.0492	6 24 1.6	11.184
11	8 24 38.82	2.2243	14 26 56.7	8.975	11	10 6 49.86	2.0463	6 12 49.9	11.207
12	8 26 52.15	2.2200	14 17 56.0	9.048	12	10 8 52.55	2.0435	6 1 36.8	11.228
13	8 29 5.22	2.2156	14 8 51.0	9.118	13	10 10 55.08	2.0408	5 50 22.5	11.248
14	8 31 18.02	2.2113	13 59 41.9	9.187	14	10 12 57.44	2.0380	5 39 7.0	11.268
15	8 33 30.57	2.2070	13 50 28.6	9.256	15	10 14 59.64	2.0354	5 27 50.4	11.286
16	8 35 42.86	2.2026	13 41 11.2	9.323	16	10 17 1.69	2.0328	5 16 32.7	11.303
17	8 37 54.88	2.1983	13 31 49.9	9.388	17	10 19 3.58	2.0303	5 5 14.1	11.319
18	8 40 6.65	2.1941	13 22 24.6	9.454	18	10 21 5.32	2.0277	4 53 54.4	11.335
19	8 42 18.17	2.1898	13 12 55.4	9.518	19	10 23 6.90	2.0252	4 42 33.9	11.349
20	8 44 29.43	2.1855	13 3 22.4	9.582	20	10 25 8.34	2.0228	4 31 12.5	11.363
21	8 46 40.43	2.1813	12 53 45.6	9.643	21	10 27 9.64	2.0205	4 19 50.4	11.375
22	8 48 51.19	2.1772	12 44 5.2	9.704	22	10 29 10.80	2.0181	4 8 27.5	11.388
23	8 51 1.69	2.1730	12 34 21.1	9.764	23	10 31 11.81	2.0158	3 57 3.9	11.398
24	8 53 11.95	2.1689	+12 24 33.5	-9.823	24	10 33 12.69	2.0136	+ 3 45 39.8	-11.408

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
SEPTEMBER 22.					SEPTEMBER 24.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	10 33 12.69	2.0136	+3 45 39.8	-11.407	0	12 8 6.27	1.9568	-5 16 23.9	-10.853
1	10 35 13.44	2.0113	3 34 15.1	11.416	1	12 10 3.67	1.9566	5 27 14.4	10.827
2	10 37 14.05	2.0091	3 22 49.9	11.424	2	12 12 1.06	1.9565	5 38 3.1	10.795
3	10 39 14.53	2.0070	3 11 24.2	11.432	3	12 13 58.45	1.9564	5 48 49.8	10.763
4	10 41 14.89	2.0050	2 59 58.1	11.438	4	12 15 55.83	1.9563	5 59 34.6	10.729
5	10 43 15.13	2.0030	2 48 31.7	11.443	5	12 17 53.21	1.9563	6 10 17.3	10.695
6	10 45 15.25	2.0009	2 37 5.0	11.447	6	12 19 50.58	1.9563	6 20 58.0	10.661
7	10 47 15.24	1.9989	2 25 38.1	11.451	7	12 21 47.96	1.9564	6 31 36.6	10.625
8	10 49 15.12	1.9972	2 14 10.9	11.453	8	12 23 45.35	1.9565	6 42 13.0	10.583
9	10 51 14.90	1.9953	2 2 43.7	11.454	9	12 25 42.74	1.9565	6 52 47.2	10.531
10	10 53 14.56	1.9934	1 51 16.4	11.455	10	12 27 40.13	1.9567	7 3 19.1	10.513
11	10 55 14.11	1.9917	1 39 49.1	11.454	11	12 29 37.54	1.9569	7 13 48.8	10.476
12	10 57 13.56	1.9900	1 28 21.9	11.453	12	12 31 34.96	1.9572	7 24 16.2	10.437
13	10 59 12.91	1.9883	1 16 54.7	11.452	13	12 33 32.40	1.9574	7 34 41.2	10.398
14	11 1 12.16	1.9867	1 5 27.7	11.448	14	12 35 29.85	1.9577	7 45 3.9	10.357
15	11 3 11.31	1.9851	0 54 0.9	11.445	15	12 37 27.32	1.9580	7 55 24.0	10.315
16	11 5 10.37	1.9836	0 42 34.3	11.441	16	12 39 24.81	1.9583	8 5 41.7	10.274
17	11 7 9.34	1.9821	0 31 8.0	11.435	17	12 41 22.32	1.9588	8 15 56.9	10.232
18	11 9 8.22	1.9807	0 19 42.1	11.428	18	12 43 19.86	1.9592	8 26 9.5	10.188
19	11 11 7.02	1.9793	+0 8 16.6	11.422	19	12 45 17.42	1.9596	8 36 19.4	10.143
20	11 13 5.73	1.9778	-0 3 8.5	11.414	20	12 47 15.01	1.9602	8 46 26.7	10.099
21	11 15 4.36	1.9765	0 14 33.1	11.405	21	12 49 12.64	1.9607	8 56 31.3	10.054
22	11 17 2.91	1.9753	0 25 57.1	11.395	22	12 51 10.29	1.9612	9 6 33.2	10.008
23	11 19 1.39	1.9740	-0 37 20.5	-11.384	23	12 53 7.98	1.9618	-9 16 32.3	-9.963
SEPTEMBER 23.					SEPTEMBER 25.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	11 20 59.79	1.9728	-0 48 43.2	-11.373	0	12 55 5.70	1.9623	-9 26 28.6	-9.914
1	11 22 58.12	1.9717	1 0 5.2	11.361	1	12 57 3.46	1.9630	9 36 22.0	9.867
2	11 24 56.39	1.9706	1 11 26.5	11.348	2	12 59 1.26	1.9637	9 46 12.6	9.818
3	11 26 54.59	1.9695	1 22 46.9	11.333	3	13 0 59.10	1.9644	9 56 0.2	9.768
4	11 28 52.73	1.9685	1 34 6.5	11.319	4	13 2 56.99	1.9652	10 5 44.8	9.719
5	11 30 50.81	1.9675	1 45 25.2	11.303	5	13 4 54.92	1.9658	10 15 26.5	9.669
6	11 32 48.83	1.9666	1 56 42.9	11.287	6	13 6 52.89	1.9666	10 25 5.1	9.618
7	11 34 46.80	1.9657	2 7 59.6	11.270	7	13 8 50.91	1.9674	10 34 40.6	9.566
8	11 36 44.71	1.9648	2 19 15.3	11.252	8	13 10 48.98	1.9683	10 44 13.0	9.513
9	11 38 42.58	1.9641	2 30 29.8	11.233	9	13 12 47.11	1.9692	10 53 42.2	9.460
10	11 40 40.40	1.9633	2 41 43.2	11.213	10	13 14 45.28	1.9700	11 3 8.2	9.407
11	11 42 38.17	1.9625	2 52 55.4	11.193	11	13 16 43.51	1.9709	11 12 31.0	9.353
12	11 44 35.90	1.9618	3 4 6.4	11.173	12	13 18 41.79	1.9718	11 21 50.5	9.295
13	11 46 33.59	1.9613	3 15 16.1	11.150	13	13 20 40.13	1.9728	11 31 6.7	9.243
14	11 48 31.25	1.9607	3 26 24.4	11.128	14	13 22 38.53	1.9738	11 40 19.6	9.187
15	11 50 28.87	1.9600	3 37 31.4	11.104	15	13 24 36.98	1.9748	11 49 29.1	9.129
16	11 52 26.45	1.9595	3 48 36.9	11.080	16	13 26 35.50	1.9758	11 58 35.1	9.072
17	11 54 24.01	1.9591	3 59 41.0	11.055	17	13 28 34.08	1.9769	12 7 37.7	9.014
18	11 56 21.54	1.9586	4 10 43.5	11.028	18	13 30 32.73	1.9780	12 16 36.8	8.956
19	11 58 19.04	1.9583	4 21 44.4	11.002	19	13 32 31.44	1.9790	12 25 32.4	8.897
20	12 0 16.53	1.9579	4 32 43.7	10.975	20	13 34 30.21	1.9802	12 34 24.4	8.838
21	12 2 13.99	1.9575	4 43 41.4	10.947	21	13 36 29.06	1.9813	12 43 12.9	8.778
22	12 4 11.43	1.9573	4 54 37.3	10.918	22	13 38 27.97	1.9825	12 51 57.7	8.716
23	12 6 8.86	1.9570	5 5 31.5	10.888	23	13 40 26.96	1.9837	13 0 38.8	8.654
24	12 8 6.27	1.9568	-5 16 23.9	-10.858	24	13 42 26.01	1.9848	-13 9 16.2	-8.593

MOON, 1919.

93

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
SEPTEMBER 26.					SEPTEMBER 28.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	13 42 26.01	1.9848	-13 9 16.2	-8.593	0	15 19 20.07	2.0553	-18 40 13.0	-5.013
1	13 44 25.14	1.9861	13 17 49.9	8.530	1	15 21 23.43	2.0568	18 45 11.2	4.927
2	13 46 24.34	1.9873	13 26 19.8	8.467	2	15 23 26.88	2.0583	18 50 4.2	4.841
3	13 48 23.61	1.9885	13 34 45.9	8.403	3	15 25 30.43	2.0598	18 54 52.1	4.755
4	13 50 22.96	1.9898	13 43 8.2	8.338	4	15 27 34.06	2.0613	18 59 34.8	4.668
5	13 52 22.39	1.9911	13 51 26.5	8.273	5	15 29 37.79	2.0628	19 4 12.3	4.581
6	13 54 21.89	1.9924	13 59 41.0	8.208	6	15 31 41.60	2.0643	19 8 44.5	4.493
7	13 56 21.48	1.9938	14 7 51.5	8.142	7	15 33 45.50	2.0658	19 13 11.5	4.407
8	13 58 21.14	1.9951	14 15 58.0	8.076	8	15 35 49.49	2.0673	19 17 33.3	4.318
9	14 0 20.89	1.9964	14 24 0.6	8.009	9	15 37 53.57	2.0687	19 21 49.7	4.229
10	14 2 20.71	1.9978	14 31 59.1	7.942	10	15 39 57.73	2.0701	19 26 0.8	4.141
11	14 4 20.62	1.9993	14 39 53.6	7.873	11	15 42 1.98	2.0716	19 30 6.6	4.053
12	14 6 20.62	2.0007	14 47 43.9	7.804	12	15 44 6.32	2.0730	19 34 7.1	3.963
13	14 8 20.70	2.0020	14 55 30.1	7.736	13	15 46 10.74	2.0744	19 38 2.2	3.873
14	14 10 20.86	2.0033	15 3 12.2	7.666	14	15 48 15.25	2.0758	19 41 51.9	3.783
15	14 12 21.10	2.0048	15 10 50.0	7.595	15	15 50 19.84	2.0772	19 45 36.2	3.693
16	14 14 21.44	2.0063	15 18 23.6	7.525	16	15 52 24.51	2.0786	19 49 15.0	3.602
17	14 16 21.86	2.0078	15 25 53.0	7.453	17	15 54 29.27	2.0800	19 52 48.4	3.512
18	14 18 22.37	2.0092	15 33 18.0	7.382	18	15 56 34.11	2.0813	19 56 16.4	3.420
19	14 20 22.96	2.0106	15 40 38.8	7.310	19	15 58 39.03	2.0827	19 59 38.8	3.328
20	14 22 23.64	2.0121	15 47 55.2	7.237	20	16 0 44.03	2.0840	20 2 55.8	3.238
21	14 24 24.41	2.0137	15 55 7.2	7.163	21	16 2 49.11	2.0853	20 6 7.3	3.145
22	14 26 25.28	2.0152	16 2 14.8	7.090	22	16 4 54.26	2.0866	20 9 13.2	3.053
23	14 28 26.23	2.0166	-16 9 18.0	-7.016	23	16 6 59.50	2.0879	-20 12 13.6	-2.960
SEPTEMBER 27.					SEPTEMBER 29.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	14 30 27.27	2.0181	-16 16 16.7	-6.941	0	16 9 4.81	2.0832	-20 15 8.4	-2.867
1	14 32 28.40	2.0197	16 23 10.9	6.866	1	16 11 10.20	2.0904	20 17 57.6	2.774
2	14 34 29.63	2.0213	16 30 0.6	6.790	2	16 13 15.66	2.0917	20 20 41.3	2.681
3	14 36 30.95	2.0227	16 36 45.7	6.713	3	16 15 21.20	2.0928	20 23 19.3	2.587
4	14 38 32.35	2.0243	16 43 26.2	6.637	4	16 17 26.80	2.0940	20 25 51.7	2.493
5	14 40 33.86	2.0258	16 50 2.1	6.560	5	16 19 32.48	2.0953	20 28 18.5	2.399
6	14 42 35.45	2.0273	16 56 33.4	6.483	6	16 21 38.24	2.0965	20 30 39.6	2.305
7	14 44 37.13	2.0288	17 3 0.0	6.405	7	16 23 44.06	2.0976	20 32 55.1	2.210
8	14 46 38.91	2.0304	17 9 22.0	6.327	8	16 25 49.95	2.0987	20 35 4.8	2.115
9	14 48 40.78	2.0320	17 15 39.2	6.247	9	16 27 55.90	2.0998	20 37 8.9	2.021
10	14 50 42.75	2.0336	17 21 51.6	6.168	10	16 30 1.93	2.1010	20 39 7.3	1.925
11	14 52 44.81	2.0351	17 27 59.3	6.088	11	16 32 8.02	2.1020	20 40 59.9	1.829
12	14 54 46.96	2.0367	17 34 2.2	6.008	12	16 34 14.17	2.1031	20 42 46.8	1.734
13	14 56 49.21	2.0383	17 40 0.3	5.928	13	16 36 20.39	2.1041	20 44 28.0	1.638
14	14 58 51.55	2.0398	17 45 53.5	5.846	14	16 38 26.66	2.1051	20 46 3.4	1.543
15	15 0 53.98	2.0413	17 51 41.8	5.764	15	16 40 33.00	2.1062	20 47 33.1	1.447
16	15 2 56.51	2.0429	17 57 25.2	5.683	16	16 42 39.40	2.1072	20 48 57.0	1.350
17	15 4 59.13	2.0444	18 3 3.7	5.600	17	16 44 45.86	2.1081	20 50 15.1	1.253
18	15 7 1.84	2.0460	18 8 37.2	5.517	18	16 46 52.37	2.1090	20 51 27.3	1.156
19	15 9 4.65	2.0476	18 14 5.7	5.434	19	16 48 58.94	2.1099	20 52 33.8	1.060
20	15 11 7.55	2.0491	18 19 29.3	5.351	20	16 51 5.56	2.1108	20 53 34.5	0.963
21	15 13 10.54	2.0506	18 24 47.8	5.267	21	16 53 12.24	2.1118	20 54 29.4	0.866
22	15 15 13.62	2.0522	18 30 1.3	5.183	22	16 55 18.97	2.1126	20 55 18.4	0.768
23	15 17 16.80	2.0538	18 35 9.7	5.098	23	16 57 25.75	2.1134	20 56 1.5	0.670
24	15 19 20.07	2.0553	-18 40 13.0	-5.013	24	16 59 32.58	2.1143	-20 56 38.8	-0.573

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
SEPTEMBER 30.					OCTOBER 2.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	16 59 32.58	2.1143	-20 56 38.8	-0.573	0	18 41 34.63	2.1300	-19 30 38.3	+4.151
1	17 1 39.46	2.1150	20 57 10.3	0.476	1	18 43 42.43	2.1299	19 26 26.4	4.248
2	17 3 46.38	2.1158	20 57 35.9	0.378	2	18 45 50.22	2.1298	19 22 8.6	4.344
3	17 5 53.36	2.1166	20 57 55.6	0.279	3	18 47 58.01	2.1298	19 17 45.1	4.440
4	17 8 0.37	2.1173	20 58 9.4	0.181	4	18 50 5.79	2.1296	19 13 15.8	4.537
5	17 10 7.43	2.1180	20 58 17.3	-0.083	5	18 52 13.56	2.1294	19 8 40.7	4.633
6	17 12 14.53	2.1187	20 58 19.4	+0.014	6	18 54 21.32	2.1293	19 3 59.8	4.729
7	17 14 21.67	2.1194	20 58 15.6	0.113	7	18 56 29.08	2.1293	18 59 13.2	4.821
8	17 16 28.86	2.1201	20 58 5.8	0.212	8	18 58 36.83	2.1291	18 54 20.9	4.919
9	17 18 36.08	2.1206	20 57 50.2	0.310	9	19 0 44.57	2.1289	18 49 22.9	5.015
10	17 20 43.33	2.1212	20 57 28.6	0.409	10	19 2 52.30	2.1288	18 44 19.1	5.111
11	17 22 50.62	2.1218	20 57 1.1	0.508	11	19 5 0.02	2.1286	18 39 9.6	5.205
12	17 24 57.95	2.1224	20 56 27.7	0.606	12	19 7 7.73	2.1284	18 33 54.5	5.299
13	17 27 5.31	2.1229	20 55 48.4	0.705	13	19 9 15.43	2.1283	18 28 33.7	5.394
14	17 29 12.70	2.1234	20 55 3.1	0.804	14	19 11 23.12	2.1281	18 23 7.2	5.488
15	17 31 20.12	2.1240	20 54 11.9	0.903	15	19 13 30.80	2.1278	18 17 35.1	5.582
16	17 33 27.58	2.1245	20 53 14.8	1.002	16	19 15 38.46	2.1276	18 11 57.4	5.676
17	17 35 35.06	2.1248	20 52 11.7	1.101	17	19 17 46.11	2.1275	18 6 14.0	5.769
18	17 37 42.56	2.1253	20 51 2.7	1.199	18	19 19 53.76	2.1273	18 0 25.1	5.863
19	17 39 50.09	2.1258	20 49 47.8	1.298	19	19 22 1.39	2.1270	17 54 30.5	5.955
20	17 41 57.65	2.1262	20 48 26.9	1.398	20	19 24 9.00	2.1268	17 48 30.5	6.048
21	17 44 5.23	2.1265	20 47 0.1	1.497	21	19 26 16.61	2.1267	17 42 24.8	6.140
22	17 46 12.83	2.1269	20 45 27.3	1.596	22	19 28 24.20	2.1264	17 36 13.7	6.232
23	17 48 20.46	2.1273	-20 43 48.6	+1.694	23	19 30 31.78	2.1263	-17 29 57.0	+6.323
OCTOBER 1.					OCTOBER 3.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	17 50 28.10	2.1275	-20 42 4.0	+1.793	0	19 32 39.35	2.1261	-17 23 34.9	+6.414
1	17 52 35.76	2.1278	20 40 13.4	1.893	1	19 34 46.91	2.1258	17 17 7.3	6.506
2	17 54 43.44	2.1282	20 38 16.9	1.991	2	19 36 54.45	2.1257	17 10 34.2	6.597
3	17 56 51.14	2.1284	20 36 14.5	2.090	3	19 39 1.99	2.1255	17 3 55.7	6.687
4	17 58 58.85	2.1287	20 34 6.1	2.189	4	19 41 9.51	2.1253	16 57 11.8	6.777
5	18 1 6.58	2.1288	20 31 51.8	2.288	5	19 43 17.02	2.1250	16 50 22.5	6.867
6	18 3 14.31	2.1290	20 29 31.6	2.387	6	19 45 24.51	2.1248	16 43 27.8	6.956
7	18 5 22.06	2.1293	20 27 5.4	2.485	7	19 47 32.00	2.1248	16 36 27.8	7.045
8	18 7 29.82	2.1294	20 24 33.4	2.584	8	19 49 39.48	2.1245	16 29 22.4	7.134
9	18 9 37.59	2.1296	20 21 55.3	2.683	9	19 51 46.94	2.1243	16 22 11.7	7.222
10	18 11 45.37	2.1298	20 19 11.4	2.781	10	19 53 54.40	2.1242	16 14 55.8	7.309
11	18 13 53.16	2.1298	20 16 21.6	2.880	11	19 56 1.84	2.1240	16 7 34.6	7.398
12	18 16 0.95	2.1299	20 13 25.8	2.978	12	19 58 9.28	2.1239	16 0 8.1	7.485
13	18 18 8.75	2.1300	20 10 24.2	3.077	13	20 0 16.71	2.1238	15 52 36.4	7.571
14	18 20 16.55	2.1300	20 7 16.6	3.175	14	20 2 24.13	2.1236	15 44 59.6	7.658
15	18 22 24.35	2.1301	20 4 3.2	3.273	15	20 4 31.54	2.1235	15 37 17.5	7.743
16	18 24 32.16	2.1302	20 0 43.9	3.371	16	20 6 38.95	2.1233	15 29 30.4	7.828
17	18 26 39.97	2.1302	19 57 18.7	3.469	17	20 8 46.34	2.1233	15 21 38.1	7.914
18	18 28 47.78	2.1302	19 53 47.6	3.567	18	20 10 53.74	2.1233	15 13 40.7	7.999
19	18 30 55.59	2.1302	19 50 10.7	3.664	19	20 13 1.13	2.1231	15 5 38.2	8.083
20	18 33 3.40	2.1302	19 46 27.9	3.762	20	20 15 8.51	2.1230	14 57 30.7	8.167
21	18 35 11.21	2.1302	19 42 39.3	3.859	21	20 17 15.89	2.1230	14 49 18.2	8.250
22	18 37 19.02	2.1302	19 38 44.8	3.957	22	20 19 23.27	2.1230	14 41 0.7	8.333
23	18 39 26.83	2.1301	19 34 44.5	4.054	23	20 21 30.65	2.1229	14 32 38.2	8.416
24	18 41 34.63	2.1300	-19 30 38.3	+4.151	24	20 23 38.02	2.1228	-14 24 10.8	+8.498

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
OCTOBER 4.					OCTOBER 6.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	20 23 38.02	2.1228	-14 24 10.8	+ 8.498	0	22 5 56.59	2.1510	-6 12 54.9	+11.707
1	20 25 45.39	2.1229	14 15 38.5	8.579	1	22 8 5.69	2.1524	6 1 11.0	11.755
2	20 27 52.77	2.1230	14 7 1.3	8.660	2	22 10 14.88	2.1538	5 49 24.3	11.802
3	20 30 0.15	2.1230	13 58 19.3	8.740	3	22 12 24.15	2.1553	5 37 34.8	11.848
4	20 32 7.53	2.1230	13 49 32.5	8.820	4	22 14 33.51	2.1568	5 25 42.6	11.893
5	20 34 14.91	2.1231	13 40 40.9	8.900	5	22 16 42.96	2.1583	5 13 47.7	11.937
6	20 36 22.30	2.1233	13 31 44.5	8.979	6	22 18 52.51	2.1599	5 1 50.2	11.980
7	20 38 29.70	2.1233	13 22 43.4	9.058	7	22 21 2.15	2.1615	4 49 50.1	12.023
8	20 40 37.10	2.1234	13 13 37.6	9.135	8	22 23 11.89	2.1632	4 37 47.5	12.063
9	20 42 44.51	2.1236	13 4 27.2	9.212	9	22 25 21.73	2.1649	4 25 42.5	12.103
10	20 44 51.93	2.1238	12 55 12.2	9.289	10	22 27 31.68	2.1667	4 13 35.1	12.143
11	20 46 59.37	2.1240	12 45 52.5	9.366	11	22 29 41.73	2.1684	4 1 25.4	12.181
12	20 49 6.81	2.1242	12 36 28.3	9.441	12	22 31 51.89	2.1703	3 49 13.4	12.218
13	20 51 14.27	2.1244	12 26 59.6	9.516	13	22 34 2.16	2.1721	3 36 59.3	12.253
14	20 53 21.74	2.1247	12 17 26.4	9.590	14	22 36 12.54	2.1740	3 24 43.0	12.288
15	20 55 29.23	2.1250	12 7 48.8	9.664	15	22 38 23.04	2.1760	3 12 24.7	12.322
16	20 57 36.74	2.1253	11 58 6.7	9.738	16	22 40 33.66	2.1780	3 0 4.4	12.354
17	20 59 44.26	2.1256	11 48 20.3	9.810	17	22 42 44.40	2.1801	2 47 42.2	12.386
18	21 1 51.81	2.1260	11 38 29.5	9.882	18	22 44 55.27	2.1822	2 35 18.1	12.416
19	21 3 59.38	2.1263	11 28 34.5	9.953	19	22 47 6.26	2.1843	2 22 52.3	12.445
20	21 6 6.97	2.1268	11 18 35.1	10.024	20	22 49 17.38	2.1864	2 10 24.7	12.473
21	21 8 14.59	2.1272	11 8 31.6	10.094	21	22 51 28.63	2.1886	1 57 55.5	12.501
22	21 10 22.23	2.1277	10 58 23.8	10.164	22	22 53 40.01	2.1908	1 45 24.6	12.527
23	21 12 29.91	2.1282	-10 48 11.9	+10.233	23	22 55 51.53	2.1932	-1 32 52.3	+12.551
OCTOBER 5.					OCTOBER 7.				
0	21 14 37.61	2.1287	-10 37 55.9	+10.301	0	22 58 3.19	2.1955	-1 20 18.5	+12.574
1	21 16 45.35	2.1293	10 27 35.8	10.368	1	23 0 14.99	2.1979	1 7 43.4	12.596
2	21 18 53.12	2.1298	10 17 11.8	10.434	2	23 2 26.94	2.2003	0 55 7.0	12.617
3	21 21 0.93	2.1304	10 6 43.7	10.501	3	23 4 39.03	2.2028	0 42 29.4	12.637
4	21 23 8.77	2.1310	9 56 11.7	10.566	4	23 6 51.28	2.2054	0 29 50.6	12.655
5	21 25 16.65	2.1318	9 45 35.8	10.631	5	23 9 3.68	2.2079	0 17 10.8	12.672
6	21 27 24.58	2.1325	9 34 56.0	10.695	6	23 11 16.23	2.2104	-0 4 30.0	12.688
7	21 29 32.55	2.1332	9 24 12.4	10.758	7	23 13 28.93	2.2131	+0 8 11.8	12.703
8	21 31 40.56	2.1339	9 13 25.1	10.820	8	23 15 41.80	2.2158	0 20 54.4	12.716
9	21 33 48.62	2.1348	9 2 34.0	10.882	9	23 17 54.83	2.2186	0 33 37.7	12.728
10	21 35 56.73	2.1356	8 51 39.3	10.943	10	23 20 8.03	2.2213	0 46 21.8	12.739
11	21 38 4.89	2.1364	8 40 40.9	11.003	11	23 22 21.39	2.2241	0 59 6.4	12.748
12	21 40 13.10	2.1373	8 29 39.0	11.061	12	23 24 34.92	2.2270	1 11 51.6	12.757
13	21 42 21.37	2.1383	8 18 33.6	11.120	13	23 26 48.63	2.2299	1 24 37.2	12.763
14	21 44 29.70	2.1393	8 7 24.6	11.178	14	23 29 2.51	2.2328	1 37 23.2	12.769
15	21 46 38.08	2.1403	7 56 12.3	11.234	15	23 31 16.57	2.2358	1 50 9.5	12.773
16	21 48 46.53	2.1413	7 44 56.5	11.291	16	23 33 30.81	2.2388	2 2 55.9	12.775
17	21 50 55.04	2.1424	7 33 37.4	11.345	17	23 35 45.23	2.2419	2 15 42.5	12.777
18	21 53 3.62	2.1435	7 22 15.1	11.399	18	23 37 59.84	2.2450	2 28 29.1	12.777
19	21 55 12.26	2.1447	7 10 49.5	11.453	19	23 40 14.63	2.2481	2 41 15.7	12.775
20	21 57 20.98	2.1459	6 59 20.7	11.506	20	23 42 29.61	2.2513	2 54 2.1	12.772
21	21 59 29.77	2.1471	6 47 48.8	11.558	21	23 44 44.79	2.2546	3 6 48.3	12.768
22	22 1 38.63	2.1483	6 36 13.8	11.608	22	23 47 0.16	2.2578	3 19 34.2	12.763
23	22 3 47.57	2.1497	6 24 35.8	11.658	23	23 49 15.72	2.2611	3 32 19.8	12.755
24	22 5 56.59	2.1510	-6 12 54.9	+11.707	24	23 51 31.49	2.2645	+3 45 4.8	+12.741

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
OCTOBER 8.					OCTOBER 10.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	23 51 31.49	2.2645	+ 3 45 4.8	+12.746	0	1 44 37.48	2.4546	+13 17 12.3	+10.476
1	23 53 47.46	2.2678	3 57 49.3	12.735	1	1 47 4.88	2.4588	13 27 38.3	10.389
2	23 56 3.63	2.2713	4 10 33.0	12.723	2	1 49 32.53	2.4628	13 37 59.0	10.301
3	23 58 20.01	2.2748	4 23 16.1	12.711	3	1 52 0.42	2.4669	13 48 14.4	10.211
4	0 0 36.60	2.2782	4 35 58.3	12.696	4	1 54 28.56	2.4709	13 58 24.3	10.119
5	0 2 53.39	2.2817	4 48 39.6	12.679	5	1 56 56.93	2.4749	14 8 28.7	10.027
6	0 5 10.40	2.2853	5 1 19.8	12.661	6	1 59 25.55	2.4790	14 18 27.5	9.932
7	0 7 27.63	2.2889	5 13 58.9	12.643	7	2 1 54.41	2.4830	14 28 20.5	9.836
8	0 9 45.07	2.2925	5 26 36.9	12.622	8	2 4 23.51	2.4869	14 38 7.8	9.738
9	0 12 2.73	2.2962	5 39 13.5	12.598	9	2 6 52.84	2.4908	14 47 49.1	9.639
10	0 14 20.61	2.2998	5 51 48.7	12.575	10	2 9 22.41	2.4948	14 57 24.5	9.539
11	0 16 38.71	2.3036	6 4 22.5	12.550	11	2 11 52.21	2.4986	15 6 53.8	9.438
12	0 18 57.04	2.3073	6 16 54.7	12.523	12	2 14 22.24	2.5024	15 16 17.0	9.334
13	0 21 15.59	2.3112	6 29 25.2	12.494	13	2 16 52.50	2.5062	15 25 33.9	9.229
14	0 23 34.38	2.3150	6 41 54.0	12.463	14	2 19 22.98	2.5099	15 34 44.5	9.123
15	0 25 53.39	2.3188	6 54 20.8	12.432	15	2 21 53.69	2.5137	15 43 48.6	9.015
16	0 28 12.63	2.3227	7 6 45.8	12.399	16	2 24 24.62	2.5173	15 52 46.3	8.906
17	0 30 32.11	2.3266	7 19 8.7	12.363	17	2 26 55.77	2.5208	16 1 37.3	8.795
18	0 32 51.82	2.3305	7 31 29.4	12.327	18	2 29 27.12	2.5244	16 10 21.7	8.684
19	0 35 11.77	2.3344	7 43 47.9	12.289	19	2 31 58.70	2.5280	16 18 59.4	8.571
20	0 37 31.95	2.3384	7 56 4.1	12.249	20	2 34 30.48	2.5313	16 27 30.2	8.456
21	0 39 52.38	2.3425	8 8 17.8	12.208	21	2 37 2.46	2.5348	16 35 54.1	8.341
22	0 42 13.05	2.3464	8 20 29.0	12.165	22	2 39 34.65	2.5382	16 44 11.1	8.224
23	0 44 33.95	2.3504	+ 8 32 37.6	+12.121	23	2 42 7.04	2.5414	+16 52 21.0	+ 8.105
OCTOBER 9.					OCTOBER 11.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	0 46 55.10	2.3545	+ 8 44 43.5	+12.074	0	2 44 39.62	2.5446	+17 0 23.7	+ 7.985
1	0 49 16.49	2.3586	8 56 46.5	12.027	1	2 47 12.39	2.5478	17 8 19.2	7.865
2	0 51 38.13	2.3628	9 8 46.7	11.978	2	2 49 45.36	2.5510	17 16 7.5	7.743
3	0 54 0.02	2.3668	9 20 43.8	11.926	3	2 52 18.51	2.5539	17 23 48.4	7.620
4	0 56 22.15	2.3709	9 32 37.8	11.873	4	2 54 51.83	2.5568	17 31 21.9	7.496
5	0 58 44.53	2.3751	9 44 28.5	11.818	5	2 57 25.33	2.5598	17 38 47.9	7.370
6	1 1 7.16	2.3793	9 56 16.0	11.763	6	2 59 59.01	2.5627	17 46 6.3	7.243
7	1 3 30.04	2.3834	10 8 0.1	11.705	7	3 2 32.85	2.5653	17 53 17.1	7.117
8	1 5 53.17	2.3876	10 19 40.6	11.646	8	3 5 6.85	2.5681	18 0 20.3	6.988
9	1 8 16.55	2.3918	10 31 17.6	11.585	9	3 7 41.02	2.5707	18 7 15.6	6.858
10	1 10 40.18	2.3960	10 42 50.8	11.523	10	3 10 15.33	2.5732	18 14 3.2	6.728
11	1 13 4.07	2.4002	10 54 20.3	11.458	11	3 12 49.80	2.5757	18 20 42.9	6.596
12	1 15 28.20	2.4043	11 5 45.8	11.392	12	3 15 24.41	2.5780	18 27 14.7	6.463
13	1 17 52.59	2.4086	11 17 7.3	11.325	13	3 17 59.16	2.5803	18 33 38.5	6.329
14	1 20 17.23	2.4128	11 28 24.8	11.256	14	3 20 34.05	2.5825	18 39 54.2	6.194
15	1 22 42.12	2.4170	11 39 38.0	11.184	15	3 23 9.06	2.5846	18 46 1.8	6.059
16	1 25 7.27	2.4212	11 50 46.9	11.112	16	3 25 44.20	2.5867	18 52 1.3	5.923
17	1 27 32.66	2.4253	12 1 51.5	11.038	17	3 28 19.46	2.5886	18 57 52.6	5.786
18	1 29 58.31	2.4296	12 12 51.5	10.963	18	3 30 54.83	2.5904	19 3 35.6	5.648
19	1 32 24.21	2.4338	12 23 47.0	10.886	19	3 33 30.31	2.5922	19 9 10.4	5.509
20	1 34 50.37	2.4380	12 34 37.8	10.808	20	3 36 5.89	2.5938	19 14 36.7	5.369
21	1 37 16.77	2.4422	12 45 23.9	10.727	21	3 38 41.57	2.5954	19 19 54.7	5.230
22	1 39 43.43	2.4463	12 56 5.0	10.644	22	3 41 17.34	2.5969	19 25 4.3	5.089
23	1 42 10.33	2.4504	13 6 41.2	10.561	23	3 43 53.20	2.5983	19 30 5.4	4.948
24	1 44 37.48	2.4546	+13 17 12.3	+10.476	24	3 46 29.13	2.5995	+19 34 58.0	+4.806

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
OCTOBER 12.					OCTOBER 14.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	3 46 29.13	2.5995	+19 34 58.0	+4.806	0	5 50 44.99	2.5385	+20 37 16.2	-2.163
1	3 49 5.14	2.6008	19 39 42.1	4.663	1	5 53 17.19	2.5348	20 35 2.3	2.300
2	3 51 41.22	2.6018	19 44 17.5	4.519	2	5 55 49.16	2.5311	20 32 40.2	2.437
3	3 54 17.36	2.6028	19 48 44.4	4.376	3	5 58 20.92	2.5273	20 30 9.9	2.572
4	3 56 53.55	2.6036	19 53 2.6	4.232	4	6 0 52.43	2.5233	20 27 31.6	2.705
5	3 59 29.79	2.6044	19 57 12.2	4.088	5	6 3 23.72	2.5194	20 24 45.3	2.839
6	4 2 6.08	2.6051	20 1 13.1	3.942	6	6 5 54.76	2.5153	20 21 50.9	2.973
7	4 4 42.40	2.6057	20 5 5.2	3.795	7	6 8 25.56	2.5113	20 18 48.6	3.103
8	4 7 18.76	2.6062	20 8 48.5	3.649	8	6 10 56.11	2.5071	20 15 38.5	3.234
9	4 9 55.14	2.6064	20 12 23.1	3.503	9	6 13 26.41	2.5028	20 12 20.5	3.365
10	4 12 31.53	2.6067	20 15 48.9	3.357	10	6 15 56.45	2.4985	20 8 54.7	3.494
11	4 15 7.94	2.6069	20 19 5.9	3.210	11	6 18 26.23	2.4942	20 5 21.2	3.623
12	4 17 44.36	2.6069	20 22 14.1	3.063	12	6 20 55.75	2.4898	20 1 40.0	3.750
13	4 20 20.77	2.6068	20 25 13.4	2.915	13	6 23 25.00	2.4853	19 57 51.2	3.876
14	4 22 57.18	2.6067	20 28 3.9	2.768	14	6 25 53.98	2.4808	19 53 54.9	4.002
15	4 25 33.57	2.6063	20 30 45.5	2.619	15	6 28 22.69	2.4761	19 49 51.0	4.127
16	4 28 9.94	2.6059	20 33 18.2	2.471	16	6 30 51.11	2.4714	19 45 39.7	4.249
17	4 30 46.28	2.6054	20 35 42.0	2.323	17	6 33 19.26	2.4668	19 41 21.1	4.372
18	4 33 22.59	2.6048	20 37 56.9	2.175	18	6 35 47.13	2.4620	19 36 55.1	4.494
19	4 35 58.86	2.6042	20 40 3.0	2.027	19	6 38 14.70	2.4572	19 32 21.8	4.614
20	4 38 35.09	2.6033	20 42 0.1	1.878	20	6 40 41.99	2.4524	19 27 41.4	4.733
21	4 41 11.26	2.6023	20 43 48.4	1.731	21	6 43 8.99	2.4475	19 22 53.8	4.853
22	4 43 47.37	2.6013	20 45 27.8	1.583	22	6 45 35.69	2.4426	19 17 59.1	4.970
23	4 46 23.42	2.6002	+20 46 58.3	+1.434	23	6 48 2.10	2.4377	+19 12 57.4	-5.086
OCTOBER 13.					OCTOBER 15.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	4 48 59.39	2.5989	+20 48 19.9	+1.286	0	6 50 28.21	2.4327	+19 7 48.8	-5.201
1	4 51 35.29	2.5975	20 49 32.6	1.138	1	6 52 54.02	2.4276	19 2 33.3	5.315
2	4 54 11.09	2.5960	20 50 36.5	0.991	2	6 55 19.52	2.4225	18 57 11.0	5.428
3	4 56 46.81	2.5945	20 51 31.5	0.843	3	6 57 44.72	2.4174	18 51 42.0	5.540
4	4 59 22.43	2.5928	20 52 17.6	0.695	4	7 0 9.61	2.4123	18 46 6.2	5.651
5	5 1 57.95	2.5911	20 52 54.9	0.548	5	7 2 34.19	2.4071	18 40 23.9	5.760
6	5 4 33.36	2.5891	20 53 23.4	0.402	6	7 4 58.46	2.4019	18 34 35.0	5.869
7	5 7 8.64	2.5871	20 53 43.1	0.255	7	7 7 22.42	2.3967	18 28 39.6	5.977
8	5 9 43.81	2.5851	20 53 54.0	+0.109	8	7 9 46.06	2.3915	18 22 37.8	6.083
9	5 12 18.85	2.5828	20 53 56.2	-0.037	9	7 12 9.40	2.3863	18 16 29.6	6.188
10	5 14 53.75	2.5805	20 53 49.6	0.183	10	7 14 32.41	2.3809	18 10 15.2	6.293
11	5 17 28.51	2.5782	20 53 34.3	0.328	11	7 16 55.11	2.3757	18 3 54.5	6.396
12	5 20 3.13	2.5757	20 53 10.3	0.472	12	7 19 17.49	2.3703	17 57 27.7	6.498
13	5 22 37.59	2.5730	20 52 37.7	0.616	13	7 21 39.55	2.3650	17 50 54.8	6.598
14	5 25 11.89	2.5703	20 51 56.4	0.760	14	7 24 1.29	2.3598	17 44 15.9	6.698
15	5 27 46.03	2.5676	20 51 6.5	0.903	15	7 26 22.72	2.3544	17 37 31.1	6.796
16	5 30 20.00	2.5648	20 50 8.1	1.045	16	7 28 43.82	2.3490	17 30 40.4	6.894
17	5 32 53.80	2.5618	20 49 1.1	1.188	17	7 31 4.60	2.3437	17 23 43.8	6.990
18	5 35 27.41	2.5586	20 47 45.6	1.329	18	7 33 25.06	2.3383	17 16 41.6	7.084
19	5 38 0.83	2.5555	20 46 21.6	1.469	19	7 35 45.20	2.3330	17 9 33.7	7.178
20	5 40 34.07	2.5523	20 44 49.3	1.609	20	7 38 5.02	2.3276	17 2 20.2	7.272
21	5 43 7.11	2.5489	20 43 8.5	1.749	21	7 40 24.51	2.3223	16 55 1.1	7.363
22	5 45 39.94	2.5455	20 41 19.4	1.888	22	7 42 43.69	2.3170	16 47 36.7	7.453
23	5 48 12.57	2.5421	20 39 21.9	2.027	23	7 45 2.55	2.3116	16 40 6.8	7.543
24	5 50 44.99	2.5385	+20 37 16.2	-2.163	24	7 47 21.08	2.3062	+16 32 31.6	-1.630

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
OCTOBER 16.					OCTOBER 18.				
	<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>		<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>
0	7 47 21.08	2.3062	+16 32 31.6	7.630	0	9 32 17.81	2.0793	+9 6 30.7	-10.536
1	7 49 39.29	2.3009	16 24 51.2	7.717	1	9 34 22.46	2.0757	8 55 57.5	10.571
2	7 51 57.19	2.2956	16 17 5.6	7.803	2	9 36 26.89	2.0719	8 45 22.2	10.605
3	7 54 14.76	2.2903	16 9 14.9	7.887	3	9 38 31.09	2.0683	8 34 44.9	10.638
4	7 56 32.02	2.2849	16 1 19.2	7.969	4	9 40 35.08	2.0648	8 24 5.6	10.670
5	7 58 48.95	2.2796	15 53 18.6	8.052	5	9 42 38.86	2.0612	8 13 24.5	10.700
6	8 1 5.57	2.2744	15 45 13.0	8.133	6	9 44 42.42	2.0576	8 2 41.6	10.731
7	8 3 21.88	2.2692	15 37 2.6	8.213	7	9 46 45.77	2.0542	7 51 56.8	10.760
8	8 5 37.87	2.2638	15 28 47.5	8.292	8	9 48 48.92	2.0508	7 41 10.4	10.788
9	8 7 53.54	2.2586	15 20 27.6	8.370	9	9 50 51.87	2.0474	7 30 22.2	10.816
10	8 10 8.90	2.2533	15 12 3.1	8.446	10	9 52 54.61	2.0441	7 19 32.5	10.841
11	8 12 23.94	2.2482	15 3 34.1	8.521	11	9 54 57.16	2.0409	7 8 41.3	10.867
12	8 14 38.68	2.2431	14 55 0.6	8.595	12	9 56 59.52	2.0378	6 57 48.5	10.892
13	8 16 53.11	2.2379	14 46 22.7	8.668	13	9 59 1.69	2.0346	6 46 54.3	10.915
14	8 19 7.23	2.2328	14 37 40.5	8.739	14	10 1 3.67	2.0314	6 35 58.7	10.938
15	8 21 21.04	2.2277	14 28 54.0	8.810	15	10 3 5.46	2.0283	6 25 1.8	10.959
16	8 23 34.55	2.2226	14 20 3.3	8.880	16	10 5 7.07	2.0254	6 14 3.6	10.981
17	8 25 47.75	2.2176	14 11 8.4	8.948	17	10 7 8.51	2.0225	6 3 4.1	11.001
18	8 28 0.66	2.2126	14 2 9.5	9.016	18	10 9 9.77	2.0195	5 52 3.5	11.019
19	8 30 13.26	2.2075	13 53 6.5	9.082	19	10 11 10.85	2.0167	5 41 1.8	11.038
20	8 32 25.56	2.2026	13 43 59.7	9.147	20	10 13 11.77	2.0140	5 29 59.0	11.055
21	8 34 37.57	2.1977	13 34 48.9	9.212	21	10 15 12.53	2.0113	5 18 55.2	11.071
22	8 36 49.28	2.1928	13 25 34.3	9.274	22	10 17 13.12	2.0085	5 7 50.5	11.087
23	8 39 0.70	2.1879	+13 16 16.0	9.336	23	10 19 13.55	2.0059	+4 56 44.8	-11.102
OCTOBER 17.					OCTOBER 19.				
0	8 41 11.83	2.1831	+13 6 54.0	9.397	0	10 21 13.83	2.0033	+4 45 38.3	-11.115
1	8 43 22.67	2.1783	12 57 28.4	9.456	1	10 23 13.95	2.0008	4 34 31.0	11.128
2	8 45 33.23	2.1736	12 47 59.3	9.514	2	10 25 13.93	1.9983	4 23 22.9	11.141
3	8 47 43.50	2.1688	12 38 26.7	9.572	3	10 27 13.75	1.9958	4 12 14.1	11.152
4	8 49 53.48	2.1641	12 28 50.6	9.628	4	10 29 13.43	1.9936	4 1 4.7	11.162
5	8 52 3.19	2.1595	12 19 11.3	9.683	5	10 31 12.98	1.9913	3 49 54.7	11.172
6	8 54 12.62	2.1549	12 9 28.6	9.738	6	10 33 12.38	1.9889	3 38 44.1	11.181
7	8 56 21.78	2.1503	11 59 42.7	9.791	7	10 35 11.65	1.9868	3 27 33.0	11.188
8	8 58 30.66	2.1458	11 49 53.7	9.843	8	10 37 10.79	1.9846	3 16 21.5	11.195
9	9 0 39.28	2.1413	11 40 1.5	9.894	9	10 39 9.80	1.9825	3 5 9.6	11.202
10	9 2 47.62	2.1368	11 30 6.4	9.944	10	10 41 8.69	1.9804	2 53 57.3	11.208
11	9 4 55.70	2.1325	11 20 8.2	9.993	11	10 43 7.45	1.9784	2 42 44.7	11.212
12	9 7 3.52	2.1282	11 10 7.2	10.041	12	10 45 6.10	1.9765	2 31 31.9	11.215
13	9 9 11.08	2.1238	11 0 3.3	10.088	13	10 47 4.63	1.9746	2 20 18.9	11.218
14	9 11 18.38	2.1195	10 49 56.7	10.133	14	10 49 3.05	1.9728	2 9 5.7	11.221
15	9 13 25.42	2.1153	10 39 47.3	10.178	15	10 51 1.36	1.9709	1 57 52.4	11.222
16	9 15 32.21	2.1112	10 29 35.3	10.222	16	10 52 59.56	1.9692	1 46 39.1	11.223
17	9 17 38.76	2.1070	10 19 20.7	10.264	17	10 54 57.66	1.9675	1 35 25.7	11.223
18	9 19 45.05	2.1029	10 9 3.6	10.307	18	10 56 55.66	1.9658	1 24 12.4	11.221
19	9 21 51.11	2.0989	9 58 43.9	10.348	19	10 58 53.56	1.9643	1 12 59.2	11.219
20	9 23 56.92	2.0948	9 48 21.9	10.387	20	11 0 51.37	1.9628	1 1 46.1	11.217
21	9 26 2.49	2.0909	9 37 57.5	10.426	21	11 2 49.09	1.9613	0 50 33.2	11.213
22	9 28 7.83	2.0871	9 27 30.8	10.464	22	11 4 46.72	1.9598	0 39 20.5	11.209
23	9 30 12.94	2.0832	9 17 1.8	10.501	23	11 6 44.26	1.9583	0 28 8.1	11.204
24	9 32 17.81	2.0793	+9 6 30.7	-10.536	24	11 8 41.72	1.9570	+0 16 56.0	-11.198

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
OCTOBER 20.					OCTOBER 22.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	11 8 41.72	1.9570	+0 16 56.0	-11.198	0	12 41 57.56	1.9452	- 8 19 44.0	-10.053
1	11 10 39.10	1.9558	+0 5 44.3	11.192	1	12 43 54.29	1.9459	8 29 46.0	10.013
2	11 12 36.41	1.9545	-0 5 27.0	11.184	2	12 45 51.07	1.9467	8 39 45.5	9.970
3	11 14 33.64	1.9533	0 16 37.8	11.177	3	12 47 47.89	1.9474	8 49 42.4	9.928
4	11 16 30.80	1.9521	0 27 48.2	11.168	4	12 49 44.76	1.9483	8 59 36.8	9.885
5	11 18 27.89	1.9510	0 38 57.9	11.158	5	12 51 41.68	1.9491	9 9 28.6	9.841
6	11 20 24.92	1.9500	0 50 7.1	11.148	6	12 53 38.65	1.9499	9 19 17.7	9.797
7	11 22 21.89	1.9489	1 1 15.6	11.137	7	12 55 35.67	1.9508	9 29 4.2	9.752
8	11 24 18.79	1.9480	1 12 23.5	11.125	8	12 57 32.75	1.9518	9 38 47.9	9.706
9	11 26 15.65	1.9472	1 23 30.6	11.112	9	12 59 29.88	1.9528	9 48 28.9	9.660
10	11 28 12.45	1.9463	1 34 36.9	11.098	10	13 1 27.08	1.9538	9 58 7.1	9.613
11	11 30 9.20	1.9454	1 45 42.4	11.084	11	13 3 24.33	1.9547	10 7 42.4	9.564
12	11 32 5.90	1.9447	1 56 47.0	11.069	12	13 5 21.64	1.9558	10 17 14.8	9.516
13	11 34 2.56	1.9439	2 7 50.7	11.053	13	13 7 19.02	1.9568	10 26 44.3	9.468
14	11 35 59.17	1.9433	2 18 53.4	11.038	14	13 9 16.46	1.9579	10 36 10.9	9.418
15	11 37 55.75	1.9427	2 29 55.2	11.020	15	13 11 13.97	1.9590	10 45 34.4	9.368
16	11 39 52.29	1.9420	2 40 55.8	11.002	16	13 13 11.54	1.9602	10 54 55.0	9.317
17	11 41 48.79	1.9415	2 51 55.4	10.984	17	13 15 9.19	1.9613	11 4 12.4	9.265
18	11 43 45.27	1.9410	3 2 53.9	10.964	18	13 17 6.90	1.9625	11 13 26.8	9.213
19	11 45 41.71	1.9407	3 13 51.1	10.943	19	13 19 4.69	1.9638	11 22 38.0	9.160
20	11 47 38.13	1.9402	3 24 47.1	10.923	20	13 21 2.55	1.9649	11 31 46.0	9.106
21	11 49 34.53	1.9398	3 35 41.9	10.902	21	13 23 0.48	1.9662	11 40 50.7	9.053
22	11 51 30.91	1.9395	3 46 35.3	10.879	22	13 24 58.49	1.9675	11 49 52.3	8.998
23	11 53 27.27	1.9392	-3 57 27.4	-10.857	23	13 26 56.58	1.9688	-11 58 50.5	-8.942
OCTOBER 21.					OCTOBER 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	11 55 23.61	1.9389	-4 8 18.1	-10.833	0	13 28 54.75	1.9702	-12 7 45.3	-8.886
1	11 57 19.94	1.9388	4 19 7.3	10.808	1	13 30 53.00	1.9715	12 16 36.8	8.830
2	11 59 16.26	1.9386	4 29 55.1	10.783	2	13 32 51.33	1.9728	12 25 24.9	8.773
3	12 1 12.57	1.9385	4 40 41.3	10.757	3	13 34 49.74	1.9742	12 34 9.5	8.715
4	12 3 8.88	1.9384	4 51 25.9	10.731	4	13 36 48.23	1.9756	12 42 50.7	8.657
5	12 5 5.18	1.9384	5 2 9.0	10.703	5	13 38 46.81	1.9770	12 51 28.3	8.598
6	12 7 1.49	1.9384	5 12 50.3	10.675	6	13 40 45.47	1.9784	13 0 2.4	8.538
7	12 8 57.79	1.9384	5 23 30.0	10.648	7	13 42 44.22	1.9799	13 8 32.8	8.477
8	12 10 54.10	1.9386	5 34 8.0	10.618	8	13 44 43.06	1.9814	13 16 59.6	8.417
9	12 12 50.42	1.9388	5 44 44.1	10.588	9	13 46 41.99	1.9828	13 25 22.8	8.356
10	12 14 46.75	1.9389	5 55 18.5	10.557	10	13 48 41.00	1.9843	13 33 42.3	8.293
11	12 16 43.09	1.9391	6 5 50.9	10.525	11	13 50 40.11	1.9859	13 41 58.0	8.230
12	12 18 39.44	1.9393	6 16 21.5	10.493	12	13 52 39.31	1.9874	13 50 9.9	8.167
13	12 20 35.81	1.9396	6 26 50.1	10.460	13	13 54 38.60	1.9889	13 58 18.0	8.103
14	12 22 32.19	1.9399	6 37 16.7	10.427	14	13 56 37.98	1.9904	14 6 22.3	8.039
15	12 24 28.60	1.9403	6 47 41.3	10.393	15	13 58 37.45	1.9920	14 14 22.7	7.974
16	12 26 25.03	1.9408	6 58 3.8	10.357	16	14 0 37.02	1.9936	14 22 19.2	7.908
17	12 28 21.49	1.9412	7 8 24.1	10.322	17	14 2 36.68	1.9952	14 30 11.7	7.842
18	12 30 17.97	1.9416	7 18 42.4	10.286	18	14 4 36.44	1.9968	14 38 0.2	7.776
19	12 32 14.48	1.9422	7 28 58.4	10.248	19	14 6 36.29	1.9983	14 45 44.8	7.709
20	12 34 11.03	1.9427	7 39 12.2	10.210	20	14 8 36.24	2.0000	14 53 25.3	7.641
21	12 36 7.60	1.9433	7 49 23.6	10.172	21	14 10 36.29	2.0017	15 1 1.7	7.572
22	12 38 4.22	1.9439	7 59 32.8	10.133	22	14 12 36.44	2.0033	15 8 33.9	7.503
23	12 40 0.87	1.9445	8 9 39.6	10.093	23	14 14 36.68	2.0048	15 16 2.1	7.434
24	12 41 57.56	1.9452	-8 19 44.0	-10.053	24	14 16 37.02	2.0065	-15 23 26.0	-7.363

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
OCTOBER 24.					OCTOBER 26.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	14 16 37.02	2.0065	-15 23 26.0	-7.363	0	15 54 47.06	2.0803	-19 46 52.6	-3.448
1	14 18 37.46	2.0081	15 30 45.7	7.293	1	15 56 51.92	2.0816	19 50 16.7	3.357
2	14 20 37.99	2.0098	15 38 1.2	7.223	2	15 58 56.85	2.0827	19 53 35.4	3.266
3	14 22 38.63	2.0114	15 45 12.4	7.151	3	16 1 1.84	2.0838	19 56 48.6	3.173
4	14 24 39.36	2.0131	15 52 19.3	7.078	4	16 3 6.91	2.0851	19 59 56.2	3.082
5	14 26 40.20	2.0148	15 59 21.8	7.006	5	16 5 12.05	2.0862	20 2 58.4	2.990
6	14 28 41.13	2.0164	16 6 20.0	6.933	6	16 7 17.25	2.0872	20 5 55.0	2.898
7	14 30 42.17	2.0182	16 13 13.7	6.858	7	16 9 22.51	2.0883	20 8 46.1	2.805
8	14 32 43.31	2.0198	16 20 3.0	6.784	8	16 11 27.84	2.0893	20 11 31.6	2.713
9	14 34 44.54	2.0214	16 26 47.8	6.710	9	16 13 33.23	2.0903	20 14 11.6	2.619
10	14 36 45.88	2.0232	16 33 28.2	6.635	10	16 15 38.68	2.0913	20 16 45.9	2.526
11	14 38 47.32	2.0248	16 40 4.0	6.558	11	16 17 44.19	2.0923	20 19 14.7	2.433
12	14 40 48.85	2.0265	16 46 35.2	6.483	12	16 19 49.75	2.0932	20 21 37.8	2.338
13	14 42 50.49	2.0281	16 53 1.9	6.406	13	16 21 55.37	2.0942	20 23 55.3	2.245
14	14 44 52.22	2.0297	16 59 23.9	6.328	14	16 24 1.05	2.0951	20 26 7.2	2.151
15	14 46 54.05	2.0314	17 5 41.3	6.251	15	16 26 6.78	2.0959	20 28 13.4	2.056
16	14 48 55.99	2.0331	17 11 54.0	6.172	16	16 28 12.56	2.0967	20 30 13.9	1.962
17	14 50 58.02	2.0347	17 18 1.9	6.093	17	16 30 18.38	2.0975	20 32 8.8	1.867
18	14 53 0.15	2.0363	17 24 5.2	6.015	18	16 32 24.26	2.0983	20 33 57.9	1.772
19	14 55 2.38	2.0380	17 30 3.7	5.935	19	16 34 30.18	2.0991	20 35 41.4	1.677
20	14 57 4.71	2.0396	17 35 57.4	5.855	20	16 36 36.15	2.0998	20 37 19.1	1.582
21	14 59 7.13	2.0413	17 41 46.3	5.774	21	16 38 42.16	2.1006	20 38 51.2	1.487
22	15 1 9.66	2.0429	17 47 30.3	5.694	22	16 40 48.22	2.1013	20 40 17.5	1.391
23	15 3 12.28	2.0444	-17 53 9.4	-5.612	23	16 42 54.31	2.1018	-20 41 38.1	-1.295
OCTOBER 25.					OCTOBER 27.				
0	15 5 14.99	2.0460	-17 58 43.7	-5.530	0	16 45 0.44	2.1025	-20 42 52.9	-1.199
1	15 7 17.80	2.0476	18 4 13.0	5.448	1	16 47 6.61	2.1032	20 44 2.0	1.103
2	15 9 20.70	2.0492	18 9 37.4	5.365	2	16 49 12.82	2.1037	20 45 5.3	1.008
3	15 11 23.70	2.0508	18 14 56.8	5.282	3	16 51 19.05	2.1042	20 46 2.9	0.912
4	15 13 26.80	2.0523	18 20 11.2	5.198	4	16 53 25.32	2.1048	20 46 54.7	0.815
5	15 15 29.98	2.0538	18 25 20.5	5.113	5	16 55 31.62	2.1053	20 47 40.7	0.718
6	15 17 33.26	2.0554	18 30 24.8	5.030	6	16 57 37.95	2.1058	20 48 20.9	0.623
7	15 19 36.63	2.0569	18 35 24.1	4.945	7	16 59 44.31	2.1062	20 48 55.4	0.526
8	15 21 40.09	2.0584	18 40 18.2	4.859	8	17 1 50.69	2.1065	20 49 24.0	0.429
9	15 23 43.64	2.0599	18 45 7.2	4.774	9	17 3 57.09	2.1068	20 49 46.9	0.333
10	15 25 47.28	2.0614	18 49 51.1	4.688	10	17 6 3.51	2.1073	20 50 4.0	0.236
11	15 27 51.01	2.0629	18 54 29.8	4.602	11	17 8 9.96	2.1076	20 50 15.2	0.139
12	15 29 54.83	2.0643	18 59 3.3	4.515	12	17 10 16.42	2.1078	20 50 20.7	-0.043
13	15 31 58.73	2.0658	19 3 31.6	4.428	13	17 12 22.90	2.1082	20 50 20.4	+0.054
14	15 34 2.72	2.0672	19 7 54.6	4.340	14	17 14 29.40	2.1084	20 50 14.2	0.152
15	15 36 6.79	2.0685	19 12 12.4	4.253	15	17 16 35.91	2.1086	20 50 2.2	0.248
16	15 38 10.94	2.0699	19 16 24.9	4.165	16	17 18 42.43	2.1088	20 49 44.4	0.345
17	15 40 15.18	2.0713	19 20 32.2	4.077	17	17 20 48.96	2.1089	20 49 20.8	0.442
18	15 42 19.50	2.0727	19 24 34.1	3.987	18	17 22 55.50	2.1091	20 48 51.4	0.538
19	15 44 23.90	2.0740	19 28 30.6	3.898	19	17 25 2.05	2.1092	20 48 16.2	0.636
20	15 46 28.38	2.0753	19 32 21.8	3.808	20	17 27 8.60	2.1093	20 47 35.1	0.733
21	15 48 32.93	2.0766	19 36 7.6	3.718	21	17 29 15.16	2.1093	20 46 48.3	0.829
22	15 50 37.57	2.0779	19 39 48.0	3.628	22	17 31 21.72	2.1093	20 45 55.6	0.927
23	15 52 42.28	2.0791	19 43 23.0	3.538	23	17 33 28.28	2.1093	20 44 57.1	1.023
24	15 54 47.06	2.0803	-19 46 52.6	-3.448	24	17 35 34.84	2.1093	-20 43 52.8	+1.120

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
OCTOBER 28.					OCTOBER 30.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	17 35 34.84	2.1093	-20 43 52.8	+1.120	0	19 16 25.15	2.0868	-18 0 47.6	+5.604
1	17 37 41.40	2.1093	20 42 42.7	1.217	1	19 18 30.34	2.0861	17 55 8.7	5.692
2	17 39 47.96	2.1093	20 41 26.8	1.313	2	19 20 35.48	2.0854	17 49 24.6	5.779
3	17 41 54.51	2.1091	20 40 5.1	1.410	3	19 22 40.59	2.0848	17 43 35.2	5.866
4	17 44 1.05	2.1090	20 38 37.6	1.507	4	19 24 45.65	2.0840	17 37 40.7	5.953
5	17 46 7.59	2.1089	20 37 4.3	1.603	5	19 26 50.67	2.0833	17 31 40.9	6.040
6	17 48 14.12	2.1087	20 35 25.2	1.700	6	19 28 55.65	2.0827	17 25 35.9	6.126
7	17 50 20.63	2.1085	20 33 40.3	1.796	7	19 31 0.59	2.0820	17 19 25.8	6.211
8	17 52 27.14	2.1083	20 31 49.7	1.893	8	19 33 5.49	2.0813	17 13 10.6	6.297
9	17 54 33.63	2.1081	20 29 53.2	1.989	9	19 35 10.34	2.0806	17 6 50.2	6.383
10	17 56 40.11	2.1078	20 27 51.0	2.084	10	19 37 15.16	2.0799	17 0 24.7	6.467
11	17 58 46.57	2.1075	20 25 43.1	2.180	11	19 39 19.93	2.0793	16 53 54.2	6.551
12	18 0 53.01	2.1073	20 23 29.4	2.276	12	19 41 24.67	2.0787	16 47 18.6	6.635
13	18 2 59.44	2.1069	20 21 10.0	2.372	13	19 43 29.37	2.0780	16 40 38.0	6.719
14	18 5 5.84	2.1065	20 18 44.8	2.468	14	19 45 34.03	2.0773	16 33 52.3	6.803
15	18 7 12.22	2.1063	20 16 13.8	2.563	15	19 47 38.65	2.0768	16 27 1.7	6.885
16	18 9 18.59	2.1058	20 13 37.2	2.658	16	19 49 43.24	2.0762	16 20 6.1	6.968
17	18 11 24.92	2.1054	20 10 54.8	2.754	17	19 51 47.79	2.0756	16 13 5.5	7.051
18	18 13 31.24	2.1051	20 8 6.7	2.848	18	19 53 52.31	2.0750	16 6 0.0	7.132
19	18 15 37.53	2.1046	20 5 13.0	2.943	19	19 55 56.79	2.0744	15 58 49.7	7.213
20	18 17 43.79	2.1042	20 2 13.5	3.038	20	19 58 1.24	2.0738	15 51 34.4	7.295
21	18 19 50.03	2.1037	19 59 8.4	3.133	21	20 0 5.65	2.0733	15 44 14.3	7.375
22	18 21 56.23	2.1032	19 55 57.6	3.228	22	20 2 10.03	2.0728	15 36 49.4	7.456
23	18 24 2.41	2.1028	-19 52 41.1	+3.322	23	20 4 14.38	2.0723	-15 29 19.6	+7.536
OCTOBER 29.					OCTOBER 31.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 26 8.56	2.1023	-19 49 19.0	+3.416	0	20 6 18.70	2.0718	-15 21 45.1	+7.615
1	18 28 14.68	2.1017	19 45 51.2	3.509	1	20 8 22.99	2.0713	15 14 5.8	7.694
2	18 30 20.76	2.1011	19 42 17.9	3.603	2	20 10 27.26	2.0708	15 6 21.8	7.773
3	18 32 26.81	2.1006	19 38 38.9	3.697	3	20 12 31.49	2.0703	14 58 33.1	7.851
4	18 34 32.83	2.1000	19 34 54.3	3.790	4	20 14 35.70	2.0700	14 50 39.7	7.929
5	18 36 38.81	2.0994	19 31 4.1	3.883	5	20 16 39.89	2.0696	14 42 41.6	8.007
6	18 38 44.76	2.0988	19 27 8.3	3.976	6	20 18 44.05	2.0692	14 34 38.9	8.083
7	18 40 50.67	2.0983	19 23 7.0	4.068	7	20 20 48.19	2.0688	14 26 31.6	8.159
8	18 42 56.55	2.0976	19 19 0.1	4.161	8	20 22 52.31	2.0685	14 18 19.8	8.236
9	18 45 2.38	2.0969	19 14 47.7	4.253	9	20 24 56.41	2.0682	14 10 3.3	8.312
10	18 47 8.18	2.0963	19 10 29.8	4.345	10	20 27 0.49	2.0678	14 1 42.4	8.386
11	18 49 13.94	2.0957	19 6 6.3	4.437	11	20 29 4.55	2.0676	13 53 17.0	8.461
12	18 51 19.66	2.0950	19 1 37.4	4.528	12	20 31 8.60	2.0673	13 44 47.1	8.535
13	18 53 25.34	2.0944	18 57 3.0	4.619	13	20 33 12.63	2.0672	13 36 12.8	8.609
14	18 55 30.99	2.0938	18 52 23.1	4.710	14	20 35 16.66	2.0670	13 27 34.0	8.683
15	18 57 36.59	2.0930	18 47 37.8	4.800	15	20 37 20.67	2.0668	13 18 50.9	8.755
16	18 59 42.15	2.0923	18 42 47.1	4.891	16	20 39 24.67	2.0667	13 10 3.4	8.828
17	19 1 47.67	2.0917	18 37 50.9	4.982	17	20 41 28.67	2.0666	13 1 11.5	8.900
18	19 3 53.15	2.0910	18 32 49.3	5.071	18	20 43 32.66	2.0665	12 52 15.4	8.970
19	19 5 58.59	2.0903	18 27 42.4	5.160	19	20 45 36.65	2.0664	12 43 15.1	9.041
20	19 8 3.99	2.0896	18 22 30.1	5.246	20	20 47 40.63	2.0663	12 34 10.5	9.112
21	19 10 9.34	2.0888	18 17 12.5	5.338	21	20 49 44.61	2.0664	12 25 1.7	9.182
22	19 12 14.65	2.0882	18 11 49.5	5.428	22	20 51 48.60	2.0665	12 15 48.7	9.251
23	19 14 19.92	2.0875	18 6 21.2	5.516	23	20 53 52.59	2.0665	12 6 31.6	9.320
24	19 16 25.15	2.0868	-18 0 47.6	+5.604	24	20 55 56.58	2.0666	-11 57 10.3	+9.388

GREENWICH MEAN TIME.

Hour.	Right Ascension.			Var. per Min.	Declination.			Var. per Min.	Hour.	Right Ascension.			Var. per Min.	Declination.			Var. per Min.
NOVEMBER 1.									NOVEMBER 3.								
	h	m	s	s	°	'	"	"		h	m	s	s	°	'	"	"
0	20	55	56.58	2.0666	-11	57	10.3	+ 9.388	0	22	36	0.01	2.1198	-3	19	21.5	+11.921
1	20	58	0.58	2.0668	11	47	45.0	9.456	1	22	38	7.26	2.1220	3	7	25.2	11.955
2	21	0	4.59	2.0669	11	38	15.6	9.523	2	22	40	14.65	2.1244	2	55	26.9	11.988
3	21	2	8.61	2.0671	11	28	42.3	9.589	3	22	42	22.19	2.1268	2	43	26.6	12.020
4	21	4	12.64	2.0673	11	19	4.9	9.656	4	22	44	29.86	2.1292	2	31	24.5	12.052
5	21	6	16.68	2.0676	11	9	23.6	9.721	5	22	46	37.69	2.1318	2	19	20.4	12.083
6	21	8	20.75	2.0679	10	59	38.4	9.786	6	22	48	45.67	2.1343	2	7	14.6	12.111
7	21	10	24.83	2.0683	10	49	49.3	9.851	7	22	50	53.80	2.1369	1	55	7.1	12.139
8	21	12	28.94	2.0687	10	39	56.3	9.914	8	22	53	2.10	2.1396	1	42	57.9	12.167
9	21	14	33.07	2.0691	10	29	59.6	9.978	9	22	55	10.55	2.1423	1	30	47.1	12.193
10	21	16	37.23	2.0695	10	19	59.0	10.041	10	22	57	19.17	2.1451	1	18	34.7	12.218
11	21	18	41.41	2.0700	10	9	54.7	10.103	11	22	59	27.96	2.1479	1	6	20.9	12.243
12	21	20	45.63	2.0706	9	59	46.7	10.164	12	23	1	36.92	2.1508	0	54	5.6	12.266
13	21	22	49.88	2.0712	9	49	35.0	10.225	13	23	3	46.06	2.1538	0	41	49.0	12.288
14	21	24	54.17	2.0718	9	39	19.7	10.285	14	23	5	55.37	2.1567	0	29	31.1	12.309
15	21	26	58.49	2.0723	9	29	0.8	10.345	15	23	8	4.86	2.1598	0	17	11.9	12.329
16	21	29	2.85	2.0731	9	18	38.3	10.404	16	23	10	14.54	2.1629	-0	4	51.6	12.348
17	21	31	7.26	2.0738	9	8	12.3	10.463	17	23	12	24.41	2.1661	+0	7	29.8	12.365
18	21	33	11.71	2.0746	8	57	42.8	10.521	18	23	14	34.47	2.1693	0	19	52.2	12.383
19	21	35	16.21	2.0755	8	47	9.8	10.578	19	23	16	44.72	2.1726	0	32	15.7	12.398
20	21	37	20.77	2.0763	8	36	33.4	10.635	20	23	18	55.18	2.1759	0	44	40.0	12.412
21	21	39	25.37	2.0772	8	25	53.6	10.691	21	23	21	5.83	2.1793	0	57	5.1	12.425
22	21	41	30.03	2.0782	8	15	10.5	10.746	22	23	23	16.69	2.1827	1	9	31.0	12.438
23	21	43	34.75	2.0792	- 8	4	24.1	+10.800	23	23	25	27.75	2.1862	+1	21	57.7	+12.449
NOVEMBER 2.									NOVEMBER 4.								
0	21	45	39.53	2.0802	- 7	53	34.5	+10.854	0	23	27	39.03	2.1898	+1	34	24.9	+12.458
1	21	47	44.37	2.0813	7	42	41.6	10.908	1	23	29	50.52	2.1933	1	46	52.7	12.467
2	21	49	49.28	2.0824	7	31	45.6	10.959	2	23	32	2.23	2.1970	1	59	20.9	12.474
3	21	51	54.26	2.0836	7	20	46.5	11.012	3	23	34	14.16	2.2007	2	11	49.6	12.480
4	21	53	59.31	2.0848	7	9	44.2	11.063	4	23	36	26.31	2.2044	2	24	18.5	12.485
5	21	56	4.44	2.0861	6	58	38.9	11.113	5	23	38	38.69	2.2083	2	36	47.8	12.489
6	21	58	9.64	2.0874	6	47	30.6	11.163	6	23	40	51.30	2.2122	2	49	17.2	12.491
7	22	0	14.93	2.0888	6	36	19.4	11.212	7	23	43	4.15	2.2161	3	1	46.7	12.492
8	22	2	20.30	2.0902	6	25	5.2	11.260	8	23	45	17.23	2.2200	3	14	16.2	12.492
9	22	4	25.75	2.0917	6	13	48.2	11.307	9	23	47	30.55	2.2240	3	26	45.7	12.490
10	22	6	31.30	2.0933	6	2	28.4	11.353	10	23	49	44.11	2.2281	3	39	15.0	12.487
11	22	8	36.94	2.0948	5	51	5.8	11.399	11	23	51	57.92	2.2323	3	51	44.1	12.483
12	22	10	42.67	2.0963	5	39	40.5	11.444	12	23	54	11.98	2.2364	4	4	13.0	12.478
13	22	12	48.50	2.0980	5	28	12.5	11.488	13	23	56	26.29	2.2407	4	16	41.5	12.471
14	22	14	54.43	2.0998	5	16	41.9	11.533	14	23	58	40.86	2.2449	4	29	9.5	12.463
15	22	17	0.47	2.1015	5	5	8.6	11.575	15	0	0	55.68	2.2492	4	41	36.9	12.453
16	22	19	6.61	2.1033	4	53	32.9	11.617	16	0	3	10.76	2.2536	4	54	3.8	12.443
17	22	21	12.87	2.1053	4	41	54.6	11.658	17	0	5	26.11	2.2580	5	6	29.9	12.429
18	22	23	19.24	2.1071	4	30	14.0	11.698	18	0	7	41.72	2.2625	5	18	55.3	12.415
19	22	25	25.72	2.1091	4	18	30.9	11.738	19	0	9	57.61	2.2670	5	31	19.7	12.399
20	22	27	32.33	2.1112	4	6	45.5	11.776	20	0	12	13.76	2.2715	5	43	43.2	12.383
21	22	29	39.06	2.1132	3	54	57.8	11.814	21	0	14	30.19	2.2762	5	56	5.6	12.364
22	22	31	45.91	2.1153	3	43	7.8	11.851	22	0	16	46.90	2.2808	6	8	26.9	12.344
23	22	33	52.89	2.1175	3	31	15.7	11.886	23	0	19	3.88	2.2854	6	20	46.9	12.323
24	22	36	0.01	2.1198	- 3	19	21.5	+11.921	24	0	21	21.15	2.2902	+6	33	5.6	+12.300

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
NOVEMBER 5.					NOVEMBER 7.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	0 21 21.15	2.2902	+ 6 33 5.6	+12.300	0	2 17 15.09	2.5420	+15 26 19.6	+9.268
1	0 23 38.70	2.2949	6 45 22.9	12.276	1	2 19 47.76	2.5471	15 35 32.6	9.163
2	0 25 56.54	2.2998	6 57 38.7	12.249	2	2 22 20.74	2.5521	15 44 39.2	9.057
3	0 28 14.67	2.3046	7 9 52.8	12.222	3	2 24 54.01	2.5570	15 53 39.4	8.948
4	0 30 33.09	2.3095	7 22 5.3	12.193	4	2 27 27.58	2.5619	16 2 33.0	8.838
5	0 32 51.81	2.3144	7 34 16.0	12.163	5	2 30 1.44	2.5668	16 11 20.0	8.728
6	0 35 10.82	2.3194	7 46 24.8	12.131	6	2 32 35.60	2.5716	16 20 0.3	8.615
7	0 37 30.14	2.3244	7 58 31.7	12.098	7	2 35 10.03	2.5763	16 28 33.8	8.501
8	0 39 49.75	2.3294	8 10 36.5	12.062	8	2 37 44.75	2.5810	16 37 0.4	8.385
9	0 42 9.67	2.3345	8 22 39.1	12.024	9	2 40 19.75	2.5857	16 45 20.0	8.268
10	0 44 29.89	2.3396	8 34 39.4	11.986	10	2 42 55.03	2.5902	16 53 32.5	8.148
11	0 46 50.42	2.3448	8 46 37.4	11.946	11	2 45 30.57	2.5946	17 1 37.8	8.028
12	0 49 11.26	2.3499	8 58 32.9	11.904	12	2 48 6.38	2.5991	17 9 35.8	7.906
13	0 51 32.41	2.3551	9 10 25.9	11.861	13	2 50 42.46	2.6034	17 17 26.5	7.783
14	0 53 53.87	2.3603	9 22 16.2	11.815	14	2 53 18.79	2.6077	17 25 9.7	7.658
15	0 56 15.65	2.3656	9 34 3.7	11.768	15	2 55 55.38	2.6118	17 32 45.4	7.532
16	0 58 37.74	2.3708	9 45 48.4	11.720	16	2 58 32.21	2.6159	17 40 13.5	7.404
17	1 1 0.15	2.3762	9 57 30.1	11.670	17	3 1 9.29	2.6200	17 47 33.9	7.275
18	1 3 22.88	2.3814	10 9 8.8	11.619	18	3 3 46.61	2.6239	17 54 46.5	7.145
19	1 5 45.92	2.3868	10 20 44.4	11.566	19	3 6 24.16	2.6278	18 1 51.3	7.013
20	1 8 9.29	2.3922	10 32 16.7	11.510	20	3 9 1.94	2.6315	18 8 48.1	6.880
21	1 10 32.98	2.3975	10 43 45.6	11.453	21	3 11 39.94	2.6352	18 15 36.9	6.746
22	1 12 56.99	2.4028	10 55 11.1	11.395	22	3 14 18.16	2.6388	18 22 17.6	6.611
23	1 15 21.32	2.4083	+11 6 33.0	+11.334	23	3 16 56.59	2.6423	+18 28 50.2	+6.474
NOVEMBER 6.					NOVEMBER 8.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	1 17 45.98	2.4137	+11 17 51.2	+11.273	0	3 19 35.23	2.6457	+18 35 14.5	+6.336
1	1 20 10.96	2.4191	11 29 5.7	11.209	1	3 22 14.07	2.6489	18 41 30.5	6.198
2	1 22 36.27	2.4246	11 40 16.3	11.143	2	3 24 53.10	2.6520	18 47 38.2	6.058
3	1 25 1.91	2.4300	11 51 22.9	11.076	3	3 27 32.31	2.6551	18 53 37.4	5.916
4	1 27 27.87	2.4354	12 2 25.4	11.008	4	3 30 11.71	2.6581	18 59 28.1	5.773
5	1 29 54.16	2.4409	12 13 23.8	10.938	5	3 32 51.28	2.6609	19 5 10.2	5.630
6	1 32 20.78	2.4463	12 24 17.9	10.864	6	3 35 31.02	2.6637	19 10 43.7	5.487
7	1 34 47.72	2.4518	12 35 7.5	10.790	7	3 38 10.92	2.6663	19 16 8.6	5.341
8	1 37 14.99	2.4572	12 45 52.7	10.715	8	3 40 50.97	2.6688	19 21 24.6	5.194
9	1 39 42.58	2.4626	12 56 33.3	10.638	9	3 43 31.17	2.6711	19 26 31.9	5.048
10	1 42 10.50	2.4681	13 7 9.2	10.558	10	3 46 11.50	2.6733	19 31 30.4	4.900
11	1 44 38.75	2.4735	13 17 40.2	10.477	11	3 48 51.97	2.6756	19 36 19.9	4.751
12	1 47 7.32	2.4789	13 28 6.4	10.395	12	3 51 32.57	2.6776	19 41 0.5	4.602
13	1 49 36.22	2.4843	13 38 27.6	10.310	13	3 54 13.28	2.6794	19 45 32.1	4.452
14	1 52 5.43	2.4896	13 48 43.6	10.223	14	3 56 54.10	2.6813	19 49 54.7	4.301
15	1 54 34.97	2.4950	13 58 54.4	10.135	15	3 59 35.03	2.6828	19 54 8.2	4.148
16	1 57 4.83	2.5004	14 8 59.8	10.046	16	4 2 16.04	2.6843	19 58 12.5	3.996
17	1 59 35.02	2.5058	14 18 59.9	9.955	17	4 4 57.15	2.6858	20 2 7.7	3.843
18	2 2 5.52	2.5109	14 28 54.4	9.862	18	4 7 38.33	2.6870	20 5 53.7	3.690
19	2 4 36.33	2.5162	14 38 43.3	9.767	19	4 10 19.59	2.6881	20 9 30.5	3.536
20	2 7 7.46	2.5214	14 48 26.4	9.670	20	4 13 0.90	2.6891	20 12 58.0	3.381
21	2 9 38.90	2.5267	14 58 3.7	9.573	21	4 15 42.28	2.6900	20 16 16.2	3.226
22	2 12 10.66	2.5318	15 7 35.1	9.473	22	4 18 23.70	2.6907	20 19 25.1	3.070
23	2 14 42.72	2.5369	15 17 0.4	9.371	23	4 21 5.16	2.6913	20 22 24.6	2.911
24	2 17 15.09	2.5420	+15 26 19.6	+9.268	24	4 23 46.65	2.6917	+20 25 14.8	+2.750

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
NOVEMBER 9.					NOVEMBER 11.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	4 23 46.65	2.6917	+20 25 14.8	+2.758	0	6 30 56.17	2.5603	+19 40 3.0	-4.430
1	4 26 28.16	2.6920	20 27 55.6	2.602	1	6 33 29.63	2.5549	19 35 33.3	4.560
2	4 29 9.69	2.6923	20 30 27.0	2.445	2	6 36 2.76	2.5494	19 30 55.8	4.690
3	4 31 51.23	2.6922	20 32 49.0	2.288	3	6 38 35.56	2.5440	19 26 10.5	4.818
4	4 34 32.75	2.6919	20 35 1.6	2.131	4	6 41 8.04	2.5386	19 21 17.7	4.943
5	4 37 14.26	2.6918	20 37 4.7	1.973	5	6 43 40.19	2.5329	19 16 17.3	5.069
6	4 39 55.76	2.6914	20 38 58.3	1.816	6	6 46 11.99	2.5273	19 11 9.4	5.194
7	4 42 37.23	2.6908	20 40 42.6	1.658	7	6 48 43.46	2.5216	19 5 54.0	5.317
8	4 45 18.66	2.6901	20 42 17.3	1.501	8	6 51 14.58	2.5158	19 0 31.4	5.438
9	4 48 0.04	2.6893	20 43 42.7	1.343	9	6 53 45.35	2.5100	18 55 1.5	5.558
10	4 50 41.38	2.6884	20 44 58.5	1.185	10	6 56 15.78	2.5042	18 49 24.4	5.678
11	4 53 22.65	2.6873	20 46 4.9	1.028	11	6 58 45.85	2.4982	18 43 40.1	5.796
12	4 56 3.86	2.6862	20 47 1.9	0.871	12	7 1 15.56	2.4923	18 37 48.9	5.912
13	4 58 44.99	2.6848	20 47 49.4	0.713	13	7 3 44.92	2.4863	18 31 50.7	6.027
14	5 1 26.03	2.6833	20 48 27.5	0.556	14	7 6 13.91	2.4802	18 25 45.7	6.140
15	5 4 6.98	2.6816	20 48 56.1	0.399	15	7 8 42.54	2.4741	18 19 33.9	6.253
16	5 6 47.82	2.6798	20 49 15.4	0.243	16	7 11 10.80	2.4680	18 13 15.3	6.364
17	5 9 28.56	2.6779	20 49 25.2	+0.086	17	7 13 38.70	2.4619	18 6 50.2	6.473
18	5 12 9.17	2.6758	20 49 25.7	-0.069	18	7 16 6.23	2.4558	18 0 18.5	6.583
19	5 14 49.66	2.6738	20 49 16.9	0.224	19	7 18 33.39	2.4495	17 53 40.3	6.689
20	5 17 30.02	2.6714	20 48 58.8	0.380	20	7 21 0.17	2.4433	17 46 55.8	6.795
21	5 20 10.23	2.6690	20 48 31.3	0.535	21	7 23 26.58	2.4371	17 40 4.9	6.899
22	5 22 50.30	2.6665	20 47 54.6	0.688	22	7 25 52.62	2.4308	17 33 7.9	7.002
23	5 25 30.21	2.6638	+20 47 8.7	-0.843	23	7 28 18.28	2.4245	+17 26 4.7	-7.104
NOVEMBER 10.					NOVEMBER 12.				
0	5 28 9.95	2.6609	+20 46 13.5	-0.996	0	7 30 43.56	2.4183	+17 18 55.4	-7.204
1	5 30 49.52	2.6579	20 45 9.2	1.148	1	7 33 8.47	2.4119	17 11 40.2	7.303
2	5 33 28.90	2.6548	20 43 55.7	1.300	2	7 35 32.99	2.4056	17 4 19.1	7.400
3	5 36 8.10	2.6517	20 42 33.2	1.452	3	7 37 57.14	2.3993	16 56 52.2	7.496
4	5 38 47.10	2.6484	20 41 1.5	1.603	4	7 40 20.91	2.3930	16 49 19.6	7.590
5	5 41 25.91	2.6450	20 39 20.9	1.752	5	7 42 44.30	2.3868	16 41 41.4	7.683
6	5 44 4.50	2.6414	20 37 31.3	1.901	6	7 45 7.32	2.3804	16 33 57.6	7.776
7	5 46 42.88	2.6378	20 35 32.8	2.050	7	7 47 29.95	2.3740	16 26 8.3	7.867
8	5 49 21.03	2.6340	20 33 25.3	2.198	8	7 49 52.20	2.3677	16 18 13.6	7.955
9	5 51 58.96	2.6302	20 31 9.1	2.344	9	7 52 14.07	2.3613	16 10 13.7	8.043
10	5 54 36.65	2.6262	20 28 44.0	2.490	10	7 54 35.56	2.3550	16 2 8.5	8.130
11	5 57 14.10	2.6221	20 26 10.3	2.635	11	7 56 56.67	2.3488	15 53 58.1	8.215
12	5 59 51.30	2.6178	20 23 27.8	2.780	12	7 59 17.41	2.3425	15 45 42.7	8.298
13	6 2 28.24	2.6135	20 20 36.7	2.923	13	8 1 37.77	2.3362	15 37 22.4	8.380
14	6 5 4.92	2.6092	20 17 37.1	3.065	14	8 3 57.75	2.3299	15 28 57.1	8.461
15	6 7 41.34	2.6047	20 14 28.9	3.207	15	8 6 17.36	2.3237	15 20 27.1	8.540
16	6 10 17.48	2.6000	20 11 12.3	3.346	16	8 8 36.59	2.3174	15 11 52.3	8.619
17	6 12 53.34	2.5954	20 7 47.4	3.486	17	8 10 55.45	2.3112	15 3 12.8	8.696
18	6 15 28.93	2.5907	20 4 14.0	3.624	18	8 13 13.93	2.3050	14 54 28.8	8.771
19	6 18 4.22	2.5858	20 0 32.5	3.761	19	8 15 32.05	2.2989	14 45 40.3	8.845
20	6 20 39.22	2.5808	19 56 42.7	3.898	20	8 17 49.80	2.2927	14 36 47.4	8.918
21	6 23 13.92	2.5758	19 52 44.8	4.033	21	8 20 7.17	2.2866	14 27 50.1	8.990
22	6 25 48.31	2.5707	19 48 38.8	4.166	22	8 22 24.19	2.2806	14 18 48.6	9.060
23	6 28 22.40	2.5655	19 44 24.9	4.298	23	8 24 40.84	2.2744	14 9 42.9	9.129
24	6 30 56.17	2.5603	+19 40 3.0	-4.430	24	8 26 57.12	2.2683	+14 0 33.1	-9.197

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
NOVEMBER 13.					NOVEMBER 15.				
	h m s	s"	° ' "	"		h m s	s"	° ' "	"
0	8 26 57.12	2.2683	+14 0 33.1	-9.197	0	10 9 42.35	2.0333	+5 43 55.7	-11.078
1	8 29 13.04	2.2623	13 51 19.3	9.263	1	10 11 44.24	2.0298	5 32 50.6	11.092
2	8 31 28.60	2.2564	13 42 1.6	9.328	2	10 13 45.92	2.0263	5 21 44.7	11.105
3	8 33 43.81	2.2506	13 32 39.9	9.392	3	10 15 47.39	2.0228	5 10 38.0	11.118
4	8 35 58.66	2.2446	13 23 14.6	9.454	4	10 17 48.66	2.0195	4 59 30.5	11.130
5	8 38 13.16	2.2387	13 13 45.4	9.516	5	10 19 49.73	2.0162	4 48 22.4	11.140
6	8 40 27.30	2.2328	13 4 12.7	9.575	6	10 21 50.60	2.0130	4 37 13.7	11.150
7	8 42 41.10	2.2271	12 54 36.4	9.634	7	10 23 51.29	2.0099	4 26 4.4	11.159
8	8 44 54.55	2.2213	12 44 56.6	9.692	8	10 25 51.79	2.0068	4 14 54.6	11.168
9	8 47 7.66	2.2157	12 35 13.4	9.748	9	10 27 52.10	2.0038	4 3 44.3	11.175
10	8 49 20.43	2.2100	12 25 26.8	9.803	10	10 29 52.24	2.0008	3 52 33.6	11.182
11	8 51 32.86	2.2043	12 15 37.0	9.857	11	10 31 52.20	1.9978	3 41 22.5	11.188
12	8 53 44.95	2.1988	12 5 44.0	9.909	12	10 33 51.98	1.9950	3 30 11.1	11.193
13	8 55 56.71	2.1933	11 55 47.9	9.961	13	10 35 51.60	1.9923	3 18 59.4	11.197
14	8 58 8.14	2.1878	11 45 48.7	10.011	14	10 37 51.05	1.9895	3 7 47.5	11.200
15	9 0 19.24	2.1823	11 35 46.6	10.060	15	10 39 50.34	1.9869	2 56 35.4	11.203
16	9 2 30.02	2.1769	11 25 41.5	10.108	16	10 41 49.48	1.9843	2 45 23.2	11.204
17	9 4 40.47	2.1716	11 15 33.6	10.155	17	10 43 48.46	1.9817	2 34 10.9	11.205
18	9 6 50.61	2.1663	11 5 22.9	10.200	18	10 45 47.28	1.9793	2 22 58.6	11.206
19	9 9 0.43	2.1611	10 55 9.6	10.245	19	10 47 45.97	1.9768	2 11 46.2	11.205
20	9 11 9.94	2.1558	10 44 53.5	10.288	20	10 49 44.50	1.9744	2 0 34.0	11.203
21	9 13 19.13	2.1507	10 34 35.0	10.330	21	10 51 42.90	1.9722	1 49 21.8	11.202
22	9 15 28.02	2.1457	10 24 13.9	10.373	22	10 53 41.16	1.9699	1 38 9.8	11.198
23	9 17 36.61	2.1406	+10 13 50.3	-10.413	23	10 55 39.29	1.9678	+1 26 58.0	-11.195
NOVEMBER 14.					NOVEMBER 16.				
	h m s	s"	° ' "	"		h m s	s"	° ' "	"
0	9 19 44.89	2.1356	+10 3 24.4	-10.451	0	10 57 37.29	1.9657	+1 15 46.4	-11.191
1	9 21 52.88	2.1307	9 52 56.2	10.488	1	10 59 35.17	1.9636	1 4 35.1	11.185
2	9 24 0.57	2.1258	9 42 25.8	10.525	2	11 1 32.92	1.9615	0 53 24.2	11.179
3	9 26 7.97	2.1210	9 31 53.2	10.561	3	11 3 30.55	1.9596	0 42 13.6	11.173
4	9 28 15.09	2.1163	9 21 18.5	10.596	4	11 5 28.07	1.9578	0 31 3.5	11.166
5	9 30 21.92	2.1115	9 10 41.7	10.629	5	11 7 25.48	1.9559	0 19 53.7	11.158
6	9 32 28.47	2.1068	9 0 3.0	10.662	6	11 9 22.78	1.9542	+0 8 44.5	11.148
7	9 34 34.74	2.1023	8 49 22.3	10.693	7	11 11 19.98	1.9524	-0 2 24.1	11.139
8	9 36 40.74	2.0978	8 38 39.8	10.723	8	11 13 17.07	1.9508	0 13 32.2	11.129
9	9 38 46.47	2.0933	8 27 55.5	10.753	9	11 15 14.07	1.9492	0 24 39.6	11.118
10	9 40 51.93	2.0888	8 17 9.5	10.781	10	11 17 10.97	1.9476	0 35 46.4	11.108
11	9 42 57.13	2.0845	8 6 21.8	10.809	11	11 19 7.78	1.9462	0 46 52.5	11.095
12	9 45 2.07	2.0802	7 55 32.4	10.836	12	11 21 4.51	1.9448	0 57 57.8	11.082
13	9 47 6.75	2.0759	7 44 41.5	10.860	13	11 23 1.15	1.9433	1 9 2.3	11.068
14	9 49 11.18	2.0718	7 33 49.2	10.885	14	11 24 57.71	1.9421	1 20 5.9	11.053
15	9 51 15.36	2.0676	7 22 55.3	10.908	15	11 26 54.20	1.9408	1 31 8.7	11.038
16	9 53 19.29	2.0635	7 12 0.2	10.931	16	11 28 50.61	1.9396	1 42 10.5	11.023
17	9 55 22.98	2.0595	7 1 3.6	10.953	17	11 30 46.95	1.9384	1 53 11.4	11.007
18	9 57 26.43	2.0556	6 50 5.9	10.973	18	11 32 43.22	1.9373	2 4 11.3	10.989
19	9 59 29.65	2.0518	6 39 6.9	10.993	19	11 34 39.43	1.9363	2 15 10.1	10.971
20	10 1 32.64	2.0479	6 28 6.7	11.012	20	11 36 35.58	1.9354	2 26 7.8	10.953
21	10 3 35.40	2.0441	6 17 5.5	11.029	21	11 38 31.68	1.9345	2 37 4.5	10.934
22	10 5 37.93	2.0404	6 6 3.2	11.047	22	11 40 27.72	1.9335	2 47 59.9	10.913
23	10 7 40.25	2.0368	5 54 59.9	11.063	23	11 42 23.70	1.9327	2 58 54.1	10.893
24	10 9 42.35	2.0333	+5 43 55.7	-11.078	24	11 44 19.64	1.9319	-3 9 47.1	-10.873

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
NOVEMBER 17.					NOVEMBER 19.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	11 44 19.64	1.9319	- 3 9 47.1	-10.873	0	13 17 4.90	1.9490	-11 15 13.8	-9.116
1	11 46 15.53	1.9313	3 20 38.8	10.851	1	13 19 1.88	1.9503	11 24 19.2	9.065
2	11 48 11.39	1.9306	3 31 29.2	10.828	2	13 20 58.93	1.9516	11 33 21.6	9.013
3	11 50 7.20	1.9299	3 42 18.2	10.805	3	13 22 56.07	1.9529	11 42 20.7	8.959
4	11 52 2.98	1.9293	3 53 5.8	10.781	4	13 24 53.28	1.9543	11 51 16.7	8.907
5	11 53 58.72	1.9288	4 3 51.9	10.757	5	13 26 50.58	1.9557	12 0 9.5	8.853
6	11 55 54.44	1.9284	4 14 36.6	10.733	6	13 28 47.96	1.9571	12 8 59.0	8.798
7	11 57 50.13	1.9280	4 25 19.8	10.707	7	13 30 45.43	1.9586	12 17 45.2	8.743
8	11 59 45.80	1.9277	4 36 1.4	10.680	8	13 32 42.99	1.9600	12 26 28.1	8.687
9	12 1 41.45	1.9273	4 46 41.4	10.653	9	13 34 40.63	1.9615	12 35 7.6	8.631
10	12 3 37.08	1.9271	4 57 19.7	10.625	10	13 36 38.37	1.9630	12 43 43.8	8.574
11	12 5 32.70	1.9268	5 7 56.4	10.598	11	13 38 36.19	1.9645	12 52 16.5	8.516
12	12 7 28.30	1.9267	5 18 31.4	10.568	12	13 40 34.11	1.9661	13 0 45.7	8.458
13	12 9 23.90	1.9266	5 29 4.6	10.539	13	13 42 32.12	1.9677	13 9 11.4	8.399
14	12 11 19.49	1.9265	5 39 36.1	10.509	14	13 44 30.23	1.9693	13 17 33.6	8.341
15	12 13 15.08	1.9265	5 50 5.7	10.478	15	13 46 28.44	1.9709	13 25 52.3	8.281
16	12 15 10.67	1.9265	6 0 33.4	10.447	16	13 48 26.74	1.9725	13 34 7.3	8.220
17	12 17 6.26	1.9266	6 10 59.3	10.415	17	13 50 25.14	1.9742	13 42 18.7	8.159
18	12 19 1.86	1.9267	6 21 23.2	10.382	18	13 52 23.64	1.9759	13 50 26.4	8.098
19	12 20 57.46	1.9268	6 31 45.1	10.348	19	13 54 22.25	1.9776	13 58 30.4	8.035
20	12 22 53.08	1.9271	6 42 5.0	10.315	20	13 56 20.95	1.9793	14 6 30.6	7.973
21	12 24 48.71	1.9273	6 52 22.9	10.280	21	13 58 19.76	1.9811	14 14 27.1	7.910
22	12 26 44.36	1.9277	7 2 38.6	10.244	22	14 0 18.68	1.9828	14 22 19.8	7.846
23	12 28 40.03	1.9280	- 7 12 52.2	-10.209	23	14 2 17.70	1.9845	-14 30 8.6	-7.782
NOVEMBER 18.					NOVEMBER 20.				
0	12 30 35.72	1.9283	- 7 23 3.7	-10.173	0	14 4 16.82	1.9863	-14 37 53.6	-7.717
1	12 32 31.43	1.9288	7 33 13.0	10.136	1	14 6 16.05	1.9881	14 45 34.6	7.651
2	12 34 27.17	1.9293	7 43 20.0	10.098	2	14 8 15.39	1.9898	14 53 11.7	7.585
3	12 36 22.94	1.9298	7 53 24.8	10.060	3	14 10 14.83	1.9917	15 0 44.8	7.518
4	12 38 18.74	1.9303	8 3 27.2	10.021	4	14 12 14.39	1.9935	15 8 13.9	7.452
5	12 40 14.58	1.9309	8 13 27.3	9.982	5	14 14 14.05	1.9953	15 15 39.0	7.383
6	12 42 10.45	1.9315	8 23 25.0	9.943	6	14 16 13.82	1.9972	15 22 59.9	7.315
7	12 44 6.36	1.9322	8 33 20.4	9.901	7	14 18 13.71	1.9990	15 30 16.8	7.247
8	12 46 2.31	1.9328	8 43 13.1	9.858	8	14 20 13.70	2.0008	15 37 29.5	7.177
9	12 47 58.30	1.9336	8 53 3.4	9.817	9	14 22 13.81	2.0027	15 44 38.0	7.107
10	12 49 54.34	1.9344	9 2 51.2	9.775	10	14 24 14.02	2.0045	15 51 42.3	7.036
11	12 51 50.43	1.9353	9 12 36.4	9.732	11	14 26 14.35	2.0064	15 58 42.3	6.965
12	12 53 46.57	1.9361	9 22 19.0	9.688	12	14 28 14.79	2.0083	16 5 38.1	6.894
13	12 55 42.76	1.9370	9 31 59.0	9.643	13	14 30 15.34	2.0102	16 12 29.6	6.822
14	12 57 39.01	1.9379	9 41 36.2	9.598	14	14 32 16.01	2.0121	16 19 16.7	6.748
15	12 59 35.31	1.9388	9 51 10.8	9.553	15	14 34 16.79	2.0139	16 25 59.4	6.676
16	13 1 31.67	1.9398	10 0 42.6	9.508	16	14 36 17.68	2.0158	16 32 37.8	6.603
17	13 3 28.09	1.9408	10 10 11.7	9.461	17	14 38 18.69	2.0178	16 39 11.7	6.528
18	13 5 24.57	1.9419	10 19 37.9	9.413	18	14 40 19.81	2.0196	16 45 41.1	6.453
19	13 7 21.12	1.9431	10 29 1.2	9.365	19	14 42 21.04	2.0215	16 52 6.1	6.378
20	13 9 17.74	1.9442	10 38 21.7	9.317	20	14 44 22.39	2.0234	16 58 26.5	6.302
21	13 11 14.42	1.9453	10 47 39.2	9.267	21	14 46 23.85	2.0253	17 4 42.3	6.226
22	13 13 11.17	1.9465	10 56 53.7	9.218	22	14 48 25.42	2.0272	17 10 53.6	6.150
23	13 15 8.00	1.9478	11 6 5.3	9.168	23	14 50 27.11	2.0291	17 17 0.3	6.073
24	13 17 4.90	1.9490	-11 15 13.8	-9.116	24	14 52 28.91	2.0309	-17 23 2.3	-5.995

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
NOVEMBER 21.					NOVEMBER 23.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
0	14 52 28.91	2.0309	-17 23 2.3	-5.995	0	16 31 52.31	2.1022	-20 33 3.6	-1.786
1	14 54 30.82	2.0328	17 28 59.7	5.917	1	16 33 58.47	2.1030	20 34 47.9	1.690
2	14 56 32.85	2.0347	17 34 52.3	5.838	2	16 36 4.67	2.1038	20 36 26.4	1.595
3	14 58 34.98	2.0365	17 40 40.2	5.758	3	16 38 10.92	2.1046	20 37 59.3	1.500
4	15 0 37.23	2.0384	17 46 23.3	5.679	4	16 40 17.22	2.1053	20 39 26.4	1.403
5	15 2 39.59	2.0402	17 52 1.7	5.599	5	16 42 23.56	2.1061	20 40 47.7	1.308
6	15 4 42.05	2.0420	17 57 35.2	5.518	6	16 44 29.95	2.1068	20 42 3.3	1.213
7	15 6 44.63	2.0439	18 3 3.8	5.437	7	16 46 36.37	2.1074	20 43 13.2	1.117
8	15 8 47.32	2.0457	18 8 27.6	5.356	8	16 48 42.84	2.1080	20 44 17.3	1.020
9	15 10 50.11	2.0475	18 13 46.5	5.274	9	16 50 49.33	2.1085	20 45 15.6	0.924
10	15 12 53.02	2.0493	18 19 0.5	5.192	10	16 52 55.86	2.1092	20 46 8.2	0.828
11	15 14 56.03	2.0510	18 24 9.5	5.108	11	16 55 2.43	2.1097	20 46 54.9	0.731
12	15 16 59.14	2.0528	18 29 13.5	5.025	12	16 57 9.02	2.1101	20 47 35.9	0.635
13	15 19 2.36	2.0546	18 34 12.5	4.942	13	16 59 15.64	2.1105	20 48 11.1	0.538
14	15 21 5.69	2.0563	18 39 6.5	4.858	14	17 1 22.28	2.1109	20 48 40.4	0.441
15	15 23 9.11	2.0579	18 43 55.4	4.773	15	17 3 28.95	2.1113	20 49 4.0	0.345
16	15 25 12.64	2.0597	18 48 39.2	4.687	16	17 5 35.64	2.1117	20 49 21.8	0.248
17	15 27 16.28	2.0614	18 53 17.8	4.602	17	17 7 42.35	2.1119	20 49 33.7	0.150
18	15 29 20.01	2.0630	18 57 51.4	4.517	18	17 9 49.07	2.1122	20 49 39.8	-0.053
19	15 31 23.84	2.0648	19 2 19.8	4.430	19	17 11 55.81	2.1124	20 49 40.1	+0.043
20	15 33 27.78	2.0664	19 6 43.0	4.343	20	17 14 2.56	2.1126	20 49 34.6	0.140
21	15 35 31.81	2.0679	19 11 1.0	4.257	21	17 16 9.32	2.1128	20 49 23.3	0.238
22	15 37 35.93	2.0695	19 15 13.8	4.169	22	17 18 16.09	2.1129	20 49 6.1	0.335
23	15 39 40.15	2.0712	-19 19 21.3	-4.082	23	17 20 22.87	2.1130	-20 48 43.1	+0.432
NOVEMBER 22.					NOVEMBER 24.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
0	15 41 44.47	2.0728	-19 23 23.6	-3.993	0	17 22 29.65	2.1130	-20 48 14.3	+0.528
1	15 43 48.88	2.0743	19 27 20.5	3.905	1	17 24 36.43	2.1131	20 47 39.7	0.626
2	15 45 53.38	2.0758	19 31 12.2	3.816	2	17 26 43.22	2.1131	20 46 59.2	0.723
3	15 47 57.97	2.0772	19 34 58.4	3.727	3	17 28 50.00	2.1129	20 46 13.0	0.819
4	15 50 2.64	2.0787	19 38 39.4	3.638	4	17 30 56.77	2.1128	20 45 20.9	0.917
5	15 52 7.41	2.0802	19 42 14.9	3.547	5	17 33 3.54	2.1128	20 44 23.0	1.013
6	15 54 12.26	2.0815	19 45 45.0	3.458	6	17 35 10.31	2.1127	20 43 19.3	1.110
7	15 56 17.19	2.0828	19 49 9.8	3.367	7	17 37 17.06	2.1123	20 42 9.8	1.207
8	15 58 22.20	2.0843	19 52 29.0	3.276	8	17 39 23.79	2.1122	20 40 54.5	1.303
9	16 0 27.30	2.0857	19 55 42.9	3.185	9	17 41 30.52	2.1120	20 39 33.4	1.400
10	16 2 32.48	2.0869	19 58 51.2	3.093	10	17 43 37.23	2.1116	20 38 6.5	1.497
11	16 4 37.73	2.0882	20 1 54.1	3.002	11	17 45 43.91	2.1113	20 36 33.8	1.593
12	16 6 43.06	2.0895	20 4 51.4	2.909	12	17 47 50.58	2.1110	20 34 55.3	1.689
13	16 8 48.47	2.0907	20 7 43.2	2.818	13	17 49 57.23	2.1106	20 33 11.1	1.785
14	16 10 53.94	2.0918	20 10 29.5	2.725	14	17 52 3.85	2.1102	20 31 21.1	1.882
15	16 12 59.49	2.0931	20 13 10.2	2.632	15	17 54 10.45	2.1097	20 29 25.3	1.978
16	16 15 5.11	2.0942	20 15 45.3	2.538	16	17 56 17.01	2.1092	20 27 23.8	2.073
17	16 17 10.79	2.0953	20 18 14.8	2.445	17	17 58 23.55	2.1088	20 25 16.5	2.169
18	16 19 16.54	2.0963	20 20 38.7	2.352	18	18 0 30.06	2.1083	20 23 3.5	2.265
19	16 21 22.35	2.0974	20 22 57.0	2.258	19	18 2 36.54	2.1077	20 20 44.7	2.360
20	16 23 28.23	2.0984	20 25 9.6	2.163	20	18 4 42.98	2.1070	20 18 20.3	2.455
21	16 25 34.16	2.0994	20 27 16.6	2.070	21	18 6 49.38	2.1063	20 15 50.1	2.551
22	16 27 40.16	2.1004	20 29 18.0	1.975	22	18 8 55.74	2.1058	20 13 14.2	2.645
23	16 29 46.21	2.1013	20 31 13.6	1.880	23	18 11 2.07	2.1051	20 10 32.7	2.740
24	16 31 52.31	2.1022	-20 33 3.6	-1.786	24	18 13 8.35	2.1043	-20 7 45.4	+2.835

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
NOVEMBER 25.					NOVEMBER 27.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 13 8.35	2.1043	-20 7 45.4	+2.835	0	19 52 58.90	2.0520	-16 8 13.0	+ 7.013
1	18 15 14.59	2.1037	20 4 52.5	2.928	1	19 55 1.99	2.0508	16 1 9.9	7.090
2	18 17 20.79	2.1028	20 1 54.0	3.023	2	19 57 5.00	2.0497	15 54 2.2	7.168
3	18 19 26.93	2.1021	19 58 49.8	3.117	3	19 59 7.95	2.0486	15 46 49.8	7.245
4	18 21 33.03	2.1013	19 55 40.0	3.210	4	20 1 10.83	2.0474	15 39 32.8	7.321
5	18 23 39.09	2.1005	19 52 24.6	3.303	5	20 3 13.64	2.0463	15 32 11.3	7.396
6	18 25 45.09	2.0996	19 49 3.6	3.397	6	20 5 16.38	2.0452	15 24 45.3	7.471
7	18 27 51.04	2.0988	19 45 37.0	3.489	7	20 7 19.06	2.0441	15 17 14.8	7.546
8	18 29 56.94	2.0978	19 42 4.9	3.582	8	20 9 21.67	2.0430	15 9 39.8	7.621
9	18 32 2.78	2.0969	19 38 27.2	3.674	9	20 11 24.22	2.0419	15 2 0.3	7.694
10	18 34 8.57	2.0960	19 34 44.0	3.767	10	20 13 26.70	2.0408	14 54 16.5	7.768
11	18 36 14.30	2.0950	19 30 55.2	3.858	11	20 15 29.12	2.0398	14 46 28.2	7.841
12	18 38 19.97	2.0940	19 27 1.0	3.949	12	20 17 31.47	2.0388	14 38 35.6	7.913
13	18 40 25.58	2.0930	19 23 1.3	4.041	13	20 19 33.77	2.0378	14 30 38.7	7.984
14	18 42 31.13	2.0920	19 18 56.1	4.132	14	20 21 36.00	2.0368	14 22 37.5	8.056
15	18 44 36.62	2.0910	19 14 45.5	4.223	15	20 23 38.18	2.0359	14 14 32.0	8.127
16	18 46 42.05	2.0900	19 10 29.4	4.313	16	20 25 40.31	2.0349	14 6 22.3	8.197
17	18 48 47.42	2.0889	19 6 7.9	4.403	17	20 27 42.37	2.0340	13 58 8.4	8.267
18	18 50 52.72	2.0878	19 1 41.1	4.493	18	20 29 44.39	2.0332	13 49 50.3	8.337
19	18 52 57.95	2.0867	18 57 8.8	4.583	19	20 31 46.35	2.0322	13 41 28.0	8.405
20	18 55 3.12	2.0856	18 52 31.2	4.671	20	20 33 48.25	2.0313	13 33 1.7	8.473
21	18 57 8.22	2.0844	18 47 48.3	4.759	21	20 35 50.11	2.0306	13 24 31.3	8.541
22	18 59 13.25	2.0833	18 43 0.1	4.848	22	20 37 51.92	2.0298	13 15 56.8	8.609
23	19 1 18.22	2.0822	-18 38 6.5	+4.937	23	20 39 53.68	2.0290	-13 7 18.2	+ 8.676
NOVEMBER 26.					NOVEMBER 28.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 3 23.11	2.0810	-18 33 7.7	+5.024	0	20 41 55.40	2.0283	-12 58 35.7	+ 8.741
1	19 5 27.94	2.0798	18 28 3.6	5.112	1	20 43 57.07	2.0276	12 49 49.3	8.807
2	19 7 32.69	2.0786	18 22 54.3	5.198	2	20 45 58.71	2.0269	12 40 58.9	8.873
3	19 9 37.37	2.0774	18 17 39.8	5.285	3	20 48 0.30	2.0262	12 32 4.6	8.938
4	19 11 41.98	2.0763	18 12 20.1	5.372	4	20 50 1.85	2.0256	12 23 6.4	9.002
5	19 13 46.52	2.0751	18 6 55.2	5.458	5	20 52 3.37	2.0251	12 14 4.4	9.064
6	19 15 50.99	2.0738	18 1 25.2	5.543	6	20 54 4.86	2.0245	12 4 58.7	9.128
7	19 17 55.38	2.0726	17 55 50.1	5.628	7	20 56 6.31	2.0239	11 55 49.1	9.191
8	19 19 59.70	2.0714	17 50 9.9	5.713	8	20 58 7.73	2.0234	11 46 35.8	9.252
9	19 22 3.95	2.0703	17 44 24.6	5.798	9	21 0 9.12	2.0229	11 37 18.9	9.313
10	19 24 8.13	2.0690	17 38 34.2	5.881	10	21 2 10.48	2.0225	11 27 58.2	9.375
11	19 26 12.23	2.0678	17 32 38.9	5.964	11	21 4 11.82	2.0221	11 18 33.9	9.435
12	19 28 16.26	2.0666	17 26 38.5	6.048	12	21 6 13.13	2.0218	11 9 6.0	9.495
13	19 30 20.22	2.0653	17 20 33.2	6.130	13	21 8 14.43	2.0214	10 59 34.5	9.554
14	19 32 24.10	2.0641	17 14 22.9	6.213	14	21 10 15.70	2.0211	10 49 59.5	9.613
15	19 34 27.91	2.0628	17 8 7.6	6.295	15	21 12 16.96	2.0209	10 40 21.0	9.670
16	19 36 31.64	2.0616	17 1 47.5	6.376	16	21 14 18.21	2.0207	10 30 39.1	9.728
17	19 38 35.30	2.0604	16 55 22.5	6.457	17	21 16 19.44	2.0205	10 20 53.7	9.785
18	19 40 38.89	2.0593	16 48 52.7	6.538	18	21 18 20.67	2.0204	10 11 4.9	9.841
19	19 42 42.41	2.0580	16 42 18.0	6.618	19	21 20 21.89	2.0203	10 1 12.8	9.897
20	19 44 45.85	2.0568	16 35 38.5	6.699	20	21 22 23.10	2.0202	9 51 17.3	9.953
21	19 46 49.22	2.0556	16 28 54.1	6.778	21	21 24 24.31	2.0202	9 41 18.5	10.007
22	19 48 52.52	2.0544	16 22 5.2	6.855	22	21 26 25.52	2.0202	9 31 16.5	10.060
23	19 50 55.75	2.0532	16 15 11.5	6.935	23	21 28 26.73	2.0203	9 21 11.3	10.113
24	19 52 58.90	2.0520	-16 8 13.0	+7.013	24	21 30 27.95	2.0204	- 9 11 2.9	+10.166

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
NOVEMBER 29.					DECEMBER 1.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	21 30 27.95	2.0204	-9 11 2.9	+10.166	0	23 8 30.51	2.0858	-0 14 47.9	+11.897
1	21 32 29.18	2.0205	9 0 51.4	10.218	1	23 10 35.74	2.0885	-0 2 53.6	11.914
2	21 34 30.41	2.0207	8 50 36.7	10.270	2	23 12 41.13	2.0913	+0 9 1.8	11.930
3	21 36 31.66	2.0210	8 40 19.0	10.321	3	23 14 46.70	2.0943	0 20 58.0	11.944
4	21 38 32.93	2.0213	8 29 58.2	10.372	4	23 16 52.45	2.0973	0 32 55.1	11.958
5	21 40 34.21	2.0216	8 19 34.4	10.421	5	23 18 58.37	2.1002	0 44 53.0	11.972
6	21 42 35.52	2.0220	8 9 7.7	10.470	6	23 21 4.47	2.1033	0 56 51.7	11.984
7	21 44 36.85	2.0224	7 58 38.0	10.519	7	23 23 10.77	2.1065	1 8 51.1	11.995
8	21 46 38.21	2.0229	7 48 5.4	10.567	8	23 25 17.25	2.1097	1 20 51.1	12.005
9	21 48 39.60	2.0234	7 37 30.0	10.613	9	23 27 23.93	2.1129	1 32 51.7	12.014
10	21 50 41.02	2.0240	7 26 51.8	10.660	10	23 29 30.80	2.1163	1 44 52.8	12.023
11	21 52 42.48	2.0246	7 16 10.8	10.706	11	23 31 37.88	2.1197	1 56 54.4	12.029
12	21 54 43.97	2.0253	7 5 27.1	10.751	12	23 33 45.16	2.1231	2 8 56.3	12.035
13	21 56 45.51	2.0260	6 54 40.7	10.796	13	23 35 52.65	2.1267	2 20 58.6	12.041
14	21 58 47.09	2.0268	6 43 51.6	10.840	14	23 38 0.36	2.1303	2 33 1.2	12.045
15	22 0 48.72	2.0276	6 32 59.9	10.883	15	23 40 8.28	2.1339	2 45 4.0	12.048
16	22 2 50.40	2.0284	6 22 5.6	10.926	16	23 42 16.43	2.1376	2 57 6.9	12.049
17	22 4 52.13	2.0293	6 11 8.8	10.968	17	23 44 24.79	2.1413	3 9 9.9	12.051
18	22 6 53.92	2.0304	6 0 9.5	11.009	18	23 46 33.39	2.1453	3 21 13.0	12.051
19	22 8 55.78	2.0314	5 49 7.7	11.049	19	23 48 42.22	2.1491	3 33 16.0	12.048
20	22 10 57.69	2.0324	5 38 3.6	11.088	20	23 50 51.28	2.1530	3 45 18.8	12.046
21	22 12 59.67	2.0336	5 26 57.1	11.128	21	23 53 0.58	2.1571	3 57 21.5	12.043
22	22 15 1.72	2.0348	5 15 48.2	11.167	22	23 55 10.13	2.1612	4 9 24.0	12.038
23	22 17 3.84	2.0360	-5 4 37.1	+11.204	23	23 57 19.92	2.1653	+4 21 26.1	+12.033
NOVEMBER 30.					DECEMBER 2.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	22 19 6.04	2.0373	-4 53 23.7	+11.242	0	23 59 29.96	2.1695	+4 33 27.9	+12.026
1	22 21 8.32	2.0387	4 42 8.1	11.278	1	0 1 40.26	2.1738	4 45 29.2	12.018
2	22 23 10.68	2.0400	4 30 50.4	11.313	2	0 3 50.81	2.1781	4 57 30.0	12.008
3	22 25 13.12	2.0415	4 19 30.5	11.348	3	0 6 1.63	2.1824	5 9 30.1	11.997
4	22 27 15.66	2.0430	4 8 8.6	11.382	4	0 8 12.70	2.1868	5 21 29.6	11.986
5	22 29 18.28	2.0446	3 56 44.7	11.415	5	0 10 24.05	2.1914	5 33 28.4	11.973
6	22 31 21.01	2.0463	3 45 18.8	11.448	6	0 12 35.67	2.1960	5 45 26.3	11.958
7	22 33 23.83	2.0479	3 33 50.9	11.480	7	0 14 47.57	2.2006	5 57 23.4	11.943
8	22 35 26.76	2.0497	3 22 21.2	11.511	8	0 16 59.74	2.2053	6 9 19.4	11.926
9	22 37 29.79	2.0515	3 10 49.6	11.542	9	0 19 12.20	2.2100	6 21 14.5	11.908
10	22 39 32.94	2.0533	2 59 16.2	11.571	10	0 21 24.94	2.2148	6 33 8.4	11.888
11	22 41 36.19	2.0553	2 47 41.1	11.600	11	0 23 37.97	2.2196	6 45 1.1	11.868
12	22 43 39.57	2.0573	2 36 4.2	11.628	12	0 25 51.29	2.2245	6 56 52.6	11.847
13	22 45 43.07	2.0593	2 24 25.7	11.654	13	0 28 4.91	2.2295	7 8 42.7	11.823
14	22 47 46.68	2.0613	2 12 45.7	11.681	14	0 30 18.83	2.2345	7 20 31.4	11.798
15	22 49 50.43	2.0636	2 1 4.0	11.707	15	0 32 33.05	2.2395	7 32 18.5	11.772
16	22 51 54.31	2.0658	1 49 20.9	11.731	16	0 34 47.57	2.2446	7 44 4.0	11.745
17	22 53 58.32	2.0681	1 37 36.3	11.754	17	0 37 2.40	2.2498	7 55 47.9	11.717
18	22 56 2.48	2.0704	1 25 50.4	11.778	18	0 39 17.55	2.2550	8 7 30.0	11.687
19	22 58 6.77	2.0728	1 14 3.0	11.800	19	0 41 33.00	2.2603	8 19 10.3	11.655
20	23 0 11.21	2.0753	1 2 14.4	11.821	20	0 43 48.78	2.2657	8 30 48.6	11.623
21	23 2 15.80	2.0778	0 50 24.5	11.842	21	0 46 4.88	2.2709	8 42 25.0	11.588
22	23 4 20.55	2.0804	0 38 33.4	11.861	22	0 48 21.29	2.2763	8 53 59.2	11.553
23	23 6 25.45	2.0830	0 26 41.2	11.879	23	0 50 38.04	2.2818	9 5 31.3	11.518
24	23 8 30.51	2.0858	-0 14 47.9	+11.897	24	0 52 55.11	2.2873	+9 17 1.1	+11.477

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 3.					DECEMBER 5.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	0 52 55.11	2.2873	+ 9 17 1.1	+11.477	0	2 49 33.09	2.5735	+17 13 48.7	+7.763
1	0 55 12.52	2.2928	9 28 28.5	11.437	1	2 52 7.67	2.5790	17 21 31.0	7.645
2	0 57 30.25	2.2984	9 39 53.5	11.396	2	2 54 42.57	2.5845	17 29 6.1	7.527
3	0 59 48.33	2.3042	9 51 16.0	11.353	3	2 57 17.81	2.5900	17 36 34.2	7.407
4	1 2 6.75	2.3098	10 2 35.9	11.308	4	2 59 53.37	2.5953	17 43 54.9	7.284
5	1 4 25.50	2.3154	10 13 53.0	11.262	5	3 2 29.25	2.6007	17 51 8.3	7.161
6	1 6 44.60	2.3213	10 25 7.3	11.215	6	3 5 5.45	2.6058	17 58 14.2	7.036
7	1 9 4.05	2.3270	10 36 18.8	11.167	7	3 7 41.95	2.6110	18 5 12.6	6.909
8	1 11 23.84	2.3328	10 47 27.3	11.115	8	3 10 18.77	2.6161	18 12 3.3	6.782
9	1 13 43.99	2.3387	10 58 32.6	11.063	9	3 12 55.88	2.6211	18 18 46.4	6.653
10	1 16 4.48	2.3445	11 9 34.8	11.010	10	3 15 33.30	2.6260	18 25 21.6	6.522
11	1 18 25.33	2.3505	11 20 33.8	10.955	11	3 18 11.00	2.6308	18 31 49.0	6.390
12	1 20 46.54	2.3564	11 31 29.4	10.898	12	3 20 48.99	2.6355	18 38 8.4	6.257
13	1 23 8.10	2.3624	11 42 21.5	10.839	13	3 23 27.26	2.6402	18 44 19.8	6.122
14	1 25 30.03	2.3684	11 53 10.1	10.779	14	3 26 5.81	2.6448	18 50 23.0	5.986
15	1 27 52.31	2.3744	12 3 55.0	10.718	15	3 28 44.63	2.6493	18 56 18.1	5.848
16	1 30 14.96	2.3805	12 14 36.2	10.655	16	3 31 23.72	2.6536	19 2 4.8	5.710
17	1 32 37.97	2.3865	12 25 13.6	10.590	17	3 34 3.06	2.6578	19 7 43.3	5.570
18	1 35 1.34	2.3927	12 35 47.0	10.523	18	3 36 42.65	2.6619	19 13 13.2	5.428
19	1 37 25.09	2.3988	12 46 16.4	10.456	19	3 39 22.49	2.6660	19 18 34.7	5.287
20	1 39 49.19	2.4048	12 56 41.7	10.386	20	3 42 2.57	2.6700	19 23 47.7	5.144
21	1 42 13.67	2.4110	13 7 2.7	10.314	21	3 44 42.89	2.6738	19 28 52.0	4.999
22	1 44 38.51	2.4172	13 17 19.4	10.242	22	3 47 23.42	2.6774	19 33 47.6	4.853
23	1 47 3.73	2.4233	+13 27 31.7	+10.168	23	3 50 4.18	2.6811	+19 38 34.4	+4.707
DECEMBER 4.					DECEMBER 6.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	1 49 29.31	2.4295	+13 37 39.5	+10.091	0	3 52 45.15	2.6845	+19 43 12.4	+4.559
1	1 51 55.27	2.4357	13 47 42.6	10.013	1	3 55 26.32	2.6878	19 47 41.5	4.410
2	1 54 21.59	2.4418	13 57 41.0	9.933	2	3 58 7.69	2.6911	19 52 1.6	4.260
3	1 56 48.29	2.4480	14 7 34.6	9.853	3	4 0 49.25	2.6942	19 56 12.7	4.110
4	1 59 15.35	2.4542	14 17 23.3	9.769	4	4 3 30.99	2.6972	20 0 14.8	3.959
5	2 1 42.79	2.4603	14 27 6.9	9.684	5	4 6 12.90	2.6999	20 4 7.8	3.807
6	2 4 10.59	2.4665	14 36 45.4	9.598	6	4 8 54.98	2.7026	20 7 51.6	3.653
7	2 6 38.77	2.4727	14 46 18.7	9.511	7	4 11 37.21	2.7052	20 11 26.1	3.498
8	2 9 7.31	2.4788	14 55 46.7	9.421	8	4 14 19.60	2.7076	20 14 51.4	3.345
9	2 11 36.22	2.4849	15 5 9.2	9.329	9	4 17 2.12	2.7098	20 18 7.5	3.189
10	2 14 5.50	2.4910	15 14 26.2	9.237	10	4 19 44.78	2.7120	20 21 14.1	3.033
11	2 16 35.14	2.4971	15 23 37.6	9.143	11	4 22 27.56	2.7140	20 24 11.4	2.877
12	2 19 5.15	2.5032	15 32 43.3	9.046	12	4 25 10.46	2.7159	20 26 59.3	2.719
13	2 21 35.52	2.5093	15 41 43.1	8.948	13	4 27 53.47	2.7176	20 29 37.7	2.561
14	2 24 6.26	2.5153	15 50 37.1	8.848	14	4 30 36.57	2.7191	20 32 6.6	2.402
15	2 26 37.35	2.5213	15 59 24.9	8.747	15	4 33 19.76	2.7205	20 34 25.9	2.243
16	2 29 8.81	2.5273	16 8 6.7	8.644	16	4 36 3.03	2.7218	20 36 35.7	2.083
17	2 31 40.62	2.5331	16 16 42.2	8.540	17	4 38 46.38	2.7229	20 38 35.9	1.924
18	2 34 12.78	2.5390	16 25 11.5	8.434	18	4 41 29.78	2.7239	20 40 26.6	1.764
19	2 36 45.30	2.5449	16 33 34.3	8.326	19	4 44 13.25	2.7247	20 42 7.6	1.603
20	2 39 18.17	2.5508	16 41 50.6	8.216	20	4 46 56.75	2.7253	20 43 38.9	1.443
21	2 41 51.39	2.5565	16 50 0.2	8.105	21	4 49 40.29	2.7259	20 45 0.7	1.282
22	2 44 24.95	2.5622	16 58 3.2	7.993	22	4 52 23.86	2.7263	20 46 12.7	1.120
23	2 46 58.85	2.5678	17 5 59.4	7.879	23	4 55 7.45	2.7265	20 47 15.1	0.959
24	2 49 33.09	2.5735	+17 13 48.7	+7.763	24	4 57 51.04	2.7265	+20 48 7.8	+0.798

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 7.					DECEMBER 9.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	4 57 51.04	2.7265	+20 48 7.8	+0.798	0	7 6 1.54	2.5663	+18 27 55.3	-6.318
1	5 0 34.63	2.7264	20 48 50.8	0.636	1	7 8 35.34	2.5603	18 21 32.5	6.440
2	5 3 18.21	2.7261	20 49 24.1	0.474	2	7 11 8.77	2.5543	18 15 2.5	6.560
3	5 6 1.76	2.7257	20 49 47.7	0.313	3	7 13 41.85	2.5483	18 8 25.3	6.679
4	5 8 45.29	2.7252	20 50 1.6	+0.151	4	7 16 14.56	2.5421	18 1 41.0	6.797
5	5 11 28.78	2.7244	20 50 5.8	-0.011	5	7 18 46.90	2.5359	17 54 49.7	6.913
6	5 14 12.22	2.7235	20 50 0.3	0.172	6	7 21 18.87	2.5298	17 47 51.5	7.027
7	5 16 55.60	2.7225	20 49 45.2	0.332	7	7 23 50.47	2.5236	17 40 46.5	7.140
8	5 19 38.92	2.7213	20 49 20.5	0.493	8	7 26 21.70	2.5173	17 33 34.7	7.252
9	5 22 22.16	2.7200	20 48 46.0	0.654	9	7 28 52.54	2.5109	17 26 16.3	7.361
10	5 25 5.32	2.7186	20 48 2.0	0.814	10	7 31 23.01	2.5046	17 18 51.4	7.469
11	5 27 48.39	2.7169	20 47 8.3	0.974	11	7 33 53.09	2.4981	17 11 20.0	7.577
12	5 30 31.35	2.7151	20 46 5.1	1.133	12	7 36 22.78	2.4917	17 3 42.2	7.682
13	5 33 14.20	2.7132	20 44 52.3	1.293	13	7 38 52.09	2.4852	16 55 58.2	7.785
14	5 35 56.93	2.7111	20 43 30.0	1.452	14	7 41 21.00	2.4787	16 48 8.0	7.888
15	5 38 39.53	2.7088	20 41 58.1	1.610	15	7 43 49.53	2.4723	16 40 11.7	7.988
16	5 41 21.99	2.7064	20 40 16.8	1.767	16	7 46 17.67	2.4657	16 32 9.4	8.087
17	5 44 4.30	2.7039	20 38 26.1	1.923	17	7 48 45.41	2.4590	16 24 1.3	8.184
18	5 46 46.46	2.7013	20 36 26.0	2.080	18	7 51 12.75	2.4525	16 15 47.3	8.280
19	5 49 28.45	2.6985	20 34 16.5	2.236	19	7 53 39.71	2.4459	16 7 27.7	8.373
20	5 52 10.28	2.6956	20 31 57.7	2.391	20	7 56 6.26	2.4393	15 59 2.5	8.467
21	5 54 51.92	2.6925	20 29 29.6	2.545	21	7 58 32.42	2.4327	15 50 31.7	8.558
22	5 57 33.38	2.6893	20 26 52.3	2.698	22	8 0 58.18	2.4260	15 41 55.5	8.648
23	6 0 14.64	2.6859	+20 24 5.8	-2.851	23	8 3 23.54	2.4193	+15 33 14.0	-8.736
DECEMBER 8.					DECEMBER 10.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	6 2 55.69	2.6824	+20 21 10.2	-3.003	0	8 5 48.50	2.4127	+15 24 27.2	-8.823
1	6 5 36.53	2.6788	20 18 5.5	3.154	1	8 8 13.06	2.4061	15 15 35.3	8.907
2	6 8 17.15	2.6751	20 14 51.7	3.304	2	8 10 37.23	2.3995	15 6 38.4	8.990
3	6 10 57.54	2.6713	20 11 29.0	3.453	3	8 13 1.00	2.3928	14 57 36.5	9.072
4	6 13 37.70	2.6673	20 7 57.4	3.601	4	8 15 24.37	2.3862	14 48 29.8	9.152
5	6 16 17.62	2.6632	20 4 16.9	3.748	5	8 17 47.34	2.3796	14 39 18.3	9.231
6	6 18 57.28	2.6590	20 0 27.6	3.894	6	8 20 9.92	2.3730	14 30 2.1	9.308
7	6 21 36.70	2.6547	19 56 29.6	4.039	7	8 22 32.10	2.3663	14 20 41.4	9.383
8	6 24 15.84	2.6503	19 52 22.9	4.183	8	8 24 53.88	2.3598	14 11 16.1	9.458
9	6 26 54.73	2.6458	19 48 7.6	4.327	9	8 27 15.27	2.3532	14 1 46.5	9.530
10	6 29 33.33	2.6410	19 43 43.7	4.468	10	8 29 36.26	2.3467	13 52 12.5	9.602
11	6 32 11.65	2.6363	19 39 11.4	4.608	11	8 31 56.87	2.3402	13 42 34.3	9.671
12	6 34 49.69	2.6315	19 34 30.7	4.748	12	8 34 17.08	2.3336	13 32 52.0	9.738
13	6 37 27.43	2.6264	19 29 41.7	4.886	13	8 36 36.90	2.3272	13 23 5.7	9.805
14	6 40 4.86	2.6214	19 24 44.4	5.023	14	8 38 56.34	2.3208	13 13 15.4	9.870
15	6 42 42.00	2.6163	19 19 39.0	5.158	15	8 41 15.39	2.3143	13 3 21.3	9.933
16	6 45 18.81	2.6110	19 14 25.5	5.293	16	8 43 34.05	2.3078	12 53 23.4	9.995
17	6 47 55.32	2.6058	19 9 3.9	5.426	17	8 45 52.33	2.3015	12 43 21.9	10.056
18	6 50 31.50	2.6003	19 3 34.4	5.557	18	8 48 10.23	2.2953	12 33 16.7	10.116
19	6 53 7.35	2.5948	18 57 57.1	5.687	19	8 50 27.76	2.2889	12 23 8.0	10.173
20	6 55 42.87	2.5892	18 52 12.0	5.816	20	8 52 44.90	2.2826	12 12 56.0	10.229
21	6 58 18.05	2.5836	18 46 19.2	5.944	21	8 55 1.67	2.2764	12 2 40.5	10.285
22	7 0 52.90	2.5778	18 40 18.7	6.071	22	8 57 18.07	2.2702	11 52 21.8	10.338
23	7 3 27.39	2.5720	18 34 10.7	6.195	23	8 59 34.09	2.2640	11 42 0.0	10.380
24	7 6 1.54	2.5663	+18 27 55.3	-6.318	24	9 1 49.75	2.2579	+11 31 35.0	-10.4

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 11.					DECEMBER 13.				
	h m s	s	" ' "	"		h m s	s	" ' "	"
0	9 1 49.75	2.2579	+11 31 35.0	-10.441	0	10 44 9.07	2.0283	+2 35 44.1	-11.463
1	9 4 5.04	2.2518	11 21 7.1	10.490	1	10 46 10.67	2.0249	2 24 16.4	11.459
2	9 6 19.97	2.2458	11 10 36.2	10.538	2	10 48 12.06	2.0218	2 12 49.0	11.454
3	9 8 34.54	2.2399	11 0 2.6	10.584	3	10 50 13.28	2.0187	2 1 21.9	11.450
4	9 10 48.76	2.2340	10 49 26.1	10.630	4	10 52 14.30	2.0155	1 49 55.0	11.444
5	9 13 2.62	2.2280	10 38 47.0	10.673	5	10 54 15.14	2.0125	1 38 28.6	11.436
6	9 15 16.12	2.2222	10 28 5.3	10.716	6	10 56 15.80	2.0096	1 27 2.6	11.429
7	9 17 29.28	2.2163	10 17 21.1	10.758	7	10 58 16.29	2.0067	1 15 37.1	11.421
8	9 19 42.08	2.2106	10 6 34.4	10.798	8	11 0 16.60	2.0038	1 4 12.1	11.413
9	9 21 54.55	2.2049	9 55 45.4	10.836	9	11 2 16.75	2.0011	0 52 47.6	11.403
10	9 24 6.67	2.1993	9 44 54.1	10.873	10	11 4 16.73	1.9983	0 41 23.8	11.391
11	9 26 18.46	2.1937	9 34 0.6	10.910	11	11 6 16.55	1.9958	0 30 0.7	11.379
12	9 28 29.91	2.1881	9 23 4.9	10.945	12	11 8 16.22	1.9933	0 18 38.3	11.367
13	9 30 41.03	2.1827	9 12 7.2	10.978	13	11 10 15.74	1.9908	+0 7 16.7	11.354
14	9 32 51.83	2.1773	9 1 7.6	11.010	14	11 12 15.11	1.9883	-0 4 4.2	11.341
15	9 35 2.30	2.1718	8 50 6.0	11.042	15	11 14 14.33	1.9858	0 15 24.2	11.326
16	9 37 12.45	2.1665	8 39 2.6	11.072	16	11 16 13.41	1.9836	0 26 43.3	11.311
17	9 39 22.28	2.1613	8 27 57.4	11.100	17	11 18 12.36	1.9813	0 38 1.5	11.295
18	9 41 31.80	2.1560	8 16 50.6	11.128	18	11 20 11.17	1.9791	0 49 18.7	11.278
19	9 43 41.00	2.1508	8 5 42.1	11.154	19	11 22 9.85	1.9770	1 0 34.9	11.261
20	9 45 49.90	2.1458	7 54 32.1	11.179	20	11 24 8.41	1.9749	1 11 50.0	11.243
21	9 47 58.49	2.1407	7 43 20.6	11.203	21	11 26 6.84	1.9729	1 23 4.0	11.224
22	9 50 6.78	2.1358	7 32 7.7	11.227	22	11 28 5.16	1.9710	1 34 16.9	11.204
23	9 52 14.78	2.1308	+ 7 20 53.4	-11.248	23	11 30 3.36	1.9691	-1 45 28.5	-11.184
DECEMBER 12.					DECEMBER 14.				
0	9 54 22.48	2.1259	+ 7 9 37.9	-11.268	0	11 32 1.45	1.9673	-1 56 39.0	-11.163
1	9 56 29.89	2.1212	6 58 21.2	11.288	1	11 33 59.43	1.9655	2 7 48.1	11.142
2	9 58 37.02	2.1165	6 47 3.3	11.308	2	11 35 57.31	1.9638	2 18 56.0	11.120
3	10 0 43.87	2.1118	6 35 44.3	11.325	3	11 37 55.09	1.9622	2 30 2.5	11.097
4	10 2 50.43	2.1071	6 24 24.3	11.341	4	11 39 52.77	1.9606	2 41 7.6	11.073
5	10 4 56.72	2.1026	6 13 3.4	11.356	5	11 41 50.36	1.9591	2 52 11.2	11.048
6	10 7 2.74	2.0982	6 1 41.6	11.371	6	11 43 47.86	1.9577	3 3 13.4	11.024
7	10 9 8.50	2.0937	5 50 18.9	11.384	7	11 45 45.28	1.9563	3 14 14.1	10.998
8	10 11 13.98	2.0893	5 38 55.5	11.396	8	11 47 42.61	1.9548	3 25 13.2	10.973
9	10 13 19.21	2.0851	5 27 31.4	11.408	9	11 49 39.86	1.9536	3 36 10.8	10.946
10	10 15 24.19	2.0808	5 16 6.6	11.418	10	11 51 37.04	1.9523	3 47 6.7	10.918
11	10 17 28.91	2.0766	5 4 41.2	11.428	11	11 53 34.14	1.9512	3 58 1.0	10.890
12	10 19 33.38	2.0725	4 53 15.3	11.435	12	11 55 31.18	1.9501	4 8 53.5	10.861
13	10 21 37.61	2.0685	4 41 49.0	11.443	13	11 57 28.15	1.9490	4 19 44.3	10.833
14	10 23 41.60	2.0645	4 30 22.2	11.449	14	11 59 25.06	1.9481	4 30 33.4	10.803
15	10 25 45.35	2.0605	4 18 55.1	11.455	15	12 1 21.92	1.9471	4 41 20.6	10.772
16	10 27 48.86	2.0567	4 7 27.6	11.459	16	12 3 18.71	1.9462	4 52 6.0	10.741
17	10 29 52.15	2.0529	3 56 0.0	11.463	17	12 5 15.46	1.9454	5 2 49.5	10.709
18	10 31 55.21	2.0492	3 44 32.1	11.466	18	12 7 12.16	1.9446	5 13 31.1	10.678
19	10 33 58.05	2.0456	3 33 4.1	11.467	19	12 9 8.81	1.9438	5 24 10.8	10.644
20	10 36 0.68	2.0420	3 21 36.1	11.468	20	12 11 5.42	1.9432	5 34 48.4	10.610
21	10 38 3.09	2.0383	3 10 8.0	11.468	21	12 13 1.99	1.9426	5 45 24.0	10.577
22	10 40 5.28	2.0349	2 58 39.9	11.467	22	12 14 58.53	1.9420	5 55 57.6	10.543
23	10 42 7.28	2.0316	2 47 12.0	11.465	23	12 16 55.03	1.9414	6 6 29.1	10.507
24	10 44 9.07	2.0283	+ 2 35 44.1	-11.463	24	12 18 51.50	1.9410	-6 16 58.4	-10.471

MOON, 1919.

113

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 15.					DECEMBER 17.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	12 18 51.50	1.9410	- 6 16 58.4	-10.471	0	13 52 22.73	1.9711	-13 47 43.4	-8.103
1	12 20 47.95	1.9406	6 27 25.6	10.435	1	13 54 21.04	1.9726	13 55 47.8	8.042
2	12 22 44.37	1.9403	6 37 50.6	10.398	2	13 56 19.44	1.9740	14 3 48.4	7.978
3	12 24 40.78	1.9399	6 48 13.3	10.359	3	13 58 17.92	1.9756	14 11 45.2	7.914
4	12 26 37.16	1.9397	6 58 33.7	10.322	4	14 0 16.51	1.9772	14 19 38.1	7.851
5	12 28 33.54	1.9395	7 8 51.9	10.283	5	14 2 15.18	1.9787	14 27 27.3	7.788
6	12 30 29.90	1.9393	7 19 7.7	10.244	6	14 4 13.95	1.9803	14 35 12.6	7.722
7	12 32 26.25	1.9392	7 29 21.2	10.204	7	14 6 12.82	1.9820	14 42 53.9	7.656
8	12 34 22.60	1.9392	7 39 32.2	10.163	8	14 8 11.79	1.9836	14 50 31.3	7.591
9	12 36 18.95	1.9391	7 49 40.8	10.123	9	14 10 10.85	1.9853	14 58 4.8	7.525
10	12 38 15.29	1.9391	7 59 46.9	10.081	10	14 12 10.02	1.9870	15 5 34.3	7.458
11	12 40 11.64	1.9393	8 9 50.5	10.039	11	14 14 9.29	1.9887	15 12 59.7	7.390
12	12 42 8.00	1.9394	8 19 51.6	9.997	12	14 16 8.66	1.9904	15 20 21.1	7.323
13	12 44 4.37	1.9396	8 29 50.1	9.953	13	14 18 8.14	1.9921	15 27 38.4	7.253
14	12 46 0.75	1.9398	8 39 46.0	9.909	14	14 20 7.71	1.9938	15 34 51.5	7.184
15	12 47 57.15	1.9401	8 49 39.2	9.865	15	14 22 7.40	1.9957	15 42 0.5	7.115
16	12 49 53.56	1.9403	8 59 29.8	9.820	16	14 24 7.19	1.9974	15 49 5.3	7.045
17	12 51 49.99	1.9406	9 9 17.6	9.774	17	14 26 7.09	1.9993	15 56 5.9	6.975
18	12 53 46.45	1.9412	9 19 2.7	9.729	18	14 28 7.10	2.0010	16 3 2.3	6.904
19	12 55 42.93	1.9416	9 28 45.1	9.683	19	14 30 7.21	2.0028	16 9 54.4	6.833
20	12 57 39.44	1.9422	9 38 24.6	9.635	20	14 32 7.44	2.0047	16 16 42.2	6.761
21	12 59 35.99	1.9427	9 48 1.3	9.588	21	14 34 7.78	2.0065	16 23 25.7	6.688
22	13 1 32.56	1.9432	9 57 35.2	9.540	22	14 36 8.22	2.0083	16 30 4.8	6.615
23	13 3 29.17	1.9438	-10 7 6.1	-9.491	23	14 38 8.78	2.0103	-16 36 39.5	-6.542
DECEMBER 16.					DECEMBER 18.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	13 5 25.82	1.9445	-10 16 34.1	-9.442	0	14 40 9.45	2.0121	-16 43 9.8	-6.468
1	13 7 22.51	1.9452	10 25 59.1	9.393	1	14 42 10.23	2.0140	16 49 35.7	6.394
2	13 9 19.24	1.9459	10 35 21.2	9.343	2	14 44 11.13	2.0158	16 55 57.1	6.319
3	13 11 16.02	1.9468	10 44 40.2	9.292	3	14 46 12.13	2.0178	17 2 14.0	6.243
4	13 13 12.85	1.9476	10 53 56.2	9.240	4	14 48 13.26	2.0197	17 8 26.3	6.168
5	13 15 9.73	1.9484	11 3 9.0	9.188	5	14 50 14.49	2.0215	17 14 34.1	6.092
6	13 17 6.66	1.9493	11 12 18.8	9.136	6	14 52 15.84	2.0235	17 20 37.3	6.015
7	13 19 3.64	1.9502	11 21 25.3	9.083	7	14 54 17.31	2.0253	17 26 35.9	5.938
8	13 21 0.68	1.9512	11 30 28.7	9.030	8	14 56 18.88	2.0273	17 32 29.9	5.860
9	13 22 57.78	1.9523	11 39 28.9	8.976	9	14 58 20.58	2.0292	17 38 19.1	5.782
10	13 24 54.95	1.9533	11 48 25.8	8.922	10	15 0 22.38	2.0310	17 44 3.7	5.703
11	13 26 52.17	1.9543	11 57 19.5	8.867	11	15 2 24.30	2.0330	17 49 43.5	5.624
12	13 28 49.46	1.9554	12 6 9.8	8.811	12	15 4 26.34	2.0349	17 55 18.6	5.545
13	13 30 46.82	1.9566	12 14 56.8	8.755	13	15 6 28.49	2.0368	18 0 48.9	5.465
14	13 32 44.25	1.9577	12 23 40.4	8.698	14	15 8 30.75	2.0387	18 6 14.4	5.384
15	13 34 41.74	1.9588	12 32 20.5	8.640	15	15 10 33.13	2.0406	18 11 35.0	5.303
16	13 36 39.31	1.9602	12 40 57.2	8.583	16	15 12 35.62	2.0424	18 16 50.8	5.223
17	13 38 36.96	1.9614	12 49 30.5	8.526	17	15 14 38.22	2.0443	18 22 1.7	5.141
18	13 40 34.68	1.9628	12 58 0.3	8.467	18	15 16 40.93	2.0462	18 27 7.7	5.058
19	13 42 32.49	1.9641	13 6 26.5	8.407	19	15 18 43.76	2.0481	18 32 8.7	4.976
20	13 44 30.37	1.9653	13 14 49.1	8.348	20	15 20 46.70	2.0500	18 37 4.8	4.893
21	13 46 28.33	1.9668	13 23 8.2	8.288	21	15 22 49.76	2.0518	18 41 55.8	4.809
22	13 48 26.38	1.9682	13 31 23.6	8.227	22	15 24 52.92	2.0537	18 46 41.9	4.726
23	13 50 24.51	1.9696	13 39 35.4	8.165	23	15 26 56.20	2.0555	18 51 22.9	4.641
24	13 52 22.73	1.9711	-13 47 43.4	-8.103	24	15 28 59.58	2.0573	-18 55 58.8	-4.557

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 19.					DECEMBER 21.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	15 28 59.58	2.0373	-18 55 58.8	-4.557	0	17 9 28.06	2.1186	-20 50 35.8	-0.118
1	15 31 3.07	2.0592	19 0 29.7	4.472	1	17 11 35.19	2.1191	20 50 39.9	-0.020
2	15 33 6.68	2.0610	19 4 55.4	4.386	2	17 13 42.35	2.1196	20 50 38.2	+0.077
3	15 35 10.39	2.0628	19 9 16.0	4.300	3	17 15 49.54	2.1200	20 50 30.7	0.174
4	15 37 14.21	2.0645	19 13 31.4	4.213	4	17 17 56.75	2.1203	20 50 17.3	0.273
5	15 39 18.13	2.0663	19 17 41.6	4.127	5	17 20 3.98	2.1208	20 49 58.0	0.370
6	15 41 22.16	2.0680	19 21 46.6	4.039	6	17 22 11.24	2.1211	20 49 32.9	0.468
7	15 43 26.29	2.0697	19 25 46.3	3.953	7	17 24 18.51	2.1213	20 49 1.9	0.566
8	15 45 30.52	2.0714	19 29 40.9	3.865	8	17 26 25.80	2.1216	20 48 25.0	0.663
9	15 47 34.86	2.0732	19 33 30.1	3.776	9	17 28 33.10	2.1218	20 47 42.3	0.761
10	15 49 39.30	2.0748	19 37 14.0	3.688	10	17 30 40.41	2.1219	20 46 53.7	0.858
11	15 51 43.84	2.0764	19 40 52.6	3.599	11	17 32 47.73	2.1221	20 45 59.3	0.956
12	15 53 48.47	2.0780	19 44 25.9	3.510	12	17 34 55.06	2.1222	20 44 59.0	1.054
13	15 55 53.20	2.0797	19 47 53.8	3.420	13	17 37 2.39	2.1223	20 43 52.8	1.152
14	15 57 58.03	2.0813	19 51 16.3	3.330	14	17 39 9.73	2.1223	20 42 40.8	1.248
15	16 0 2.96	2.0828	19 54 33.4	3.240	15	17 41 17.07	2.1223	20 41 23.0	1.347
16	16 2 7.97	2.0843	19 57 45.1	3.149	16	17 43 24.40	2.1222	20 39 59.2	1.444
17	16 4 13.08	2.0859	20 0 51.3	3.058	17	17 45 31.73	2.1222	20 38 29.7	1.541
18	16 6 18.28	2.0874	20 3 52.1	2.968	18	17 47 39.06	2.1220	20 36 54.3	1.639
19	16 8 23.57	2.0889	20 6 47.4	2.876	19	17 49 46.37	2.1218	20 35 13.0	1.736
20	16 10 28.95	2.0904	20 9 37.2	2.783	20	17 51 53.67	2.1216	20 33 26.0	1.833
21	16 12 34.42	2.0918	20 12 21.4	2.691	21	17 54 0.96	2.1214	20 31 33.1	1.930
22	16 14 39.97	2.0932	20 15 0.1	2.598	22	17 56 8.24	2.1211	20 29 34.4	2.028
23	16 16 45.60	2.0945	-20 17 33.2	-2.507	23	17 58 15.49	2.1208	-20 27 29.8	+2.124
DECEMBER 20.					DECEMBER 22.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	16 18 51.31	2.0958	-20 20 0.9	-2.414	0	18 0 22.73	2.1205	-20 25 19.5	+2.220
1	16 20 57.10	2.0973	20 22 22.9	2.320	1	18 2 29.95	2.1201	20 23 3.4	2.318
2	16 23 2.98	2.0986	20 24 39.3	2.227	2	18 4 37.14	2.1196	20 20 41.4	2.414
3	16 25 8.93	2.0998	20 26 50.1	2.133	3	18 6 44.30	2.1192	20 18 13.7	2.509
4	16 27 14.95	2.1010	20 28 55.2	2.038	4	18 8 51.44	2.1187	20 15 40.3	2.606
5	16 29 21.05	2.1022	20 30 54.7	1.945	5	18 10 58.54	2.1181	20 13 1.0	2.703
6	16 31 27.21	2.1033	20 32 48.6	1.850	6	18 13 5.61	2.1176	20 10 16.0	2.798
7	16 33 33.45	2.1045	20 34 36.7	1.755	7	18 15 12.65	2.1171	20 7 25.3	2.893
8	16 35 39.75	2.1056	20 36 19.2	1.660	8	18 17 19.66	2.1164	20 4 28.9	2.988
9	16 37 46.12	2.1067	20 37 55.9	1.565	9	18 19 26.62	2.1158	20 1 26.7	3.083
10	16 39 52.55	2.1077	20 39 27.0	1.470	10	18 21 33.55	2.1151	19 58 18.9	3.178
11	16 41 59.04	2.1087	20 40 52.3	1.374	11	18 23 40.43	2.1143	19 55 5.3	3.273
12	16 44 5.59	2.1097	20 42 11.9	1.279	12	18 25 47.27	2.1137	19 51 46.1	3.368
13	16 46 12.20	2.1106	20 43 25.8	1.183	13	18 27 54.07	2.1128	19 48 21.2	3.462
14	16 48 18.86	2.1115	20 44 33.8	1.086	14	18 30 0.81	2.1120	19 44 50.7	3.555
15	16 50 25.58	2.1124	20 45 36.1	0.991	15	18 32 7.51	2.1113	19 41 14.6	3.649
16	16 52 32.35	2.1132	20 46 32.7	0.894	16	18 34 14.16	2.1103	19 37 32.8	3.743
17	16 54 39.16	2.1140	20 47 23.4	0.797	17	18 36 20.75	2.1094	19 33 45.5	3.835
18	16 56 46.03	2.1148	20 48 8.3	0.701	18	18 38 27.29	2.1085	19 29 52.6	3.928
19	16 58 52.93	2.1154	20 48 47.5	0.604	19	18 40 33.77	2.1076	19 25 54.1	4.022
20	17 0 59.88	2.1162	20 49 20.8	0.507	20	18 42 40.20	2.1067	19 21 50.0	4.113
21	17 3 6.87	2.1168	20 49 48.3	0.410	21	18 44 46.57	2.1056	19 17 40.5	4.205
22	17 5 13.90	2.1174	20 50 10.0	0.313	22	18 46 52.87	2.1046	19 13 25.4	4.298
23	17 7 20.96	2.1180	20 50 25.8	0.215	23	18 48 59.12	2.1036	19 9 4.8	4.388
24	17 9 28.06	2.1186	-20 50 35.8	-0.118	24	18 51 5.30	2.1025	-19 4 38.8	+4.479

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 23.					DECEMBER 25.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 51 5.30	2.1025	-19 4 38.8	+4.479	0	20 30 29.88	2.0378	-13 52 44.2	+ 8.330
1	18 53 11.42	2.1014	19 0 7.3	4.570	1	20 32 32.11	2.0365	13 44 22.4	8.398
2	18 55 17.47	2.1003	18 55 30.4	4.660	2	20 34 34.26	2.0353	13 35 56.5	8.465
3	18 57 23.45	2.0991	18 50 48.1	4.750	3	20 36 36.34	2.0339	13 27 26.6	8.531
4	18 59 29.36	2.0980	18 46 0.4	4.840	4	20 38 38.33	2.0327	13 18 52.8	8.596
5	19 1 35.21	2.0968	18 41 7.3	4.929	5	20 40 40.26	2.0315	13 10 15.1	8.662
6	19 3 40.98	2.0956	18 36 8.9	5.018	6	20 42 42.11	2.0303	13 1 33.4	8.726
7	19 5 46.68	2.0943	18 31 5.2	5.106	7	20 44 43.89	2.0291	12 52 48.0	8.789
8	19 7 52.30	2.0931	18 25 56.2	5.194	8	20 46 45.60	2.0279	12 43 58.7	8.853
9	19 9 57.85	2.0918	18 20 41.9	5.282	9	20 48 47.24	2.0268	12 35 5.6	8.916
10	19 12 3.32	2.0906	18 15 22.4	5.368	10	20 50 48.81	2.0257	12 26 8.8	8.977
11	19 14 8.72	2.0893	18 9 57.7	5.456	11	20 52 50.32	2.0246	12 17 8.4	9.038
12	19 16 14.04	2.0880	18 4 27.7	5.543	12	20 54 51.76	2.0235	12 8 4.2	9.099
13	19 18 19.28	2.0867	17 58 52.6	5.628	13	20 56 53.14	2.0224	11 58 56.5	9.159
14	19 20 24.44	2.0854	17 53 12.3	5.714	14	20 58 54.45	2.0213	11 49 45.1	9.219
15	19 22 29.53	2.0841	17 47 26.9	5.799	15	21 0 55.70	2.0203	11 40 30.2	9.278
16	19 24 34.53	2.0827	17 41 36.4	5.883	16	21 2 56.89	2.0194	11 31 11.8	9.336
17	19 26 39.45	2.0813	17 35 40.9	5.968	17	21 4 58.03	2.0185	11 21 49.9	9.393
18	19 28 44.28	2.0799	17 29 40.3	6.053	18	21 6 59.11	2.0175	11 12 24.6	9.450
19	19 30 49.04	2.0786	17 23 34.6	6.136	19	21 9 0.13	2.0167	11 2 55.9	9.506
20	19 32 53.71	2.0771	17 17 24.0	6.218	20	21 11 1.11	2.0158	10 53 23.9	9.562
21	19 34 58.29	2.0757	17 11 8.5	6.300	21	21 13 2.03	2.0149	10 43 48.5	9.618
22	19 37 2.79	2.0743	17 4 48.0	6.383	22	21 15 2.90	2.0142	10 34 9.8	9.672
23	19 39 7.21	2.0729	-16 58 22.6	+6.464	23	21 17 3.73	2.0134	-10 24 27.9	+ 9.725
DECEMBER 24.					DECEMBER 26.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 41 11.54	2.0715	-16 51 52.3	+6.545	0	21 19 4.51	2.0127	-10 14 42.8	+ 9.778
1	19 43 15.79	2.0701	16 45 17.2	6.626	1	21 21 5.25	2.0119	10 4 54.5	9.830
2	19 45 19.95	2.0686	16 38 37.2	6.706	2	21 23 5.94	2.0113	9 55 3.2	9.882
3	19 47 24.02	2.0672	16 31 52.5	6.785	3	21 25 6.60	2.0107	9 45 8.7	9.933
4	19 49 28.01	2.0658	16 25 3.0	6.864	4	21 27 7.22	2.0100	9 35 11.2	9.983
5	19 51 31.92	2.0643	16 18 8.8	6.943	5	21 29 7.80	2.0094	9 25 10.7	10.033
6	19 53 35.73	2.0628	16 11 9.9	7.020	6	21 31 8.35	2.0089	9 15 7.2	10.083
7	19 55 39.46	2.0615	15 4 6.4	7.098	7	21 33 8.87	2.0084	9 5 0.8	10.131
8	19 57 43.11	2.0600	15 56 58.2	7.175	8	21 35 9.36	2.0079	8 54 51.5	10.179
9	19 59 46.66	2.0586	15 49 45.4	7.251	9	21 37 9.82	2.0075	8 44 39.3	10.226
10	20 1 50.14	2.0572	15 42 28.1	7.327	10	21 39 10.26	2.0072	8 34 24.4	10.272
11	20 3 53.52	2.0557	15 35 6.2	7.403	11	21 41 10.68	2.0068	8 24 6.7	10.318
12	20 5 56.82	2.0543	15 27 39.8	7.477	12	21 43 11.08	2.0065	8 13 46.3	10.363
13	20 8 0.03	2.0528	15 20 9.0	7.551	13	21 45 11.46	2.0063	8 3 23.2	10.407
14	20 10 3.16	2.0515	15 12 33.7	7.625	14	21 47 11.83	2.0060	7 52 57.5	10.450
15	20 12 6.21	2.0501	15 4 54.0	7.698	15	21 49 12.18	2.0058	7 42 29.2	10.493
16	20 14 9.17	2.0487	14 57 9.9	7.771	16	21 51 12.53	2.0057	7 31 58.3	10.536
17	20 16 12.05	2.0473	14 49 21.5	7.843	17	21 53 12.86	2.0056	7 21 24.9	10.578
18	20 18 14.84	2.0458	14 41 28.8	7.913	18	21 55 13.20	2.0056	7 10 49.0	10.618
19	20 20 17.55	2.0445	14 33 31.9	7.984	19	21 57 13.53	2.0055	7 0 10.7	10.658
20	20 22 20.18	2.0431	14 25 30.7	8.056	20	21 59 13.86	2.0055	6 49 30.0	10.698
21	20 24 22.72	2.0418	14 17 25.2	8.125	21	22 1 14.19	2.0056	6 38 47.0	10.737
22	20 26 25.19	2.0404	14 9 15.7	8.193	22	22 3 14.53	2.0058	6 28 1.6	10.775
23	20 28 27.57	2.0391	14 1 2.0	8.263	23	22 5 14.88	2.0059	6 17 14.0	10.812
24	20 30 29.88	2.0378	-13 52 44.2	+8.330	24	22 7 15.24	2.0062	- 6 6 24.2	+10.848

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 27.					DECEMBER 29.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	22 7 15.24	2.0062	-6 6 24.2	+10.848	0	23 44 46.96	2.0792	+3 2 9.9	+11.696
1	22 9 15.62	2.0064	5 55 32.2	10.884	1	23 46 51.80	2.0821	3 13 51.6	11.693
2	22 11 16.01	2.0068	5 44 38.1	10.920	2	23 48 56.81	2.0851	3 25 33.0	11.688
3	22 13 16.43	2.0071	5 33 41.8	10.955	3	23 51 2.01	2.0882	3 37 14.2	11.684
4	22 15 16.86	2.0074	5 22 43.5	10.988	4	23 53 7.39	2.0913	3 48 55.1	11.678
5	22 17 17.32	2.0079	5 11 43.2	11.021	5	23 55 12.96	2.0944	4 0 35.5	11.670
6	22 19 17.81	2.0085	5 0 41.0	11.053	6	23 57 18.72	2.0978	4 12 15.5	11.662
7	22 21 18.34	2.0091	4 49 36.8	11.085	7	23 59 24.69	2.1011	4 23 54.9	11.653
8	22 23 18.90	2.0096	4 38 30.8	11.116	8	0 1 30.85	2.1044	4 35 33.8	11.643
9	22 25 19.49	2.0103	4 27 22.9	11.146	9	0 3 37.22	2.1078	4 47 12.0	11.632
10	22 27 20.13	2.0110	4 16 13.3	11.175	10	0 5 43.79	2.1113	4 58 49.6	11.620
11	22 29 20.81	2.0117	4 5 1.9	11.204	11	0 7 50.58	2.1149	5 10 26.4	11.606
12	22 31 21.53	2.0125	3 53 48.8	11.232	12	0 9 57.58	2.1185	5 22 2.3	11.592
13	22 33 22.31	2.0133	3 42 34.1	11.259	13	0 12 4.80	2.1223	5 33 37.4	11.577
14	22 35 23.13	2.0143	3 31 17.7	11.286	14	0 14 12.25	2.1259	5 45 11.5	11.560
15	22 37 24.02	2.0153	3 19 59.8	11.311	15	0 16 19.91	2.1297	5 56 44.6	11.543
16	22 39 24.97	2.0163	3 8 40.4	11.335	16	0 18 27.81	2.1336	6 8 16.6	11.521
17	22 41 25.97	2.0173	2 57 19.6	11.359	17	0 20 35.94	2.1375	6 19 47.5	11.505
18	22 43 27.05	2.0185	2 45 57.3	11.383	18	0 22 44.31	2.1415	6 31 17.2	11.484
19	22 45 28.19	2.0197	2 34 33.6	11.406	19	0 24 52.92	2.1455	6 42 45.6	11.463
20	22 47 29.41	2.0210	2 23 8.6	11.428	20	0 27 1.77	2.1496	6 54 12.7	11.440
21	22 49 30.71	2.0223	2 11 42.3	11.448	21	0 29 10.87	2.1538	7 5 38.4	11.416
22	22 51 32.08	2.0236	2 0 14.8	11.468	22	0 31 20.22	2.1579	7 17 2.6	11.391
23	22 53 33.54	2.0250	-1 48 46.1	+11.488	23	0 33 29.82	2.1622	+7 28 25.3	+11.364
DECEMBER 28.					DECEMBER 30.				
0	22 55 35.08	2.0264	-1 37 16.3	+11.506	0	0 35 39.68	2.1665	+7 39 46.3	+11.336
1	22 57 36.71	2.0280	1 25 45.4	11.523	1	0 37 49.80	2.1709	7 51 5.7	11.308
2	22 59 38.44	2.0296	1 14 13.5	11.541	2	0 40 0.19	2.1753	8 2 23.3	11.278
3	23 1 40.26	2.0312	1 2 40.5	11.557	3	0 42 10.84	2.1798	8 13 39.1	11.248
4	23 3 42.18	2.0328	0 51 6.7	11.572	4	0 44 21.76	2.1843	8 24 53.1	11.217
5	23 5 44.20	2.0346	0 39 31.9	11.587	5	0 46 32.96	2.1889	8 36 5.1	11.183
6	23 7 46.33	2.0364	0 27 56.3	11.600	6	0 48 44.43	2.1936	8 47 15.0	11.148
7	23 9 48.57	2.0383	0 16 19.9	11.613	7	0 50 56.19	2.1983	8 58 22.9	11.113
8	23 11 50.93	2.0403	-0 4 42.7	11.625	8	0 53 8.22	2.2030	9 9 28.6	11.076
9	23 13 53.40	2.0422	+0 6 55.1	11.636	9	0 55 20.55	2.2078	9 20 32.0	11.038
10	23 15 55.99	2.0443	0 18 33.6	11.646	10	0 57 33.16	2.2127	9 31 33.2	10.999
11	23 17 58.71	2.0463	0 30 12.6	11.655	11	0 59 46.07	2.2176	9 42 31.9	10.958
12	23 20 1.55	2.0485	0 41 52.2	11.664	12	1 1 59.27	2.2225	9 53 28.2	10.917
13	23 22 4.53	2.0508	0 53 32.3	11.672	13	1 4 12.77	2.2275	10 4 22.0	10.874
14	23 24 7.64	2.0529	1 5 12.8	11.678	14	1 6 26.57	2.2326	10 15 13.1	10.829
15	23 26 10.88	2.0553	1 16 53.7	11.684	15	1 8 40.68	2.2377	10 26 1.5	10.784
16	23 28 14.27	2.0578	1 28 34.9	11.689	16	1 10 55.09	2.2428	10 36 47.2	10.738
17	23 30 17.81	2.0603	1 40 16.4	11.693	17	1 13 9.82	2.2480	10 47 30.1	10.690
18	23 32 21.50	2.0628	+1 51 58.1	11.697	18	1 15 24.85	2.2532	10 58 10.0	10.640
19	23 34 25.34	2.0653	2 3 40.0	11.699	19	1 17 40.20	2.2585	11 8 46.9	10.589
20	23 36 29.33	2.0679	2 15 22.0	11.701	20	1 19 55.87	2.2638	11 19 20.7	10.538
21	23 38 33.49	2.0707	2 27 4.1	11.701	21	1 22 11.86	2.2692	11 29 51.4	10.485
22	23 40 37.81	2.0734	2 38 46.1	11.700	22	1 24 28.17	2.2746	11 40 18.9	10.430
23	23 42 42.30	2.0763	2 50 28.1	11.698	23	1 26 44.81	2.2800	11 50 43.0	10.374
24	23 44 46.96	2.0792	+3 2 9.9	+11.696	24	1 29 1.77	2.2854	+12 1 3.8	+10.318

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 31.					DECEMBER 31.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	1 29 1.77	2.2854	+12 1 3.8	+10.318	12	1 56 51.55	2.3534	+14 0 18.3	+9.523
1	1 31 19.06	2.2910	12 11 21.1	10.258	13	1 59 12.93	2.3593	14 9 47.4	9.448
2	1 33 36.69	2.2965	12 21 34.8	10.198	14	2 1 34.67	2.3653	14 19 12.0	9.371
3	1 35 54.64	2.3021	12 31 44.9	10.138	15	2 3 56.76	2.3710	14 28 31.9	9.293
4	1 38 12.94	2.3077	12 41 51.3	10.074	16	2 6 19.19	2.3768	14 37 47.1	9.213
5	1 40 31.56	2.3133	12 51 53.8	10.010	17	2 8 41.98	2.3828	14 46 57.5	9.132
6	1 42 50.53	2.3190	13 1 52.5	9.945	18	2 11 5.13	2.3888	14 56 2.9	9.049
7	1 45 9.84	2.3247	13 11 47.2	9.878	19	2 13 28.63	2.3946	15 5 3.4	8.966
8	1 47 29.49	2.3304	13 21 37.9	9.810	20	2 15 52.48	2.4004	15 13 58.8	8.880
9	1 49 49.49	2.3362	13 31 24.4	9.740	21	2 18 16.68	2.4063	15 22 49.0	8.793
10	1 52 9.83	2.3419	13 41 6.7	9.669	22	2 20 41.24	2.4123	15 31 34.0	8.705
11	1 54 30.52	2.3477	13 50 44.7	9.597	23	2 23 6.16	2.4183	15 40 13.6	8.615
12	1 56 51.55	2.3534	+14 0 18.3	+9.523	24	2 25 31.43	2.4241	+15 48 47.8	+8.524

PHASES OF THE MOON.

● New Moon	Jan.	d h m	1 20 24.1	Mar.	d h m	31 9 4.9	June	d h m	27 8 52.6	Sept.	d h m	23 16 33.9
☾ First Quarter		8 22 55.2		Apr.	7 0 38.8		July	4 15 17.2		Oct.	1 20 37.3	
○ Full Moon		15 20 44.4			14 20 25.1			12 18 2.2			9 1 38.6	
☾ Last Quarter		23 16 22.0			22 23 21.1			19 23 3.0			15 17 4.7	
● New Moon		31 11 7.0			29 17 30.4			26 17 21.4			23 8 39.5	
☾ First Quarter	Feb.	7 6 52.3		May	6 11 33.9		Aug.	3 8 11.5			31 13 43.2	
○ Full Moon		14 11 38.2			14 13 1.3			11 5 39.5	Nov.	7 11 35.2		
☾ Last Quarter		22 13 47.7			22 10 3.9			18 3 56.1		14 3 40.5		
● New Moon	Mar.	1 23 11.4			29 1 11.9			25 3 37.1		22 3 19.7		
☾ First Quarter		8 15 14.1		June	5 0 21.9		Sept.	2 2 21.9		30 4 46.9		
○ Full Moon		16 3 41.1			13 4 28.2			9 15 54.3	Dec.	6 22 3.5		
☾ Last Quarter		24 8 33.9			20 17 32.9			16 9 31.7		13 18 2.4		
● New Moon		31 9 4.9			27 8 52.6			23 16 33.9		21 22 55.2		
☾ First Quarter	Apr.	7 0 38.8		July	4 15 17.2		Oct.	1 20 37.3		29 17 25.0		

APOGEE.

PERIGEE.

January	d h	23 11.4	August	d h	4 3.3	January	d h	10 22.2	July	d h	23 2.4
February	20 7.9		August	31 22.3		February	4 14.9		August	17 17.0	
March	20 0.6		September	28 17.5		March	4 2.7		September	12 20.1	
April	16 8.5		October	26 8.7		April	1 9.0		October	10 16.9	
May	13 10.2		November	22 14.4		April	29 19.3		November	8 1.9	
June	9 18.5		December	19 15.6		May	28 5.4		December	6 14.7	
July	7 9.4					June	25 10.4				

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
	" ' "	" ' "	" "	" "	"	d			h m	m
Jan. 1.0	269 59 2.0	+1 32 4.0	15 17.9	56 2.73	+1.361	28.9	Jan. 1	L	11 44.5	2.20
1.5	276 22 53.5	2 4 58.1	15 22.3	56 19.11	1.366	29.4			.....	...
2.0	282 50 48.7	2 36 34.8	15 26.8	56 35.45	1.353	0.2	2	U	0 10.9	2.19
2.5	289 22 44.9	3 6 26.3	15 31.2	56 51.51	1.321	0.7	2	L	12 37.1	2.17
3.0	295 58 35.6	3 34 4.8	15 35.4	57 7.11	1.277	1.2	3	U	1 3.0	2.15
3.5	302 38 11.0	+3 59 3.1	15 39.5	57 22.11	+1.221	1.7	3	L	13 28.7	2.13
4.0	309 21 18.4	4 20 55.8	15 43.4	57 36.37	1.155	2.2	4	U	1 54.1	2.10
4.5	316 7 42.7	4 39 19.2	15 47.0	57 49.80	1.083	2.7	4	L	14 19.2	2.08
5.0	322 57 7.5	4 53 52.5	15 50.5	58 2.35	1.008	3.2	5	U	2 44.0	2.06
5.5	329 49 15.2	5 4 18.4	15 53.6	58 13.98	0.932	3.7	5	L	15 8.6	2.04
6.0	336 43 48.2	+5 10 22.9	15 56.6	58 24.72	+0.858	4.2	6	U	3 33.1	2.04
6.5	343 40 29.2	5 11 56.7	15 59.2	58 34.57	0.784	4.7	6	L	15 57.6	2.04
7.0	350 39 1.4	5 8 54.7	16 1.7	58 43.53	0.709	5.2	7	U	4 22.2	2.06
7.5	357 39 9.6	5 1 16.4	16 3.9	58 51.59	0.636	5.7	7	L	16 47.0	2.08
8.0	4 40 39.5	4 49 5.9	16 5.8	58 58.79	0.563	6.2	8	U	5 12.1	2.11
8.5	11 43 18.3	+4 32 32.0	16 7.6	59 5.09	+0.485	6.7	8	L	17 37.6	2.15
9.0	18 46 53.6	4 11 48.1	16 9.0	59 10.42	0.403	7.2	9	U	6 3.7	2.20
9.5	25 51 14.1	3 47 11.7	16 10.2	59 14.73	0.314	7.7	9	L	18 30.4	2.25
10.0	32 56 8.7	3 19 4.9	16 11.1	59 17.92	0.215	8.2	10	U	6 57.7	2.30
10.5	40 1 25.8	2 47 53.4	16 11.6	59 19.84	+0.104	8.7	10	L	19 25.7	2.36
11.0	47 6 52.6	+2 14 6.4	16 11.7	59 20.36	-0.020	9.2	11	U	7 54.3	2.41
11.5	54 12 15.0	1 38 16.4	16 11.4	59 19.32	0.155	9.7	11	L	20 23.5	2.45
12.0	61 17 17.0	1 0 58.3	16 10.7	59 16.58	0.304	10.2	12	U	8 53.1	2.48
12.5	68 21 40.3	+0 22 48.7	16 9.4	59 11.98	0.463	10.7	12	L	21 22.9	2.49
13.0	75 25 4.1	-0 15 34.7	16 7.7	59 5.45	0.628	11.2	13	U	9 52.7	2.47
13.5	82 27 5.5	-0 53 34.1	16 5.3	58 56.90	-0.797	11.7	13	L	22 22.2	2.44
14.0	89 27 19.5	1 30 32.7	16 2.4	58 46.33	0.965	12.2	14	U	10 51.3	2.40
14.5	96 25 20.0	2 5 55.5	15 59.0	58 33.77	1.126	12.7	14	L	23 19.8	2.34
15.0	103 20 40.4	2 39 10.3	15 55.1	58 19.36	1.274	13.2	15	U	11 47.5	2.28
15.5	110 12 54.4	3 9 48.3	15 50.7	58 3.26	1.405	13.7			.....	...
16.0	117 1 37.2	-3 37 25.0	15 45.9	57 45.73	-1.514	14.2	16	L	0 14.4	2.21
16.5	123 46 26.1	4 1 40.6	15 40.8	57 27.03	1.598	14.7	16	U	12 40.4	2.13
17.0	130 27 2.6	4 22 19.9	15 35.5	57 7.50	1.652	15.2	17	L	1 5.5	2.06
17.5	137 3 11.7	4 39 12.6	15 30.1	56 47.50	1.675	15.7	17	U	13 29.8	1.99
18.0	143 34 43.7	4 52 12.7	15 24.6	56 27.42	1.667	16.2	18	L	1 53.3	1.93
18.5	150 1 34.3	-5 1 18.4	15 19.2	56 7.61	-1.628	16.7	18	U	14 16.2	1.88
19.0	156 23 44.5	5 6 31.4	15 14.0	55 48.46	1.559	17.2	19	L	2 38.5	1.84
19.5	162 41 21.4	5 7 56.3	15 9.0	55 30.32	1.490	17.7	19	U	15 0.3	1.80
20.0	168 54 37.3	5 5 40.4	15 4.5	55 13.53	1.335	18.2	20	L	3 21.8	1.78
20.5	175 3 49.6	4 59 52.5	15 0.3	54 58.36	1.188	18.7	20	U	15 43.1	1.77
21.0	181 9 20.9	-4 50 42.8	14 56.7	54 45.09	-1.021	19.2	21	L	4 4.3	1.76
21.5	187 11 37.8	4 38 22.6	14 53.7	54 33.93	0.836	19.7	21	U	16 25.4	1.76
22.0	193 11 10.4	4 23 3.7	14 51.3	54 25.09	0.635	20.2	22	L	4 46.7	1.78
22.5	199 8 32.4	4 4 58.3	14 49.5	54 18.72	0.426	20.7	22	U	17 8.2	1.80
23.0	205 4 19.8	3 44 19.0	14 48.5	54 14.90	-0.210	21.2	23	L	5 29.9	1.83
23.5	210 59 10.5	-3 21 18.3	14 48.2	54 13.71	+0.012	21.7	23	U	17 52.1	1.86
24.0	216 53 43.9	-2 56 9.4	14 48.6	54 15.20	+0.235	22.2	24	L	6 14.6	1.90

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.				Var. per Hour.
	" "	" "	" "	" "	" "	d			h m	m	
Jan. 24.0	216 53 43.9	-2 56 9.4	14 48.6	54 15.20	+0.235	22.2	Jan. 24	L	6 14.6	1.90	
24.5	222 48 40.5	2 29 5.5	14 49.7	54 19.33	0.454	22.7	24	U	18 37.7	1.95	
25.0	228 44 40.4	2 0 20.4	14 51.5	54 26.08	0.668	23.2	25	L	7 1.3	1.99	
25.5	234 42 23.8	1 30 9.1	14 54.0	54 35.32	0.872	23.7	25	U	19 25.4	2.03	
26.0	240 42 29.6	0 58 47.0	14 57.2	54 46.96	1.065	24.2	26	L	7 50.1	2.08	
26.5	246 45 35.6	-0 26 31.0	15 1.0	55 0.81	+1.240	24.7	26	U	20 15.2	2.12	
27.0	252 52 16.4	+0 6 20.4	15 5.3	55 16.65	1.396	25.2	27	L	8 40.9	2.15	
27.5	259 3 4.0	0 39 27.4	15 10.1	55 34.22	1.528	25.7	27	U	21 6.8	2.18	
28.0	265 18 26.2	1 12 27.8	15 15.3	55 53.21	1.633	26.2	28	L	9 33.1	2.20	
28.5	271 38 45.9	1 44 58.1	15 20.7	56 13.30	1.710	26.7	28	U	21 59.5	2.21	
29.0	278 4 20.8	+2 16 32.6	15 26.4	56 34.12	+1.754	27.2	29	L	10 26.0	2.21	
29.5	284 35 21.8	2 46 44.3	15 32.2	56 55.27	1.785	27.7	29	U	22 52.5	2.20	
30.0	291 11 52.8	3 15 4.7	15 37.9	57 16.34	1.742	28.2	30	L	11 18.8	2.18	
30.5	297 53 50.6	3 41 5.1	15 43.5	57 36.94	1.684	28.7	30	U	23 44.9	2.17	
31.0	304 41 3.9	4 4 16.6	15 48.9	57 56.63	1.593	29.2			.....	...
31.5	311 33 13.8	+4 24 11.6	15 53.9	58 15.06	+1.473	0.0	31	L	12 10.8	2.15	
Feb. 1.0	318 29 54.5	4 40 24.6	15 58.5	58 31.88	1.327	0.5	Feb. 1	U	0 36.5	2.14	
1.5	325 30 33.9	4 52 33.4	16 2.6	58 46.82	1.159	1.0	1	L	13 2.1	2.12	
2.0	332 34 34.5	5 0 19.7	16 6.1	58 59.64	0.977	1.5	2	U	1 27.4	2.11	
2.5	339 41 15.8	5 3 30.3	16 9.0	59 10.22	0.785	2.0	2	L	13 52.7	2.10	
3.0	346 49 54.9	+5 1 57.8	16 11.2	59 18.46	+0.589	2.5	3	U	2 17.9	2.11	
3.5	353 59 49.6	4 55 40.7	16 12.8	59 24.38	0.399	3.0	3	L	14 43.3	2.12	
4.0	1 10 19.0	4 44 43.7	16 13.8	59 28.06	0.215	3.5	4	U	3 8.8	2.14	
4.5	8 20 45.5	4 29 17.4	16 14.2	59 29.59	+0.042	4.0	4	L	15 34.6	2.17	
5.0	15 30 36.2	4 9 37.8	16 14.1	59 29.14	-0.114	4.5	5	U	4 0.8	2.19	
5.5	22 39 23.3	+3 46 5.7	16 13.5	59 26.92	-0.254	5.0	5	L	16 27.3	2.23	
6.0	29 46 44.6	3 19 6.3	16 12.5	59 23.10	0.378	5.5	6	U	4 54.4	2.28	
6.5	36 52 23.3	2 49 7.7	16 11.1	59 17.91	0.486	6.0	6	L	17 22.0	2.32	
7.0	43 56 7.9	2 16 40.7	16 9.3	59 11.50	0.579	6.5	7	U	5 50.0	2.36	
7.5	50 57 50.9	1 42 17.8	16 7.3	59 4.07	0.658	7.0	7	L	18 18.5	2.38	
8.0	57 57 28.7	+1 6 32.4	16 5.0	58 55.75	-0.729	7.5	8	U	6 47.2	2.40	
8.5	64 54 59.7	+0 29 58.6	16 2.5	58 46.60	0.794	8.0	8	L	19 16.2	2.42	
9.0	71 50 23.6	-0 6 49.9	15 59.8	58 36.73	0.851	8.5	9	U	7 45.3	2.42	
9.5	78 43 40.8	0 43 19.6	15 57.0	58 26.18	0.907	9.0	9	L	20 14.2	2.40	
10.0	85 34 50.9	1 18 58.4	15 53.9	58 14.97	0.961	9.5	10	U	8 42.8	2.37	
10.5	92 23 52.2	-1 53 15.9	15 50.7	58 3.13	-1.013	10.0	10	L	21 11.0	2.32	
11.0	99 10 41.8	2 25 43.2	15 47.3	57 50.66	1.065	10.5	11	U	9 38.5	2.27	
11.5	105 55 14.5	2 55 54.3	15 43.7	57 37.57	1.115	11.0	11	L	22 5.4	2.21	
12.0	112 37 23.0	3 23 25.5	15 40.0	57 23.90	1.164	11.5	12	U	10 31.5	2.15	
12.5	119 16 58.4	3 47 56.7	15 36.1	57 9.65	1.207	12.0	12	L	22 56.9	2.08	
13.0	125 53 50.6	-4 9 11.0	15 32.1	56 54.95	-1.244	12.5	13	U	11 21.5	2.02	
13.5	132 27 49.0	4 26 55.1	15 28.0	56 39.83	1.271	13.0	13	L	23 45.4	1.97	
14.0	138 58 42.2	4 40 59.7	15 23.8	56 24.48	1.288	13.5			.....	...
14.5	145 26 20.8	4 51 18.7	15 19.6	56 8.98	1.291	14.0	14	U	12 8.7	1.92	
15.0	151 50 36.1	4 57 50.2	15 15.4	55 53.56	1.277	14.5	15	L	0 31.5	1.87	
15.5	158 11 22.4	-5 0 35.2	15 11.2	55 38.40	-1.246	15.0	15	U	12 53.7	1.83	
16.0	164 28 36.8	-4 59 38.0	15 7.2	55 23.73	-1.196	15.5	16	L	1 15.6	1.82	

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
	" "	" "	" "	" "	"	d		h m	m	
Feb. 16.0	164 28 36.8	-4 59 38.0	15 7.2	55 23.73	-1.196	15.5	Feb. 16	L	1 15.6	1.82
16.5	170 42 20.0	4 55 5.2	15 3.4	55 9.77	1.128	16.0	16	U	13 37.3	1.79
17.0	176 52 36.8	4 47 6.0	14 59.9	54 56.73	1.040	16.5	17	L	1 58.7	1.78
17.5	182 59 36.4	4 35 51.2	14 56.6	54 44.90	0.931	17.0	17	U	14 20.1	1.78
18.0	189 3 31.8	4 21 33.0	14 53.8	54 34.47	0.804	17.5	18	L	2 41.4	1.78
18.5	195 4 41.2	-4 4 24.4	14 51.4	54 25.68	-0.659	18.0	18	U	15 2.9	1.79
19.0	201 3 26.1	3 44 39.5	14 49.5	54 18.72	0.498	18.5	19	L	3 24.5	1.81
19.5	207 0 12.7	3 22 32.5	14 48.2	54 13.80	0.320	19.0	19	U	15 46.4	1.84
20.0	212 55 30.2	2 58 18.0	14 47.4	54 11.08	-0.131	19.5	20	L	4 8.6	1.87
20.5	218 49 51.7	2 32 10.7	14 47.3	54 10.70	+0.069	20.0	20	U	16 31.2	1.90
21.0	224 43 52.8	-2 4 25.5	14 47.9	54 12.78	+0.278	20.5	21	L	4 54.2	1.94
21.5	230 38 11.5	1 35 17.6	14 49.2	54 17.40	0.493	21.0	21	U	17 17.7	1.97
22.0	236 38 27.9	1 5 2.5	14 51.1	54 24.62	0.710	21.5	22	L	5 41.6	2.01
22.5	242 30 23.4	0 33 56.0	14 53.8	54 34.43	0.926	22.0	22	U	18 6.0	2.05
23.0	248 29 39.8	-0 2 14.6	14 57.2	54 46.82	1.137	22.5	23	L	6 30.8	2.08
23.5	254 31 59.4	+0 29 44.0	15 1.2	55 1.68	+1.340	23.0	23	U	18 55.9	2.11
24.0	260 38 3.4	1 1 41.2	15 5.9	55 18.94	1.532	23.5	24	L	7 21.4	2.14
24.5	266 48 31.4	1 33 16.8	15 11.2	55 38.38	1.705	24.0	24	U	19 47.2	2.16
25.0	273 4 0.5	2 4 9.3	15 17.1	55 59.78	1.858	24.5	25	L	8 13.1	2.17
25.5	279 25 4.2	2 33 55.5	15 23.4	56 22.86	1.983	25.0	25	U	20 39.2	2.18
26.0	285 52 10.5	+3 2 10.4	15 30.0	56 47.24	+2.075	25.5	26	L	9 5.3	2.18
26.5	292 25 41.1	3 28 27.5	15 36.9	57 12.52	2.132	26.0	26	U	21 31.4	2.17
27.0	299 5 50.4	3 52 19.3	15 43.9	57 38.23	2.146	26.5	27	L	9 57.4	2.16
27.5	305 52 44.2	4 13 17.9	15 50.9	58 3.83	2.113	27.0	27	U	22 23.3	2.16
28.0	312 46 17.2	4 30 55.4	15 57.7	58 28.76	2.035	27.5	28	L	10 49.2	2.16
28.5	319 46 13.8	+4 44 45.2	16 4.1	58 52.48	+1.909	28.0	28	U	23 15.1	2.15
Mar. 1.0	326 52 8.0	4 54 23.7	16 10.1	59 14.38	1.735	28.5	Mar. 1	L	11 40.9	2.15
1.5	334 3 22.4	4 59 30.6	16 15.4	59 33.96	1.520	29.0			.....	...
2.0	341 19 10.5	4 59 51.1	16 20.0	59 50.71	1.266	0.0	2	U	0 6.8	2.16
2.5	348 38 37.2	4 55 16.8	16 23.7	60 4.23	0.986	0.5	2	L	12 32.8	2.17
3.0	356 0 42.1	+4 45 46.4	16 26.4	60 14.29	+0.687	1.0	3	U	0 59.0	2.19
3.5	3 24 21.5	4 31 26.2	16 28.2	60 20.67	0.377	1.5	3	L	13 25.5	2.22
4.0	10 48 31.2	4 12 30.2	16 28.9	60 23.34	+0.069	2.0	4	U	1 52.3	2.25
4.5	18 12 10.3	3 49 19.5	16 28.6	60 22.38	-0.224	2.5	4	L	14 19.6	2.29
5.0	25 34 22.5	3 22 21.4	16 27.4	60 18.04	0.497	3.0	5	U	2 47.3	2.33
5.5	32 54 18.5	+2 52 8.3	16 25.4	60 10.56	-0.743	3.5	5	L	15 15.4	2.36
6.0	40 11 17.9	2 19 15.9	16 22.6	60 0.34	0.954	4.0	6	U	3 43.9	2.40
6.5	47 24 48.9	1 44 22.0	16 19.2	59 47.80	1.131	4.5	6	L	16 12.9	2.43
7.0	54 34 28.9	1 8 5.3	16 15.3	59 33.35	1.270	5.0	7	U	4 42.1	2.44
7.5	61 40 4.2	+0 31 3.9	16 10.9	59 17.46	1.374	5.5	7	L	17 11.4	2.44
8.0	68 41 27.7	-0 6 5.3	16 6.3	59 0.49	-1.448	6.0	8	U	5 40.7	2.44
8.5	75 38 39.6	0 42 47.4	16 1.5	58 42.83	1.491	6.5	8	L	18 9.8	2.41
9.0	82 31 44.2	1 18 30.3	15 56.6	58 24.80	1.508	7.0	9	U	6 38.5	2.38
9.5	89 20 49.5	1 52 44.3	15 51.6	58 6.71	1.505	7.5	9	L	19 6.8	2.33
10.0	96 6 6.0	2 25 3.0	15 46.7	57 48.73	1.489	8.0	10	U	7 34.4	2.27
10.5	102 47 45.1	-2 55 2.9	15 41.9	57 31.03	-1.459	8.5	10	L	20 1.3	2.21
11.0	109 25 58.0	-3 22 23.3	15 37.2	57 13.74	-1.422	9.0	11	U	8 27.4	2.15

MOON, 1919.

121

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.				Var. per Hour.
	" ' "	" ' "	" "	" "	"	d			h m	m	
Mar. 10.0	96 6 6.0	-2 25 3.0	15 46.7	57 48.73	-1.489	8.0	Mar. 10	U	7 34.4	2.27	
10.5	102 47 45.1	2 55 2.9	15 41.9	57 31.03	1.459	8.5	10	L	20 1.3	2.21	
11.0	109 25 58.0	3 22 23.3	15 37.2	57 13.74	1.422	9.0	11	U	8 27.4	2.15	
11.5	116 0 55.9	3 46 46.6	15 32.6	56 56.94	1.376	9.5	11	L	20 52.8	2.09	
12.0	122 32 48.0	4 7 58.2	15 28.2	56 40.72	1.329	10.0	12	U	9 17.5	2.02	
12.5	129 1 42.5	-4 25 46.5	15 23.9	56 25.04	-1.282	10.5	12	L	21 41.4	1.96	
13.0	135 27 45.7	4 40 2.5	15 19.8	56 9.96	1.232	11.0	13	U	10 4.7	1.92	
13.5	141 51 2.2	4 50 40.4	15 15.9	55 55.48	1.181	11.5	13	L	22 27.5	1.88	
14.0	148 11 35.2	4 57 36.9	15 12.1	55 41.62	1.130	12.0	14	U	10 49.8	1.85	
14.5	154 29 27.1	5 0 51.8	15 8.5	55 28.37	1.076	12.5	14	L	23 11.8	1.82	
15.0	160 44 39.6	-5 0 27.0	15 5.1	55 15.80	-1.020	13.0	15	U	11 33.4	1.79	
15.5	166 57 14.1	4 56 27.5	15 1.8	55 3.91	0.959	13.5	15	L	23 54.9	1.78	
16.0	173 7 12.9	4 49 0.2	14 58.8	54 52.80	0.893	14.0			.....	...
16.5	179 14 39.4	4 38 14.3	14 56.0	54 42.51	0.820	14.5	16	U	12 16.2	1.78	
17.0	185 19 38.5	4 24 20.6	14 53.5	54 33.17	0.736	15.0	17	L	0 37.6	1.78	
17.5	191 22 17.5	-4 7 31.7	14 51.2	54 24.89	-0.643	15.5	17	U	12 59.0	1.78	
18.0	197 22 45.9	3 48 1.3	14 49.3	54 17.77	0.540	16.0	18	L	1 20.5	1.80	
18.5	203 21 16.1	3 26 4.1	14 47.7	54 11.97	0.425	16.5	18	U	13 42.3	1.82	
19.0	209 18 3.9	3 1 55.5	14 46.5	54 7.61	0.298	17.0	19	L	2 4.3	1.85	
19.5	215 13 27.9	2 35 51.7	14 45.7	54 4.87	0.158	17.5	19	U	14 26.7	1.88	
20.0	221 7 49.9	-2 8 9.0	14 45.5	54 3.87	-0.006	18.0	20	L	2 49.4	1.90	
20.5	227 1 35.3	1 39 4.0	14 45.7	54 4.78	+0.160	18.5	20	U	15 12.4	1.94	
21.0	232 55 12.3	1 8 53.4	14 46.5	54 7.74	0.335	19.0	21	L	3 35.9	1.97	
21.5	238 49 12.2	0 37 54.2	14 47.9	54 12.85	0.520	19.5	21	U	15 59.7	2.00	
22.0	244 44 9.0	-0 6 23.6	14 49.9	54 20.24	0.712	20.0	22	L	4 23.9	2.03	
22.5	250 40 38.9	+0 25 21.1	14 52.6	54 29.97	+0.911	20.5	22	U	16 48.4	2.05	
23.0	256 39 19.9	0 57 1.9	14 55.9	54 42.11	1.114	21.0	23	L	5 13.1	2.08	
23.5	262 40 51.8	1 28 20.6	14 59.9	54 56.70	1.316	21.5	23	U	17 38.2	2.09	
24.0	268 45 54.6	1 58 57.8	15 4.5	55 13.67	1.513	22.0	24	L	6 3.3	2.10	
24.5	274 55 9.0	2 28 33.4	15 9.8	55 32.98	1.704	22.5	24	U	18 28.6	2.11	
25.0	281 9 14.2	+2 56 46.3	15 15.6	55 54.52	+1.882	23.0	25	L	6 54.0	2.11	
25.5	287 28 48.0	3 23 14.0	15 22.0	56 18.07	2.041	23.5	25	U	19 19.3	2.11	
26.0	293 54 24.4	3 47 32.9	15 29.0	56 43.41	2.178	24.0	26	L	7 44.7	2.11	
26.5	300 26 33.6	4 9 18.6	15 36.3	57 10.21	2.284	24.5	26	U	20 10.0	2.11	
27.0	307 5 39.4	4 28 5.8	15 43.8	57 38.07	2.352	25.0	27	L	8 35.4	2.12	
27.5	313 51 58.0	+4 43 29.2	15 51.6	58 6.49	+2.376	25.5	27	U	21 0.8	2.12	
28.0	320 45 36.3	4 55 3.6	15 59.3	58 34.90	2.352	26.0	28	L	9 26.2	2.12	
28.5	327 46 30.9	5 2 25.9	16 6.9	59 2.72	2.276	26.5	28	U	21 51.8	2.14	
29.0	334 54 25.8	5 5 15.8	16 14.1	59 29.28	2.139	27.0	29	L	10 17.6	2.16	
29.5	342 8 53.5	5 3 16.8	16 20.8	59 53.82	1.944	27.5	29	U	22 43.6	2.19	
30.0	349 29 13.2	+4 56 18.6	16 26.8	60 15.73	+1.695	28.0	30	L	11 10.1	2.22	
30.5	356 54 32.8	4 44 17.3	16 31.9	60 34.31	1.396	28.5	30	U	23 37.0	2.26	
31.0	4 23 50.0	4 27 17.5	16 35.9	60 49.07	1.055	29.0			.....	...
31.5	11 55 55.0	4 5 31.9	16 38.7	60 59.51	0.681	0.1	31	L	12 4.4	2.31	
Apr. 1.0	19 29 33.0	3 39 22.3	16 40.3	61 5.36	+0.292	0.6	Apr. 1	U	0 32.4	2.36	
1.5	27 3 27.8	+3 9 18.2	16 40.6	61 6.52	-0.099	1.1	1	L	13 1.0	2.40	
2.0	34 36 25.5	+2 35 56.0	16 39.7	61 3.03	-0.480	1.6	2	U	1 30.1	2.45	

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
	" "	" "	" "	" "	" "	d		h m	m	
Apr. 1.0	19 29 33.0	+3 39 22.3	16 40.3	61 5.36	+0.292	0.6	Apr. 1	U	0 32.4	2.36
1.5	27 3 27.8	3 9 18.2	16 40.6	61 6.52	-0.099	1.1	1	L	13 1.0	2.40
2.0	34 36 25.5	2 35 56.0	16 39.7	61 3.03	0.480	1.6	2	U	1 30.1	2.45
2.5	42 7 17.3	1 59 57.3	16 37.5	60 55.10	0.835	2.1	2	L	13 59.8	2.49
3.0	49 35 1.6	1 22 6.7	16 34.3	60 43.12	1.155	2.6	3	U	2 29.9	2.52
3.5	56 58 46.7	+0 43 10.2	16 30.0	60 27.55	-1.431	3.1	3	L	15 0.3	2.54
4.0	64 17 51.5	+0 3 52.6	16 25.0	60 8.97	1.656	3.6	4	U	3 30.8	2.53
4.5	71 31 45.3	-0 35 3.2	16 19.2	59 48.01	1.828	4.1	4	L	16 1.0	2.51
5.0	78 40 8.7	1 12 57.8	16 13.1	59 25.29	1.951	4.6	5	U	4 31.0	2.48
5.5	85 42 51.0	1 49 16.2	16 6.5	59 1.38	2.025	5.1	5	L	17 0.4	2.42
6.0	92 39 50.4	-2 23 28.1	15 59.9	58 36.86	-2.055	5.6	6	U	5 29.0	2.36
6.5	99 31 12.0	2 55 7.7	15 53.1	58 12.22	2.045	6.1	6	L	17 56.9	2.28
7.0	106 17 6.3	3 23 54.0	15 46.5	57 47.90	2.003	6.6	7	U	6 23.8	2.21
7.5	112 57 47.7	3 49 30.0	15 40.1	57 24.24	1.937	7.1	7	L	18 49.9	2.14
8.0	119 33 33.9	4 11 42.7	15 33.9	57 1.49	1.850	7.6	8	U	7 15.1	2.06
8.5	126 4 43.9	-4 30 22.6	15 28.0	56 39.91	-1.747	8.1	8	L	19 39.4	1.99
9.0	132 31 37.6	4 45 23.1	15 22.5	56 19.60	1.635	8.6	9	U	8 3.0	1.94
9.5	138 54 34.5	4 56 40.5	15 17.3	56 0.69	1.517	9.1	9	L	20 26.0	1.89
10.0	145 13 54.3	5 4 13.2	15 12.5	55 43.21	1.396	9.6	10	U	8 48.4	1.84
10.5	151 29 55.0	5 8 2.3	15 8.2	55 27.18	1.276	10.1	10	L	21 10.3	1.81
11.0	157 42 53.7	-5 8 10.6	15 4.2	55 12.58	-1.156	10.6	11	U	9 31.9	1.79
11.5	163 53 6.5	5 4 42.9	15 0.6	54 59.43	1.039	11.1	11	L	21 53.3	1.77
12.0	170 0 47.6	4 57 45.6	14 57.4	54 47.62	0.928	11.6	12	U	10 14.5	1.76
12.5	176 6 10.4	4 47 27.3	14 54.5	54 37.15	0.818	12.1	12	L	22 35.7	1.77
13.0	182 9 27.3	4 33 57.4	14 52.0	54 27.98	0.712	12.6	13	U	10 57.0	1.77
13.5	188 10 50.2	-4 17 27.4	14 49.9	54 20.06	-0.608	13.1	13	L	23 18.3	1.79
14.0	194 10 30.5	3 58 10.0	14 48.1	54 13.38	0.505	13.6	14	U	11 39.9	1.81
14.5	200 8 39.7	3 36 19.0	14 46.6	54 7.94	0.403	14.1			.....	...
15.0	206 5 30.0	3 12 9.4	14 45.4	54 3.71	0.300	14.6	15	L	0 1.7	1.83
15.5	212 1 14.2	2 45 57.2	14 44.6	54 0.76	0.192	15.1	15	U	12 23.8	1.86
16.0	217 56 6.2	-2 17 59.1	14 44.2	53 59.11	-0.082	15.6	16	L	0 46.3	1.89
16.5	223 50 21.7	1 48 32.4	14 44.1	53 58.82	+0.034	16.1	16	U	13 9.1	1.92
17.0	229 44 17.8	1 17 55.0	14 44.4	53 59.95	0.155	16.6	17	L	1 32.3	1.95
17.5	235 38 13.5	0 46 25.1	14 45.1	54 2.58	0.285	17.1	17	U	13 55.9	1.98
18.0	241 32 29.9	-0 14 21.2	14 46.3	54 6.83	0.423	17.6	18	L	2 19.8	2.00
18.5	247 27 30.5	+0 17 58.1	14 47.9	54 12.77	+0.570	18.1	18	U	14 44.0	2.03
19.0	253 23 40.7	0 50 13.8	14 50.0	54 20.53	0.723	18.6	19	L	3 8.5	2.05
19.5	259 21 28.4	1 22 6.9	14 52.6	54 30.15	0.883	19.1	19	U	15 33.1	2.06
20.0	265 21 23.1	1 53 18.2	14 55.8	54 41.76	1.051	19.6	20	L	3 57.9	2.07
20.5	271 23 56.5	2 23 28.2	14 59.5	54 55.39	1.222	20.1	20	U	16 22.7	2.07
21.0	277 29 41.2	+2 52 17.1	15 3.8	55 11.11	+1.397	20.6	21	L	4 47.5	2.07
21.5	283 39 11.3	3 19 24.7	15 8.6	55 28.92	1.570	21.1	21	U	17 12.3	2.06
22.0	289 53 0.6	3 44 30.3	15 14.1	55 48.78	1.738	21.6	22	L	5 37.0	2.05
22.5	296 11 43.2	4 7 12.9	15 20.0	56 10.61	1.899	22.1	22	U	18 1.6	2.04
23.0	302 35 51.0	4 27 10.8	15 26.5	56 34.31	2.046	22.6	23	L	6 26.1	2.04
23.5	309 5 54.1	+4 44 2.5	15 33.4	56 59.64	+2.171	23.1	23	U	18 50.6	2.05
24.0	315 42 18.5	+4 57 26.1	15 40.6	57 26.33	+2.274	23.6	24	L	7 15.2	2.05

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.				Var. per Hour.
	" ' "	" ' "	" "	" "	" "	d			h m	m	
pr. 24.0	315 42 18.5	+4 57 26.1	15 40.6	57 26.33	+2.274	23.6	Apr. 24	L	7 15.2	2.05	
24.5	322 25 25.7	5 7 0.5	15 48.2	57 54.08	2.343	24.1	24	U	19 39.8	2.06	
25.0	329 15 30.1	5 12 25.7	15 55.9	58 22.40	2.371	24.6	25	L	8 4.6	2.07	
25.5	336 12 38.3	5 13 23.7	16 3.7	58 50.80	2.354	25.1	25	U	20 29.6	2.10	
26.0	343 16 47.7	5 9 39.6	16 11.3	59 18.68	2.283	25.6	26	L	8 55.0	2.13	
26.5	350 27 44.5	+5 1 2.8	16 18.5	59 45.36	+2.154	26.1	26	U	21 20.8	2.18	
27.0	357 45 4.0	4 47 28.4	16 25.3	60 10.15	1.967	26.6	27	L	9 47.3	2.23	
27.5	5 8 9.1	4 28 58.1	16 31.3	60 32.34	1.719	27.1	27	U	22 14.4	2.29	
28.0	12 36 11.8	4 5 41.5	16 36.5	60 51.20	1.417	27.6	28	L	10 42.2	2.35	
28.5	20 8 13.5	3 37 56.7	16 40.5	61 6.16	1.065	28.1	28	U	23 10.9	2.42	
29.0	27 43 7.4	+3 6 10.5	16 43.4	61 16.61	+0.674	28.6	29	L	11 40.3	2.48	
29.5	35 19 40.3	2 30 57.6	16 44.9	61 22.25	+0.260	29.1			.....	...
30.0	42 56 36.3	1 52 59.5	16 45.1	61 22.81	-0.166	0.3	30	U	0 10.5	2.54	
30.5	50 32 39.8	1 13 3.3	16 43.9	61 18.31	0.582	0.8	30	L	12 41.3	2.59	
May 1.0	58 6 38.1	+0 31 58.5	16 41.3	61 8.94	0.976	1.3	May 1	U	1 12.5	2.61	
1.5	65 37 24.1	-0 9 24.2	16 37.5	60 55.03	-1.336	1.8	1	L	13 43.9	2.62	
2.0	73 3 59.3	0 50 15.9	16 32.6	60 37.07	1.647	2.3	2	U	2 15.2	2.60	
2.5	80 25 34.6	1 29 50.7	16 26.8	60 15.71	1.904	2.8	2	L	14 46.2	2.57	
3.0	87 41 31.5	2 7 28.3	16 20.2	59 51.61	2.102	3.3	3	U	3 16.7	2.51	
3.5	94 51 22.3	2 42 33.7	16 13.1	59 25.49	2.241	3.8	3	L	15 46.3	2.43	
4.0	101 54 49.6	-3 14 38.2	16 5.6	58 58.06	-2.323	4.3	4	U	4 14.9	2.35	
4.5	108 51 46.2	3 43 19.8	15 58.0	58 29.95	2.352	4.8	4	L	16 42.6	2.26	
5.0	115 42 12.6	4 8 21.8	15 50.3	58 1.81	2.333	5.3	5	U	5 9.2	2.17	
5.5	122 26 17.4	4 29 33.3	15 42.8	57 34.13	2.273	5.8	5	L	17 34.8	2.09	
6.0	129 4 14.9	4 46 47.6	15 35.5	57 7.39	2.180	6.3	6	U	5 59.5	2.02	
6.5	135 36 23.8	-5 0 2.0	15 28.5	56 41.91	-2.062	6.8	6	L	18 23.3	1.95	
7.0	142 3 6.8	5 9 17.2	15 22.0	56 17.99	1.923	7.3	7	U	6 46.3	1.89	
7.5	148 24 48.7	5 14 36.1	15 16.0	55 55.81	1.770	7.8	7	L	19 8.8	1.85	
8.0	154 41 55.9	5 16 3.8	15 10.5	55 35.56	1.606	8.3	8	U	7 30.7	1.81	
8.5	160 54 55.5	5 13 47.3	15 5.5	55 17.29	1.439	8.8	8	L	19 52.3	1.79	
9.0	167 4 14.8	-5 7 54.5	15 1.0	55 1.03	-1.271	9.3	9	U	8 13.6	1.77	
9.5	173 10 20.5	4 58 35.0	14 57.2	54 46.79	1.104	9.8	9	L	20 34.8	1.76	
10.0	179 13 38.5	4 45 59.2	14 53.8	54 34.53	0.940	10.3	10	U	8 55.9	1.76	
10.5	185 14 33.8	4 30 18.2	14 51.0	54 24.20	0.783	10.8	10	L	21 17.1	1.77	
11.0	191 13 29.9	4 11 44.6	14 48.7	54 15.72	0.632	11.3	11	U	9 38.4	1.79	
11.5	197 10 49.2	-3 50 31.2	14 46.9	54 9.00	-0.489	11.8	11	L	22 0.0	1.81	
12.0	203 6 52.6	3 26 52.3	14 45.5	54 3.96	0.353	12.3	12	U	10 21.8	1.83	
12.5	209 1 59.9	3 1 2.9	14 44.6	54 0.51	0.224	12.8	12	L	22 44.0	1.87	
13.0	214 56 29.9	2 33 18.7	14 44.0	53 58.56	-0.101	13.3	13	U	11 6.6	1.90	
13.5	220 50 40.2	2 3 56.6	14 43.9	53 58.07	+0.017	13.8	13	L	23 29.6	1.93	
14.0	226 44 48.0	-1 33 13.9	14 44.1	53 58.94	+0.128	14.3	14	U	11 53.0	1.96	
14.5	232 39 10.0	1 1 29.0	14 44.7	54 1.13	0.237	14.8			.....	...
15.0	238 34 2.7	-0 29 0.7	14 45.7	54 4.62	0.345	15.3	15	L	0 16.7	1.99	
15.5	244 29 42.4	+0 3 51.5	14 47.0	54 9.40	0.453	15.8	15	U	12 40.8	2.02	
16.0	250 26 25.9	0 36 47.8	14 48.6	54 15.46	0.558	16.3	16	L	1 5.2	2.05	
16.5	256 24 30.6	+1 9 27.8	14 50.6	54 22.80	+0.667	16.8	16	U	13 29.9	2.06	
17.0	262 24 14.3	+1 41 31.1	14 53.0	54 31.48	+0.781	17.3	17	L	1 54.6	2.08	

GREENWICH MEAN TIME.

G. M. T.		Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
		° ' "	° ' "	" "	" "	"	d		L	h m	m
May	17.0	262 24 14.3	+1 41 31.1	14 53.0	54 31.48	+0.781	17.3	May 17	L	1 54.6	2.06
	17.5	268 25 55.8	2 12 37.3	14 55.7	54 41.54	0.895	17.8	17	U	14 19.4	2.07
	18.0	274 29 55.0	2 42 25.8	14 58.9	54 52.98	1.015	18.3	18	L	2 44.2	2.07
	18.5	280 36 32.4	3 10 35.9	15 2.4	55 5.92	1.140	18.8	18	U	15 8.9	2.05
	19.0	286 46 9.9	3 36 47.6	15 6.3	55 20.34	1.264	19.3	19	L	3 33.4	2.04
	19.5	292 59 9.7	+4 0 40.4	15 10.6	55 36.28	+1.393	19.8	19	U	15 57.8	2.02
	20.0	299 15 55.3	4 21 54.9	15 15.4	55 53.78	1.523	20.3	20	L	4 22.0	2.01
	20.5	305 36 49.4	4 40 11.5	15 20.6	56 12.81	1.648	20.8	20	U	16 46.1	2.00
	21.0	312 2 15.2	4 55 11.4	15 26.2	56 33.31	1.766	21.3	21	L	5 10.0	1.99
	21.5	318 32 34.7	5 6 36.8	15 32.2	56 55.16	1.876	21.8	21	U	17 33.9	1.99
	22.0	325 8 7.8	+5 14 10.5	15 38.4	57 18.27	+1.971	22.3	22	L	5 57.8	1.99
	22.5	331 49 12.2	5 17 37.5	15 45.0	57 42.38	2.043	22.8	22	U	18 21.8	2.01
	23.0	338 36 2.1	5 16 44.1	15 51.8	58 7.21	2.091	23.3	23	L	6 46.0	2.03
	23.5	345 28 46.6	5 11 19.8	15 58.7	58 32.44	2.107	23.8	23	U	19 10.6	2.07
	24.0	352 27 29.4	5 1 17.3	16 5.5	58 57.61	2.081	24.3	24	L	7 35.6	2.10
	24.5	359 32 7.3	+4 46 33.6	16 12.2	59 22.22	+2.013	24.8	24	U	20 1.1	2.16
	25.0	6 42 28.7	4 27 11.0	16 18.6	59 45.72	1.896	25.3	25	L	8 27.4	2.22
	25.5	13 58 14.1	4 3 18.1	16 24.6	60 7.51	1.726	25.8	25	U	20 54.4	2.29
	26.0	21 18 54.0	3 35 10.0	16 29.9	60 26.94	1.502	26.3	26	L	9 22.3	2.36
	26.5	28 43 50.6	3 3 9.3	16 34.3	60 43.37	1.228	26.8	26	U	21 51.1	2.44
	27.0	36 12 16.4	+2 27 46.0	16 37.8	60 56.24	+0.910	27.3	27	L	10 20.8	2.51
	27.5	43 43 16.6	1 49 36.8	16 40.2	61 5.05	0.553	27.8	27	U	22 51.3	2.57
	28.0	51 15 49.9	1 9 24.7	16 41.4	61 9.40	+0.170	28.3	28	L	11 22.5	2.62
	28.5	58 48 51.3	+0 27 56.9	16 41.3	61 9.08	-0.225	28.8	28	U	23 54.0	2.64
	29.0	66 21 12.9	-0 13 56.6	16 40.0	61 4.00	0.620	29.3				
	29.5	73 51 47.8	-0 55 25.4	16 37.3	60 54.26	-0.998	0.5	29	L	12 25.7	2.64
	30.0	81 19 31.9	1 35 41.0	16 33.5	60 40.16	1.346	1.0	30	U	0 57.3	2.62
	30.5	88 43 26.4	2 13 58.3	16 28.5	60 22.12	1.652	1.5	30	L	13 28.4	2.57
	31.0	96 2 39.5	2 49 37.8	16 22.7	60 0.70	1.908	2.0	31	U	1 58.8	2.50
	31.5	103 16 27.7	3 22 6.1	16 16.1	59 36.53	2.111	2.5	31	L	14 28.3	2.42
June	1.0	110 24 17.5	-3 50 57.1	16 9.0	59 10.26	-2.254	3.0	June 1	U	2 56.8	2.33
	1.5	117 25 44.8	4 15 51.5	16 1.4	58 42.65	2.341	3.5	1	L	15 24.2	2.24
	2.0	124 20 35.7	4 36 36.7	15 53.7	58 14.30	2.374	4.0	2	U	3 50.6	2.15
	2.5	131 8 45.2	4 53 6.1	15 46.0	57 45.88	2.356	4.5	2	L	16 15.9	2.07
	3.0	137 50 17.5	5 5 18.3	15 38.3	57 17.92	2.296	5.0	3	U	4 40.3	2.00
	3.5	144 25 23.3	-5 13 15.8	15 31.0	56 50.93	-2.198	5.5	3	L	17 3.9	1.94
	4.0	150 54 20.6	5 17 4.6	15 24.0	56 25.30	2.069	6.0	4	U	5 26.8	1.88
	4.5	157 17 31.9	5 16 53.4	15 17.5	56 1.37	1.916	6.5	4	L	17 49.1	1.84
	5.0	163 35 24.0	5 12 52.6	15 11.5	55 39.39	1.745	7.0	5	U	6 11.0	1.81
	5.5	169 48 26.7	5 5 13.5	15 6.1	55 19.53	1.562	7.5	5	L	18 32.5	1.79
	6.0	175 57 11.7	-4 54 9.0	15 1.3	55 1.93	-1.370	8.0	6	U	6 53.9	1.78
	6.5	182 2 12.0	4 39 52.0	14 57.1	54 46.66	1.174	8.5	6	L	19 15.2	1.77
	7.0	188 4 1.1	4 22 36.2	14 53.6	54 33.75	0.978	9.0	7	U	7 36.5	1.78
	7.5	194 3 12.6	4 2 35.5	14 50.7	54 23.18	0.785	9.5	7	L	19 57.9	1.80
	8.0	200 0 19.0	3 40 4.0	14 48.5	54 14.88	0.598	10.0	8	U	8 19.6	1.82
	8.5	205 55 52.6	-3 15 16.7	14 46.8	54 8.81	-0.416	10.5	8	L	20 41.5	1.84
	9.0	211 50 23.5	-2 48 28.6	14 45.7	54 4.85	-0.244	11.0	9	U	9 3.8	1.87

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
	" ' "	" ' "	" "	" "	"	d		h m	m	
June 9.0	211 50 23.5	-2 48 28.6	14 45.7	54 4.85	-0.244	11.0	June 9	U 9 3.8	1.87	
9.5	217 44 20.9	2 19 55.4	14 45.2	54 2.91	-0.082	11.5	9	L 21 26.5	1.91	
10.0	223 38 11.9	1 49 53.5	14 45.2	54 2.84	+0.068	12.0	10	U 9 49.6	1.95	
10.5	229 32 21.8	1 18 39.8	14 45.6	54 4.50	0.208	12.5	10	L 22 13.2	1.98	
11.0	235 27 14.0	0 46 32.5	14 46.5	54 7.79	0.337	13.0	11	U 10 37.1	2.01	
11.5	241 23 10.1	-0 13 50.0	14 47.8	54 12.56	+0.457	13.5	11	L 23 1.4	2.04	
12.0	247 20 29.7	+0 19 8.1	14 49.5	54 18.72	0.565	14.0	12	U 11 26.0	2.06	
12.5	253 19 30.4	0 52 1.8	14 51.5	54 26.09	0.663	14.5	12	L 23 50.8	2.08	
13.0	259 20 28.4	1 24 30.1	14 53.8	54 34.61	0.755	15.0		.....	...
13.5	265 23 38.0	1 56 11.7	14 56.5	54 44.19	0.839	15.5	13	U 12 15.8	2.08	
14.0	271 29 12.3	+2 26 45.2	14 59.3	54 54.73	+0.917	16.0	14	L 0 40.8	2.08	
14.5	277 37 23.3	2 55 48.6	15 2.4	55 6.18	0.991	16.5	14	U 13 5.8	2.08	
15.0	283 48 21.5	3 23 0.4	15 5.8	55 18.50	1.062	17.0	15	L 1 30.6	2.06	
15.5	290 2 17.1	3 47 59.5	15 9.4	55 31.65	1.130	17.5	15	U 13 55.3	2.05	
16.0	296 19 19.6	4 10 25.3	15 13.2	55 45.62	1.197	18.0	16	L 2 19.8	2.03	
16.5	302 39 37.6	+4 29 58.0	15 17.2	56 0.37	+1.262	18.5	16	U 14 44.1	2.01	
17.0	309 3 20.2	4 46 19.3	15 21.5	56 15.92	1.329	19.0	17	L 3 8.1	1.99	
17.5	315 30 35.9	4 59 12.2	15 25.9	56 32.26	1.391	19.5	17	U 15 31.9	1.98	
18.0	322 1 33.0	5 8 21.4	15 30.6	56 49.29	1.451	20.0	18	L 3 55.6	1.97	
18.5	328 36 19.8	5 13 33.7	15 35.5	57 7.07	1.509	20.5	18	U 16 19.3	1.97	
19.0	335 15 3.7	+5 14 38.1	15 40.4	57 25.48	+1.558	21.0	19	L 4 43.0	1.98	
19.5	341 57 51.9	5 11 26.5	15 45.6	57 44.41	1.595	21.5	19	U 17 6.8	1.99	
20.0	348 44 50.3	5 3 53.5	15 50.8	58 3.71	1.620	22.0	20	L 5 30.8	2.02	
20.5	355 36 2.9	4 51 57.3	15 56.1	58 23.21	1.627	22.5	20	U 17 55.3	2.06	
21.0	2 31 31.7	4 35 40.1	16 1.4	58 42.65	1.608	23.0	21	L 6 20.2	2.10	
21.5	9 31 15.7	+4 15 8.0	16 6.6	59 1.70	+1.564	23.5	21	U 18 45.7	2.15	
22.0	16 35 10.1	3 50 32.2	16 11.6	59 20.06	1.489	24.0	22	L 7 11.9	2.22	
22.5	23 43 5.9	3 22 9.0	16 16.3	59 37.28	1.375	24.5	22	U 19 39.0	2.29	
23.0	30 54 48.3	2 50 19.9	16 20.6	59 52.92	1.226	25.0	23	L 8 6.9	2.36	
23.5	38 9 57.3	2 15 32.0	16 24.3	60 6.55	1.040	25.5	23	U 20 35.6	2.43	
24.0	45 28 6.1	+1 38 17.9	16 27.3	60 17.72	+0.814	26.0	24	L 9 5.2	2.50	
24.5	52 48 41.9	0 59 14.7	16 29.6	60 25.96	0.554	26.5	24	U 21 35.6	2.55	
25.0	60 11 5.5	+0 19 4.0	16 30.9	60 30.91	+0.266	27.0	25	L 10 6.4	2.59	
25.5	67 34 31.9	-0 21 30.3	16 31.3	60 32.27	-0.043	27.5	25	U 22 37.6	2.60	
26.0	74 58 11.6	1 1 42.0	16 30.7	60 29.84	0.364	28.0	26	L 11 8.8	2.59	
26.5	82 21 11.6	-1 40 45.9	16 28.9	60 23.54	-0.684	28.5	26	U 23 39.7	2.56	
27.0	89 42 37.5	2 17 58.6	16 26.2	60 13.46	0.995	29.0		.....	...
27.5	97 1 35.3	2 52 39.8	16 22.4	59 59.75	1.284	0.1	27	L 12 10.2	2.52	
28.0	104 17 12.7	3 24 15.0	16 17.8	59 42.76	1.542	0.6	28	U 0 40.0	2.44	
28.5	111 28 42.4	3 52 15.1	16 12.4	59 22.90	1.762	1.1	28	L 13 8.8	2.36	
29.0	118 35 22.5	-4 16 17.9	16 6.3	59 0.64	-1.938	1.6	29	U 1 36.7	2.28	
29.5	125 36 38.3	4 36 8.1	15 59.8	58 36.58	2.065	2.1	29	L 14 3.6	2.20	
30.0	132 32 3.4	4 51 36.7	15 52.9	58 11.27	2.144	2.6	30	U 2 29.5	2.12	
30.5	139 21 20.4	5 2 41.1	15 45.8	57 45.32	2.174	3.1	30	L 14 54.5	2.05	
July 1.0	146 4 20.8	5 9 23.5	15 38.7	57 19.27	2.160	3.6	July 1	U 3 18.7	1.98	
1.5	152 41 4.0	-5 11 50.4	15 31.7	56 53.64	-2.105	4.1	1	L 15 42.1	1.92	
2.0	159 11 37.9	-5 10 11.9	15 25.0	56 28.90	-2.012	4.6	2	U 4 4.9	1.93	

GREENWICH MEAN TIME.

G. M. T.		Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.				Var. per Hour.
		" ' "	" ' "	" "	" "	"	d					m
July	1.0	146 4 20.8	-5 9 23.5	15 38.7	57 19.27	-2.160	3.6	July	1	U	3 18.7	1.98
	1.5	152 41 4.0	5 11 50.4	15 31.7	56 53.64	2.105	4.1		1	L	15 42.1	1.92
	2.0	159 11 37.9	5 10 11.9	15 25.0	56 28.90	2.012	4.6		2	U	4 4.9	1.88
	2.5	165 36 17.5	5 4 40.5	15 18.6	56 5.47	1.889	5.1		2	L	16 27.3	1.85
	3.0	171 55 23.9	4 55 30.1	15 12.7	55 43.68	1.739	5.6		3	U	4 49.3	1.82
	3.5	178 9 23.2	-4 42 56.0	15 7.3	55 23.83	-1.567	6.1		3	L	17 11.0	1.80
	4.0	184 18 45.9	4 27 13.9	15 2.4	55 6.13	1.381	6.6		4	U	5 32.6	1.80
	4.5	190 24 5.5	4 8 39.9	14 58.2	54 50.74	1.182	7.1		4	L	17 54.2	1.80
	5.0	196 25 57.7	3 47 29.8	14 54.7	54 37.79	0.976	7.6		5	U	6 15.9	1.82
	5.5	202 24 59.8	3 23 59.9	14 51.9	54 27.32	0.767	8.1		5	L	18 37.8	1.83
	6.0	208 21 49.9	-2 58 25.9	14 49.7	54 19.38	-0.558	8.6		6	U	6 59.9	1.85
	6.5	214 17 6.0	2 31 3.7	14 48.2	54 13.92	0.351	9.1		6	L	19 22.3	1.88
	7.0	220 11 25.8	2 2 9.3	14 47.4	54 10.93	-0.150	9.6		7	U	7 45.1	1.92
	7.5	226 5 25.9	1 31 58.9	14 47.2	54 10.28	+0.042	10.1		7	L	20 8.3	1.95
	8.0	231 59 41.6	1 0 49.3	14 47.7	54 11.90	0.224	10.6		8	U	8 31.9	1.98
	8.5	237 54 46.2	-0 28 57.4	14 48.7	54 15.62	+0.394	11.1		8	L	20 55.9	2.02
	9.0	243 51 10.9	+0 3 18.6	14 50.2	54 21.30	0.550	11.6		9	U	9 20.3	2.05
	9.5	249 49 24.4	0 35 40.4	14 52.2	54 28.77	0.692	12.1		9	L	21 45.0	2.07
	10.0	255 49 52.2	1 7 48.3	14 54.7	54 37.85	0.819	12.6		10	U	10 10.0	2.09
	10.5	261 52 57.1	1 39 21.8	14 57.6	54 48.35	0.929	13.1		10	L	22 35.1	2.10
	11.0	267 58 58.3	+2 10 0.0	15 0.8	55 0.07	+1.021	13.6		11	U	11 0.3	2.10
	11.5	274 8 11.7	2 39 21.0	15 4.3	55 12.79	1.097	14.1		11	L	23 25.5	2.10
	12.0	280 20 49.3	3 7 2.6	15 7.9	55 26.33	1.157	14.6		12	U	11 50.6	2.09
	12.5	286 36 59.7	3 32 42.4	15 11.8	55 40.50	1.202	15.1				.....	...
13.0	292 56 48.1	3 55 58.5	15 15.8	55 55.13	1.234	15.6		13	L	0 15.6	2.08	
13.5	299 20 16.3	+4 16 29.4	15 19.9	56 10.06	+1.253	16.1		13	U	12 40.4	2.05	
14.0	305 47 22.8	4 33 54.7	15 24.0	56 25.15	1.259	16.6		14	L	1 4.9	2.04	
14.5	312 18 3.6	4 47 56.0	15 28.1	56 40.24	1.256	17.1		14	U	13 29.3	2.02	
15.0	318 52 12.8	4 58 16.8	15 32.2	56 55.27	1.246	17.6		15	L	1 53.4	2.00	
15.5	325 29 42.5	5 4 43.2	15 36.2	57 10.12	1.230	18.1		15	U	14 17.4	2.00	
16.0	332 10 24.0	+5 7 4.3	15 40.2	57 24.78	+1.211	18.6		16	L	2 41.4	2.00	
16.5	338 54 7.8	5 5 12.6	15 44.1	57 39.15	1.184	19.1		16	U	15 5.3	1.99	
17.0	345 40 44.7	4 59 4.3	15 48.0	57 53.19	1.156	19.6		17	L	3 29.3	2.01	
17.5	352 30 6.1	4 48 39.5	15 51.7	58 6.88	1.124	20.1		17	U	15 53.5	2.02	
18.0	359 22 3.3	4 34 2.2	15 55.3	58 20.15	1.088	20.6		18	L	4 17.9	2.05	
18.5	6 16 29.4	+4 15 20.6	15 58.8	58 32.96	+1.045	21.1		18	U	16 42.8	2.09	
19.0	13 13 17.8	3 52 46.9	16 2.1	58 45.19	0.993	21.6		19	L	5 8.2	2.14	
19.5	20 12 22.1	3 26 37.8	16 5.3	58 56.75	0.931	22.1		19	U	17 34.2	2.19	
20.0	27 13 36.8	2 57 13.5	16 8.2	59 7.49	0.858	22.6		20	L	6 0.8	2.25	
20.5	34 16 55.1	2 24 58.7	16 10.9	59 17.27	0.769	23.1		20	U	18 28.2	2.31	
21.0	41 22 9.4	+1 50 21.4	16 13.2	59 25.87	+0.661	23.6		21	L	6 56.3	2.37	
21.5	48 29 10.2	1 13 53.1	16 15.2	59 33.06	0.534	24.1		21	U	19 25.1	2.43	
22.0	55 37 45.1	+0 36 8.1	16 16.7	59 38.61	0.388	24.6		22	L	7 54.5	2.47	
22.5	62 47 38.4	-0 2 16.7	16 17.7	59 42.29	0.221	25.1		22	U	20 24.4	2.51	
23.0	69 58 30.2	0 40 42.6	16 18.1	59 43.84	+0.037	25.6		23	L	8 54.6	2.52	
23.5	77 9 56.3	-1 18 30.5	16 17.9	59 43.11	-0.163	26.1		23	U	21 24.9	2.52	
24.0	84 21 28.1	-1 55 1.3	16 17.0	59 39.87	-0.378	26.6		24	L	9 55.0	2.49	

GREENWICH MEAN TIME.

G. M. T.		Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.				Var. per Hour.
		" ' "	" ' "	" "	" "	"	d			h m	m	
July	24.0	84 21 28.1	-1 55 1.3	16 17.0	59 39.87	-0.378	26.6	July 24	L	9 55.0	2.49	
	24.5	91 32 33.3	2 29 37.4	16 15.4	59 34.02	0.596	27.1	24	U	22 24.7	2.46	
	25.0	98 42 35.2	3 1 43.7	16 13.1	59 25.57	0.814	27.6	25	L	10 53.9	2.41	
	25.5	105 50 55.8	3 30 48.5	16 10.1	59 14.50	1.029	28.1	25	U	23 22.4	2.34	
	26.0	112 56 55.1	3 56 25.0	16 6.4	59 0.94	1.227	28.6	26	L	11 50.1	2.27	
	26.5	119 59 54.2	-4 18 11.5	16 2.1	58 45.12	-1.407	29.1			.....	...
	27.0	126 59 15.6	4 35 52.2	15 57.3	58 27.27	1.560	0.3	27	U	0 16.9	2.20	
	27.5	133 54 25.7	4 49 17.0	15 51.9	58 7.79	1.683	0.8	27	L	12 42.9	2.13	
	28.0	140 44 55.4	4 58 21.6	15 46.3	57 47.01	1.774	1.3	28	U	1 8.0	2.06	
	28.5	147 30 21.7	5 3 7.2	15 40.4	57 25.36	1.827	1.8	28	L	13 32.4	2.01	
	29.0	154 10 28.9	-5 3 39.4	15 34.4	57 3.30	-1.844	2.3	29	U	1 56.2	1.96	
	29.5	160 45 8.1	5 0 8.0	15 28.4	56 41.24	1.826	2.8	29	L	14 19.4	1.91	
	30.0	167 14 17.7	4 52 45.5	15 22.5	56 19.62	1.772	3.3	30	U	2 42.1	1.88	
	30.5	173 38 3.8	4 41 47.1	15 16.8	55 58.84	1.687	3.8	30	L	15 4.5	1.85	
	31.0	179 56 39.0	4 27 29.5	15 11.5	55 39.25	1.573	4.3	31	U	3 26.6	1.84	
	31.5	186 10 22.3	-4 10 10.1	15 6.5	55 21.19	-1.434	4.8	31	L	15 48.6	1.83	
Aug.	1.0	192 19 37.6	3 50 6.9	15 2.1	55 4.92	1.273	5.3	Aug. 1	U	4 10.5	1.83	
	1.5	198 24 54.0	3 27 37.9	14 58.2	54 50.71	1.094	5.8	1	L	16 32.5	1.84	
	2.0	204 26 44.3	3 3 1.1	14 55.0	54 38.72	0.902	6.3	2	U	4 54.7	1.85	
	2.5	210 25 44.3	2 36 33.7	14 52.3	54 29.10	0.698	6.8	2	L	17 17.0	1.87	
	3.0	216 22 32.2	-2 8 33.0	14 50.4	54 21.99	-0.486	7.3	3	U	5 39.6	1.90	
	3.5	222 17 47.4	1 39 15.8	14 49.2	54 17.44	0.273	7.8	3	L	18 2.5	1.92	
	4.0	228 12 10.6	1 8 58.9	14 48.6	54 15.45	-0.058	8.3	4	U	6 25.7	1.95	
	4.5	234 6 22.7	0 37 58.9	14 48.8	54 16.05	+0.156	8.8	4	L	18 49.3	1.98	
	5.0	240 1 4.1	-0 6 32.4	14 49.6	54 19.16	0.362	9.3	5	U	7 13.3	2.01	
	5.5	245 56 54.3	+0 25 3.1	14 51.1	54 24.71	+0.560	9.8	5	L	19 37.6	2.04	
	6.0	251 54 31.5	0 56 30.2	14 53.3	54 32.55	0.747	10.3	6	U	8 2.2	2.06	
	6.5	257 54 31.4	1 27 30.3	14 56.0	54 42.59	0.921	10.8	6	L	20 27.1	2.08	
	7.0	263 57 27.3	1 57 44.5	14 59.3	54 54.59	1.076	11.3	7	U	8 52.1	2.09	
	7.5	270 3 49.0	2 26 52.4	15 3.0	55 8.35	1.213	11.8	7	L	21 17.3	2.10	
	8.0	276 14 2.3	+2 54 33.5	15 7.2	55 23.62	+1.328	12.3	8	U	9 42.5	2.10	
	8.5	282 28 28.5	3 20 26.0	15 11.7	55 40.12	1.420	12.8	8	L	22 7.7	2.10	
	9.0	288 47 23.7	3 44 7.8	15 16.5	55 57.59	1.486	13.3	9	U	10 32.8	2.09	
	9.5	295 10 58.9	4 5 16.8	15 21.4	56 15.69	1.527	13.8	9	L	22 57.8	2.08	
	10.0	301 39 18.6	4 23 31.2	15 26.4	56 34.13	1.541	14.3	10	U	11 22.7	2.07	
	10.5	308 12 21.7	+4 38 30.1	15 31.4	56 52.57	+1.529	14.8	10	L	23 47.4	2.05	
	11.0	314 50 1.2	4 49 54.1	15 36.4	57 10.72	1.493	15.3			.....	...
	11.5	321 32 4.2	4 57 26.5	15 41.2	57 28.30	1.433	15.8	11	U	12 12.0	2.04	
	12.0	328 18 12.9	5 0 53.3	15 45.7	57 45.02	1.351	16.3	12	L	0 36.5	2.04	
	12.5	335 8 4.7	5 0 4.4	15 50.0	58 0.65	1.252	16.8	12	U	13 1.0	2.04	
	13.0	342 1 14.3	+4 54 54.0	15 53.9	58 15.02	+1.141	17.3	13	L	1 25.5	2.04	
	13.5	348 57 14.3	4 45 21.3	15 57.4	58 27.99	1.019	17.8	13	U	13 50.1	2.06	
	14.0	355 55 35.9	4 31 30.2	16 0.6	58 39.46	0.891	18.3	14	L	2 15.0	2.08	
	14.5	2 55 51.4	4 13 29.9	16 3.3	58 49.37	0.760	18.8	14	U	14 40.0	2.10	
	15.0	9 57 34.0	3 51 34.8	16 5.5	58 57.71	0.630	19.3	15	L	3 5.5	2.14	
	15.5	17 0 19.7	+3 26 3.5	16 7.4	59 4.50	+0.502	19.8	15	U	15 31.4	2.18	
	16.0	24 3 47.2	+2 57 19.3	16 8.8	59 9.79	+0.380	20.3	16	L	3 57.8	2.22	

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
	" "	" "	" "	" "	" "	d		h m	m	
Aug. 16.0	24 3 47.2	+2 57 19.3	16 8.8	59 9.79	+0.380	20.3	Aug. 16	L	3 57.8	2.22
16.5	31 7 38.8	2 25 48.7	16 9.9	59 13.65	0.263	20.8	16	U	16 24.8	2.28
17.0	38 11 39.9	1 52 1.7	16 10.6	59 16.13	0.152	21.3	17	L	4 52.4	2.33
17.5	45 15 39.1	1 16 30.4	16 10.9	59 17.31	+0.045	21.8	17	U	17 20.6	2.36
18.0	52 19 27.6	0 39 48.8	16 10.9	59 17.22	-0.059	22.3	18	L	5 49.1	2.40
18.5	59 22 58.0	+0 2 31.7	16 10.5	59 15.90	-0.159	22.8	18	U	18 18.2	2.44
19.0	66 26 3.9	-0 34 45.3	16 9.8	59 13.40	0.259	23.3	19	L	6 47.6	2.45
19.5	73 28 39.1	1 11 27.0	16 8.8	59 9.68	0.361	23.8	19	U	19 17.0	2.45
20.0	80 30 36.1	1 46 58.6	16 7.5	59 4.73	0.464	24.3	20	L	7 46.4	2.44
20.5	87 31 45.9	2 20 47.2	16 5.8	58 58.53	0.570	24.8	20	U	20 15.6	2.42
21.0	94 31 57.1	-2 52 21.7	16 3.7	58 51.05	-0.678	25.3	21	L	8 44.4	2.38
21.5	101 30 55.7	3 21 13.4	16 1.3	58 42.26	0.788	25.8	21	U	21 12.7	2.33
22.0	108 28 24.7	3 46 57.2	15 58.6	58 32.14	0.900	26.3	22	L	9 40.3	2.27
22.5	115 24 5.0	4 9 11.2	15 55.5	58 20.68	1.009	26.8	22	U	22 7.2	2.21
23.0	122 17 34.9	4 27 38.2	15 52.0	58 7.95	1.114	27.3	23	L	10 33.3	2.15
23.5	129 8 31.6	-4 42 5.2	15 48.2	57 53.98	-1.213	27.8	23	U	22 58.8	2.10
24.0	135 56 31.8	4 52 24.1	15 44.1	57 38.89	1.300	28.3	24	L	11 23.6	2.04
24.5	142 41 12.7	4 58 31.5	15 39.7	57 22.84	1.373	28.8	24	U	23 47.7	1.99
25.0	149 22 13.8	5 0 28.3	15 35.1	57 6.00	1.430	29.3			.....	...
25.5	155 59 16.6	4 58 20.0	15 30.4	56 48.60	1.467	0.3	25	L	12 11.3	1.95
26.0	162 32 6.9	-4 52 15.5	15 25.5	56 30.88	-1.482	0.8	26	U	0 34.5	1.91
26.5	169 0 35.0	4 42 27.2	15 20.7	56 13.14	1.471	1.3	26	L	12 57.2	1.88
27.0	175 24 35.9	4 29 10.1	15 15.9	55 55.66	1.438	1.8	27	U	1 19.7	1.87
27.5	181 44 10.4	4 12 41.0	15 11.3	55 38.73	1.380	2.3	27	L	13 42.1	1.86
28.0	187 59 24.7	3 53 18.0	15 6.9	55 22.63	1.298	2.8	28	U	2 4.3	1.84
28.5	194 10 30.4	-3 31 20.3	15 2.8	55 7.66	-1.194	3.3	28	L	14 26.4	1.85
29.0	200 17 44.6	3 7 7.2	14 59.1	54 54.06	1.067	3.8	29	U	2 48.7	1.86
29.5	206 21 29.0	2 40 58.0	14 55.9	54 42.13	0.920	4.3	29	L	15 11.0	1.87
30.0	212 22 9.6	2 13 11.8	14 53.1	54 32.05	0.756	4.8	30	U	3 33.5	1.89
30.5	218 20 16.7	1 44 7.4	14 51.0	54 24.05	0.575	5.3	30	L	15 56.3	1.91
31.0	224 16 23.6	-1 14 2.7	14 49.4	54 18.30	-0.383	5.8	31	U	4 19.3	1.93
31.5	230 11 6.5	0 43 15.6	14 48.5	54 14.90	-0.181	6.3	31	L	16 42.6	1.96
Sept. 1.0	236 5 3.9	-0 12 3.3	14 48.2	54 13.99	+0.030	6.8	Sept. 1	U	5 6.2	1.98
1.5	241 58 55.9	+0 19 17.1	14 48.7	54 15.64	0.245	7.3	1	L	17 30.1	2.00
2.0	247 53 23.5	0 50 28.5	14 49.8	54 19.88	0.461	7.8	2	U	5 54.2	2.02
2.5	253 49 8.4	+1 21 13.9	14 51.7	54 26.70	+0.676	8.3	2	L	18 18.6	2.04
3.0	259 46 51.8	1 51 15.8	14 54.2	54 36.08	0.885	8.8	3	U	6 43.2	2.05
3.5	265 47 14.4	2 20 16.5	14 57.5	54 47.91	1.086	9.3	3	L	19 7.9	2.07
4.0	271 50 55.0	2 47 57.2	15 1.3	55 2.09	1.275	9.8	4	U	7 32.8	2.08
4.5	277 58 30.3	3 13 58.8	15 5.8	55 18.44	1.447	10.3	4	L	19 57.7	2.08
5.0	284 10 33.2	+3 38 1.2	15 10.8	55 36.73	+1.598	10.8	5	U	8 22.6	2.08
5.5	290 27 33.3	3 59 43.7	15 16.2	55 56.70	1.725	11.3	5	L	20 47.5	2.07
6.0	296 49 54.6	4 18 45.4	15 22.0	56 18.03	1.825	11.8	6	U	9 12.3	2.07
6.5	303 17 54.9	4 34 45.0	15 28.1	56 40.37	1.892	12.3	6	L	21 37.2	2.07
7.0	309 51 45.3	4 47 21.9	15 34.4	57 3.30	1.923	12.8	7	U	10 1.9	2.06
7.5	316 31 29.4	+4 56 16.4	15 40.7	57 26.38	+1.917	13.3	7	L	22 26.7	2.07
8.0	323 17 2.0	+5 1 11.1	15 46.9	57 49.16	+1.872	13.8	8	U	10 51.5	2.07

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.				Var. per Hour.
	" " "	" " "	" " "	" " "	"	d			h m	m	
Sept. 8.0	323 17 2.0	+5 1 11.1	15 46.9	57 49.16	+1.872	13.8	Sept. 8	U	10 51.5	2.07	
8.5	330 8 10.2	5 1 51.3	15 52.9	58 11.15	1.788	14.3	8	L	23 16.4	2.08	
9.0	337 4 32.1	4 58 6.0	15 58.5	58 31.92	1.666	14.8	9	U	11 41.4	2.10	
9.5	344 5 38.5	4 49 49.1	16 3.7	58 51.00	1.508	15.3			.....	...
10.0	351 10 53.3	4 37 0.2	16 8.4	59 8.00	1.320	15.8	10	L	0 6.7	2.12	
10.5	358 19 35.0	+4 19 44.6	16 12.3	59 22.58	+1.107	16.3	10	U	12 32.2	2.14	
11.0	5 30 58.6	3 58 14.6	16 15.6	59 34.50	0.876	16.8	11	L	0 58.1	2.18	
11.5	12 44 17.1	3 32 48.5	16 18.0	59 43.57	0.635	17.3	11	U	13 24.5	2.22	
12.0	19 58 44.1	3 3 50.6	16 19.7	59 49.74	0.393	17.8	12	L	1 51.3	2.26	
12.5	27 13 35.3	2 31 50.4	16 20.6	59 53.01	+0.154	18.3	12	U	14 18.7	2.30	
13.0	34 28 9.4	+1 57 21.6	16 20.8	59 53.49	-0.072	18.8	13	L	2 46.6	2.35	
13.5	41 41 50.7	1 21 1.0	16 20.2	59 51.34	0.282	19.3	13	U	15 15.1	2.39	
14.0	48 54 8.4	0 43 27.1	16 18.9	59 46.81	0.469	19.8	14	L	3 44.0	2.42	
14.5	56 4 37.8	+0 5 19.0	16 17.1	59 40.18	0.633	20.3	14	U	16 13.2	2.45	
15.0	63 13 0.0	-0 32 44.4	16 14.8	59 31.72	0.772	20.8	15	L	4 42.7	2.47	
15.5	70 19 1.5	-1 10 5.9	16 12.1	59 21.74	-0.888	21.3	15	U	17 12.3	2.46	
16.0	77 22 32.7	1 46 10.2	16 9.0	59 10.50	0.981	21.8	16	L	5 41.7	2.44	
16.5	84 23 28.1	2 20 24.7	16 5.7	58 58.27	1.053	22.3	16	U	18 10.9	2.41	
17.0	91 21 44.4	2 52 20.0	16 2.2	58 45.28	1.110	22.8	17	L	6 39.6	2.37	
17.5	98 17 20.0	3 21 29.8	15 58.5	58 31.68	1.152	23.3	17	U	19 7.8	2.32	
18.0	105 10 14.4	-3 47 31.6	15 54.6	58 17.69	-1.180	23.8	18	L	7 35.3	2.26	
18.5	112 0 26.5	4 10 6.3	15 50.7	58 3.38	1.203	24.3	18	U	20 2.1	2.20	
19.0	118 47 55.4	4 28 59.0	15 46.8	57 48.85	1.218	24.8	19	L	8 28.2	2.14	
19.5	125 32 38.2	4 43 58.1	15 42.8	57 34.16	1.229	25.3	19	U	20 53.6	2.09	
20.0	132 14 31.8	4 54 55.8	15 38.7	57 19.37	1.236	25.8	20	L	9 18.4	2.04	
20.5	138 53 31.5	-5 1 48.3	15 34.7	57 4.50	-1.211	26.3	20	U	21 42.5	1.99	
21.0	145 29 31.8	5 4 35.3	15 30.6	56 49.60	1.241	26.8	21	L	10 6.1	1.94	
21.5	152 2 26.6	5 3 19.9	15 26.6	56 34.72	1.239	27.3	21	U	22 29.2	1.91	
22.0	158 32 9.6	4 58 8.6	15 22.5	56 19.88	1.232	27.8	22	L	10 52.0	1.89	
22.5	164 58 35.4	4 49 11.0	15 18.5	56 5.18	1.218	28.3	22	U	23 14.5	1.87	
23.0	171 21 39.3	-4 36 39.3	15 14.6	55 50.69	-1.190	28.8	23	L	11 36.8	1.85	
23.5	177 41 18.3	4 20 48.1	15 10.7	55 36.52	1.165	29.3	23	U	23 59.0	1.85	
24.0	183 57 32.0	4 1 54.0	15 7.0	55 22.78	1.122	0.3			.....	...
24.5	190 10 22.4	3 40 14.9	15 3.4	55 9.65	1.065	0.8	24	L	12 21.2	1.85	
25.0	196 19 54.6	3 16 10.1	15 0.0	54 57.27	0.995	1.3	25	U	0 43.4	1.85	
25.5	202 26 17.4	-2 49 59.2	14 56.9	54 45.82	-0.911	1.8	25	L	13 5.7	1.86	
26.0	208 29 42.7	2 22 2.6	14 54.1	54 35.47	0.810	2.3	26	U	1 28.1	1.88	
26.5	214 30 26.4	1 52 40.2	14 51.6	54 26.44	0.693	2.8	26	L	13 50.8	1.90	
27.0	220 28 47.7	1 22 12.0	14 49.6	54 18.89	0.562	3.3	27	U	2 13.7	1.92	
27.5	226 25 9.4	0 50 57.6	14 48.0	54 13.01	0.415	3.8	27	L	14 36.8	1.94	
28.0	232 19 57.5	-0 19 15.8	14 46.9	54 8.98	-0.254	4.3	28	U	3 0.2	1.96	
28.5	238 13 41.1	+0 12 35.0	14 46.3	54 6.97	-0.079	4.8	28	L	15 23.8	1.98	
29.0	244 6 52.1	0 44 16.5	14 46.4	54 7.13	+0.108	5.3	29	U	3 47.6	1.99	
29.5	250 0 5.0	1 15 31.4	14 47.0	54 9.59	0.303	5.8	29	L	16 11.6	2.01	
30.0	255 53 56.1	1 46 2.3	14 48.3	54 14.44	0.507	6.3	30	U	4 35.8	2.02	
30.5	261 49 3.6	+2 15 32.3	14 50.4	54 21.78	+0.717	6.8	30	L	17 0.1	2.02	
Oct. 1.0	267 46 6.5	+2 43 44.1	14 53.0	54 31.65	+0.929	7.3	Oct. 1	U	5 24.4	2.03	

GREENWICH MEAN TIME.

G. M. T.		Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
		" ' "	" ' "	" "	" "	"	d			h m	m
Oct.	1.0	267 46 6.5	+2 43 44.1	14 53.0	54 31.65	+0.929	7.3	Oct. 1	U	5 24.4	2.03
	1.5	273 45 45.1	3 10 20.5	14 56.4	54 44.07	1.141	7.8	1	L	17 48.8	2.03
	2.0	279 48 38.8	3 35 3.9	15 0.5	54 59.00	1.345	8.3	2	U	6 13.2	2.03
	2.5	285 55 26.9	3 57 36.3	15 5.2	55 16.33	1.543	8.8	2	L	18 37.6	2.03
	3.0	292 6 46.8	4 17 39.3	15 10.6	55 35.99	1.729	9.3	3	U	7 1.9	2.02
	3.5	298 23 13.6	+4 34 53.8	15 16.5	55 57.75	+1.895	9.8	3	L	19 26.2	2.02
	4.0	304 45 18.8	4 49 0.9	15 22.9	56 21.37	2.038	10.3	4	U	7 50.5	2.02
	4.5	311 13 29.0	4 59 41.7	15 29.8	56 46.54	2.152	10.8	4	L	20 14.8	2.03
	5.0	317 48 5.0	5 6 37.8	15 37.0	57 12.87	2.231	11.3	5	U	8 39.2	2.04
	5.5	324 29 20.5	5 9 32.1	15 44.4	57 39.91	2.267	11.8	5	L	21 3.7	2.05
	6.0	331 17 21.0	+5 8 9.5	15 51.8	58 7.11	+2.260	12.3	6	U	9 28.4	2.07
	6.5	338 12 2.6	5 2 18.4	15 59.1	58 33.95	2.203	12.8	6	L	21 53.4	2.10
	7.0	345 13 11.4	4 51 50.8	16 6.1	58 59.78	2.093	13.3	7	U	10 18.8	2.13
	7.5	352 20 23.3	4 36 44.3	16 12.7	59 23.97	1.931	13.8	7	L	22 44.6	2.17
	8.0	359 33 4.4	4 17 3.1	16 18.7	59 45.92	1.718	14.3	8	U	11 11.0	2.22
	8.5	6 50 31.2	+3 52 57.9	16 23.9	60 5.03	+1.460	14.8	8	L	23 37.9	2.27
	9.0	14 11 52.7	3 24 47.0	16 28.2	60 20.81	1.163	15.3				
	9.5	21 36 11.7	2 52 56.6	16 31.5	60 32.82	0.835	15.8	9	U	12 5.5	2.33
	10.0	29 2 27.3	2 17 59.3	16 33.6	60 40.81	0.492	16.3	10	L	0 33.8	2.38
	10.5	36 29 37.3	1 40 33.9	16 34.7	60 44.61	+0.143	16.8	10	U	13 2.7	2.43
	11.0	43 56 40.5	+1 1 23.2	16 34.6	60 44.25	-0.201	17.3	11	L	1 32.2	2.48
	11.5	51 22 39.3	+0 21 13.0	16 33.4	60 39.87	0.525	17.8	11	U	14 2.3	2.52
	12.0	58 46 41.0	-0 19 10.5	16 31.2	60 31.77	0.820	18.3	12	L	2 32.6	2.54
	12.5	66 8 0.1	0 59 1.9	16 28.1	60 20.32	1.081	18.8	12	U	15 3.2	2.55
	13.0	73 25 58.3	1 37 38.4	16 24.2	60 6.00	1.299	19.3	13	L	3 33.7	2.53
	13.5	80 40 5.3	-2 14 21.0	16 19.6	59 49.32	-1.473	19.8	13	U	16 3.9	2.50
	14.0	87 49 59.1	2 48 35.5	16 14.6	59 30.81	1.606	20.3	14	L	4 33.6	2.45
	14.5	94 55 24.3	3 19 52.5	16 9.2	59 10.95	1.696	20.8	14	U	17 2.7	2.39
	15.0	101 56 12.5	3 47 48.1	16 3.5	58 50.26	1.747	21.3	15	L	5 31.0	2.33
	15.5	108 52 20.8	4 12 3.5	15 57.8	58 29.15	1.767	21.8	15	U	17 58.5	2.26
	16.0	115 43 50.8	-4 32 24.8	15 52.0	58 7.97	-1.757	22.3	16	L	6 25.2	2.19
	16.5	122 30 48.0	4 48 42.5	15 46.3	57 47.07	1.724	22.8	16	U	18 51.0	2.12
	17.0	129 13 20.0	5 0 51.2	15 40.7	57 26.65	1.676	23.3	17	L	7 16.0	2.05
	17.5	135 51 36.6	5 8 49.3	15 35.4	57 6.91	1.613	23.8	17	U	19 40.3	1.99
	18.0	142 25 48.2	5 12 38.4	15 30.2	56 47.98	1.540	24.3	18	L	8 3.9	1.94
	18.5	148 56 6.4	-5 12 22.6	15 25.3	56 29.98	-1.461	24.8	18	U	20 27.0	1.91
	19.0	155 22 42.2	5 8 9.2	15 20.6	56 12.93	1.381	25.3	19	L	8 49.7	1.88
	19.5	161 45 46.6	5 0 7.4	15 16.3	55 56.84	1.300	25.8	19	U	21 12.1	1.85
	20.0	168 5 30.3	4 48 28.7	15 12.1	55 41.74	1.217	26.3	20	L	9 34.2	1.84
	20.5	174 22 3.4	4 33 26.4	15 8.3	55 27.62	1.136	26.8	20	U	21 56.2	1.83
	21.0	180 35 35.8	-4 15 15.3	15 4.7	55 14.46	-1.058	27.3	21	L	10 18.1	1.83
	21.5	186 46 16.7	3 54 11.8	15 1.4	55 2.23	0.979	27.8	21	U	22 40.1	1.84
	22.0	192 54 15.8	3 30 33.5	14 58.3	54 50.97	0.900	28.3	22	L	11 2.2	1.84
	22.5	198 59 43.0	3 4 39.1	14 55.5	54 40.64	0.821	28.8	22	U	23 24.4	1.86
	23.0	205 2 48.4	2 36 47.7	14 52.9	54 31.29	0.736	29.3	23	L	11 46.9	1.88
	23.5	211 3 43.4	-2 7 19.5	14 50.7	54 22.99	-0.648	0.1				
	24.0	217 2 40.0	-1 36 34.5	14 48.7	54 15.76	-0.555	0.6	24	U	0 9.6	1.90

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
	° ' "	° ' "	' "	' "	"	d		h m	m	
Oct. 24.0	217 2 40.0	-1 36 34.5	14 48.7	54 15.76	-0.555	0.6	Oct. 24	U	0 9.6	1.90
24.5	222 59 52.1	1 4 53.2	14 47.0	54 9.69	0.455	1.1	24	L	12 32.5	1.92
25.0	228 55 35.2	0 32 35.6	14 45.8	54 4.88	0.346	1.6	25	U	0 55.7	1.95
25.5	234 50 6.4	-0 0 1.7	14 44.8	54 1.42	0.228	2.1	25	L	13 19.2	1.96
26.0	240 43 44.7	+0 32 29.0	14 44.3	53 59.44	-0.100	2.6	26	U	1 42.8	1.98
26.5	246 36 51.8	+1 4 37.3	14 44.2	53 59.06	+0.039	3.1	26	L	14 6.7	2.00
27.0	252 29 50.8	1 36 4.8	14 44.5	54 0.42	0.190	3.6	27	U	2 30.7	2.01
27.5	258 23 7.4	2 6 33.3	14 45.4	54 3.65	0.350	4.1	27	L	14 54.8	2.01
28.0	264 17 9.3	2 35 45.4	14 46.8	54 8.86	0.521	4.6	28	U	3 18.9	2.01
28.5	270 12 26.4	3 3 24.0	14 48.8	54 16.20	0.702	5.1	28	L	15 43.0	2.01
29.0	276 9 30.0	+3 29 12.2	14 51.4	54 25.73	+0.889	5.6	29	U	4 7.1	2.00
29.5	282 8 53.4	3 52 53.6	14 54.6	54 37.57	1.083	6.1	29	L	16 31.0	1.99
30.0	288 11 10.6	4 14 11.8	14 58.5	54 51.74	1.279	6.6	30	U	4 54.8	1.98
30.5	294 16 56.7	4 32 50.5	15 3.0	55 8.27	1.475	7.1	30	L	17 18.6	1.98
31.0	300 26 46.8	4 48 33.7	15 8.2	55 27.13	1.667	7.6	31	U	5 42.2	1.97
31.5	306 41 15.4	+5 1 5.2	15 13.9	55 48.25	+1.850	8.1	31	L	18 5.8	1.97
Nov. 1.0	313 0 55.9	5 10 9.3	15 20.2	56 11.48	2.019	8.6	Nov. 1	U	6 29.4	1.97
1.5	319 26 18.7	5 15 30.4	15 27.1	56 36.64	2.171	9.1	1	L	18 53.1	1.97
2.0	325 57 51.8	5 16 54.4	15 34.4	57 3.48	2.296	9.6	2	U	7 16.8	1.99
2.5	332 35 57.6	5 14 8.4	15 42.1	57 31.61	2.387	10.1	2	L	19 40.8	2.01
3.0	339 20 53.2	+5 7 1.3	15 50.0	58 0.61	+2.439	10.6	3	U	8 5.1	2.04
3.5	346 12 48.4	4 55 25.6	15 58.0	58 29.96	2.444	11.1	3	L	20 29.9	2.08
4.0	353 11 44.2	4 39 17.4	16 5.9	58 59.06	2.397	11.6	4	U	8 55.1	2.13
4.5	0 17 32.2	4 18 38.1	16 13.6	59 27.25	2.291	12.1	4	L	21 21.1	2.19
5.0	7 29 53.7	3 53 35.5	16 20.8	59 53.79	2.123	12.6	5	U	9 47.7	2.25
5.5	14 48 18.3	+3 24 24.0	16 27.4	60 17.96	+1.896	13.1	5	L	22 15.2	2.33
6.0	22 12 5.7	2 51 25.9	16 33.2	60 39.06	1.610	13.6	6	U	10 43.6	2.40
6.5	29 40 25.2	2 15 11.2	16 37.9	60 56.39	1.272	14.1	6	L	23 12.8	2.47
7.0	37 12 17.2	1 36 17.5	16 41.4	61 9.43	0.894	14.6	7	U	11 42.9	2.54
7.5	44 46 35.5	0 55 28.5	16 43.7	61 17.72	0.484	15.1			.....	...
8.0	52 22 9.2	+0 13 32.7	16 44.6	61 21.00	+0.062	15.6	8	L	0 13.7	2.59
8.5	59 57 45.6	-0 28 38.6	16 44.1	61 19.24	-0.355	16.1	8	U	12 45.0	2.62
9.0	67 32 13.3	1 10 13.7	16 42.3	61 12.56	0.755	16.6	9	L	1 16.6	2.64
9.5	75 4 24.4	1 50 22.8	16 39.2	61 1.25	1.124	17.1	9	U	13 48.2	2.63
10.0	82 33 17.1	2 28 20.3	16 35.0	60 45.77	1.447	17.6	10	L	2 19.6	2.60
10.5	89 57 57.5	-3 3 25.9	16 29.8	60 26.72	-1.719	18.1	10	U	14 50.5	2.54
11.0	97 17 40.9	3 35 6.1	16 23.8	60 4.74	1.934	18.6	11	L	3 20.6	2.47
11.5	104 31 52.6	4 2 54.5	16 17.2	59 40.53	2.092	19.1	11	U	15 49.8	2.40
12.0	111 40 7.9	4 26 32.2	16 10.2	59 14.76	2.192	19.6	12	L	4 18.1	2.31
12.5	118 42 12.0	4 45 47.0	16 2.9	58 48.12	2.240	20.1	12	U	16 45.3	2.23
13.0	125 37 58.7	-5 0 32.6	15 55.6	58 21.18	-2.243	20.6	13	L	5 11.6	2.15
13.5	132 27 29.8	5 10 48.5	15 48.3	57 54.46	2.204	21.1	13	U	17 36.9	2.07
14.0	139 10 54.1	5 16 37.9	15 41.2	57 28.42	2.132	21.6	14	L	6 1.4	2.01
14.5	145 48 25.2	5 18 8.2	15 34.4	57 3.39	2.035	22.1	14	U	18 25.1	1.95
15.0	152 20 21.4	5 15 28.8	15 27.9	56 39.66	1.917	22.6	15	L	6 48.3	1.91
15.5	158 47 4.0	-5 8 52.0	15 21.9	56 17.43	-1.786	23.1	15	U	19 10.9	1.88
16.0	165 8 56.6	-4 58 31.2	15 16.2	55 56.83	-1.646	23.6	16	L	7 33.1	1.84

GREENWICH MEAN TIME.

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.				Var. per Hour.
	" ' "	" ' "	" "	" "	"	d			h m	m	
Nov.	16.0	165 8 56.6	-4 58 31.2	15 16.2	55 56.83	-1.646	23.6	Nov. 16	L	7 33.1	1.84
	16.5	171 26 23.5	4 44 41.2	15 11.1	55 37.94	1.501	24.1	16	U	19 55.1	1.83
	17.0	177 39 50.2	4 27 37.6	15 6.4	55 20.81	1.353	24.6	17	L	8 17.0	1.82
	17.5	183 49 41.6	4 7 37.1	15 2.2	55 5.45	1.210	25.1	17	U	20 38.8	1.82
	18.0	189 56 22.4	3 44 56.7	14 58.5	54 51.76	1.069	25.6	18	L	9 0.6	1.82
	18.5	196 0 16.3	-3 19 54.0	14 55.3	54 39.77	-0.932	26.1	18	U	21 22.5	1.84
	19.0	202 1 45.9	2 52 47.3	14 52.4	54 29.36	0.803	26.6	19	L	9 44.7	1.86
	19.5	208 1 12.2	2 23 55.1	14 50.0	54 20.47	0.679	27.1	19	U	22 7.1	1.87
	20.0	213 58 55.6	1 53 36.6	14 48.0	54 13.05	0.560	27.6	20	L	10 29.7	1.89
	20.5	219 55 14.7	1 22 11.0	14 46.3	54 7.01	0.447	28.1	20	U	22 52.6	1.93
	21.0	225 50 27.6	-0 49 57.8	14 45.0	54 2.30	-0.338	28.6	21	L	11 15.9	1.95
	21.5	231 44 51.3	-0 17 17.1	14 44.1	53 58.89	0.232	29.1	21	U	23 39.4	1.97
	22.0	237 38 42.0	+0 15 31.6	14 43.5	53 56.73	0.127	29.6				
	22.5	243 32 15.9	0 48 8.3	14 43.3	53 55.84	-0.021	0.4	22	L	12 3.2	1.99
	23.0	249 25 48.8	1 20 13.5	14 43.4	53 56.23	+0.086	0.9	23	U	0 27.1	2.00
	23.5	255 19 36.8	+1 51 28.0	14 43.9	53 57.92	+0.197	1.4	23	L	12 51.2	2.01
	24.0	261 13 56.5	2 21 32.9	14 44.7	54 0.96	0.312	1.9	24	U	1 15.4	2.01
	24.5	267 9 5.1	2 50 9.8	14 45.9	54 5.43	0.434	2.4	24	L	13 39.5	2.01
	25.0	273 5 20.5	3 17 1.1	14 47.5	54 11.39	0.561	2.9	25	U	2 3.6	2.01
	25.5	279 3 2.1	3 41 49.8	14 49.6	54 18.92	0.695	3.4	25	L	14 27.6	1.99
	26.0	285 2 30.4	+4 4 19.4	14 52.1	54 28.11	+0.839	3.9	26	U	2 51.4	1.98
	26.5	291 4 7.0	4 24 14.4	14 55.1	54 39.07	0.988	4.4	26	L	15 15.0	1.96
	27.0	297 8 15.5	4 41 19.8	14 58.5	54 51.84	1.143	4.9	27	U	3 38.4	1.95
	27.5	303 15 20.3	4 55 21.7	15 2.5	55 6.53	1.305	5.4	27	L	16 1.7	1.93
	28.0	309 25 46.8	5 6 6.8	15 7.1	55 23.16	1.467	5.9	28	U	4 24.8	1.92
	28.5	315 40 1.9	+5 13 22.6	15 12.1	55 41.73	+1.628	6.4	28	L	16 47.8	1.92
	29.0	321 58 32.2	5 16 57.8	15 17.7	56 2.22	1.787	6.9	29	U	5 10.8	1.92
	29.5	328 21 44.6	5 16 42.1	15 23.8	56 24.59	1.937	7.4	29	L	17 33.8	1.92
	30.0	334 50 5.2	5 12 26.8	15 30.4	56 48.65	2.072	7.9	30	U	5 57.0	1.94
	30.5	341 23 58.1	5 4 4.9	15 37.4	57 14.24	2.189	8.4	30	L	18 20.5	1.97
Dec.	1.0	348 3 44.9	+4 51 31.9	15 44.7	57 41.07	+2.278	8.9	Dec. 1	U	6 44.4	2.01
	1.5	354 49 43.7	4 34 46.1	15 52.2	58 8.78	2.335	9.4	1	L	19 8.7	2.05
	2.0	1 42 7.6	4 13 49.6	15 59.9	58 36.95	2.352	9.9	2	U	7 33.7	2.11
	2.5	8 41 3.2	3 48 49.2	16 7.5	59 5.03	2.320	10.4	2	L	19 59.4	2.18
	3.0	15 46 29.5	3 19 56.5	16 15.0	59 32.42	2.235	10.9	3	U	8 26.0	2.25
	3.5	22 58 17.0	+2 47 29.7	16 22.1	59 58.44	+2.091	11.4	3	L	20 53.5	2.33
	4.0	30 16 6.1	2 11 53.3	16 28.6	60 22.37	1.886	11.9	4	U	9 22.0	2.42
	4.5	37 39 26.6	1 33 38.8	16 34.4	60 43.47	1.621	12.4	4	L	21 51.5	2.50
	5.0	45 7 37.5	0 53 24.3	16 39.2	61 1.06	1.300	12.9	5	U	10 21.9	2.57
	5.5	52 39 47.4	+0 11 53.5	16 42.8	61 14.48	0.931	13.4	5	L	22 53.1	2.62
	6.0	60 14 55.4	-0 30 5.0	16 45.2	61 23.26	+0.525	13.9	6	U	11 24.8	2.66
	6.5	67 51 53.1	1 11 39.8	16 46.2	61 27.00	+0.097	14.4	6	L	23 56.9	2.68
	7.0	75 29 26.5	1 51 59.1	16 45.8	61 25.56	-0.338	14.9				
	7.5	83 6 18.9	2 30 13.3	16 44.0	61 18.93	0.763	15.4	7	U	12 29.0	2.66
	8.0	90 41 14.5	3 5 36.5	16 40.9	61 7.36	1.160	15.9	8	L	1 0.7	2.62
	8.5	98 13 0.4	-3 37 29.1	16 36.5	60 51.24	-1.519	16.4	8	U	13 31.9	2.57
	9.0	105 40 30.4	-4 5 19.2	16 31.0	60 31.11	-1.826	16.9	9	L	2 2.2	2.49

MOON, 1919.
GREENWICH MEAN TIME.

133

G. M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.				Var. per Hour.
	° ' "	° ' "	' "	' "	"	d	Dec.		h m	m	
Dec. 9.0	105 40 30.4	-4 5 19.2	16 31.0	60 31.11	-1.826	16.9	Dec. 9	L	2 2.2	2.49	
9.5	113 2 47.3	4 28 43.0	16 24.6	60 7.66	2.073	17.4	9	U	14 31.6	2.41	
10.0	120 19 4.0	4 47 25.4	16 17.5	59 41.60	2.259	17.9	10	L	2 59.9	2.31	
10.5	127 28 45.1	5 1 19.0	16 9.9	59 13.70	2.382	18.4	10	U	15 27.1	2.22	
11.0	134 31 27.1	5 10 23.8	16 2.0	58 44.67	2.446	18.9	11	L	3 53.3	2.14	
11.5	141 26 58.2	-5 14 45.8	15 54.0	58 15.22	-2.454	19.4	11	U	16 18.6	2.07	
12.0	148 15 16.7	5 14 35.3	15 46.0	57 45.97	2.414	19.9	12	L	4 43.0	2.00	
12.5	154 56 30.8	5 10 6.7	15 38.2	57 17.45	2.333	20.4	12	U	17 6.7	1.95	
13.0	161 30 56.5	5 1 36.6	15 30.8	56 50.11	2.217	20.9	13	L	5 29.9	1.91	
13.5	167 58 56.6	4 49 23.1	15 23.7	56 24.34	2.076	21.4	13	U	17 52.5	1.87	
14.0	174 20 58.7	-4 33 45.4	15 17.2	56 0.37	-1.914	21.9	14	L	6 14.8	1.85	
14.5	180 37 34.0	4 15 2.6	15 11.2	55 38.46	1.738	22.4	14	U	18 36.9	1.84	
15.0	186 49 16.6	3 53 34.4	15 5.9	55 18.69	1.555	22.9	15	L	6 58.9	1.83	
15.5	192 56 41.5	3 29 40.1	15 1.1	55 1.16	1.366	23.4	15	U	19 20.8	1.83	
16.0	199 0 24.4	3 3 38.3	14 56.9	54 45.91	1.177	23.9	16	L	7 42.9	1.85	
16.5	205 1 1.0	-2 35 48.1	14 53.4	54 32.90	-0.992	24.4	16	U	20 5.1	1.86	
17.0	210 59 5.7	2 6 27.8	14 50.4	54 22.08	0.811	24.9	17	L	8 27.5	1.87	
17.5	216 55 11.7	1 35 55.9	14 48.1	54 13.40	0.637	25.4	17	U	20 50.1	1.90	
18.0	222 49 50.4	1 4 30.7	14 46.2	54 6.74	0.474	25.9	18	L	9 13.1	1.93	
18.5	228 43 31.3	0 32 30.6	14 44.9	54 1.98	0.320	26.4	18	U	21 36.3	1.95	
19.0	234 36 41.2	-0 0 14.2	14 44.2	53 59.03	-0.175	26.9	19	L	9 59.9	1.98	
19.5	240 29 45.1	+0 31 59.8	14 43.8	53 57.74	-0.041	27.4	19	U	22 23.7	1.99	
20.0	246 23 5.2	1 3 52.5	14 43.9	53 58.00	+0.084	27.9	20	L	10 47.7	2.01	
20.5	252 17 1.8	1 35 5.1	14 44.3	53 59.71	0.199	28.4	20	U	23 11.9	2.02	
21.0	258 11 52.8	2 5 18.5	14 45.2	54 2.75	0.307	28.9	21	L	11 36.1	2.02	
21.5	264 7 54.1	+2 34 14.1	14 46.3	54 7.05	+0.409	29.4			.....	....
22.0	270 5 19.9	3 1 33.2	14 47.8	54 12.54	0.505	0.0	22	U	0 0.4	2.03	
22.5	276 4 22.7	3 26 57.6	14 49.6	54 19.15	0.597	0.5	22	L	12 24.7	2.02	
23.0	282 5 14.0	3 50 9.8	14 51.7	54 26.87	0.688	1.0	23	U	0 48.8	2.00	
23.5	288 8 4.2	4 10 53.2	14 54.1	54 35.67	0.779	1.5	23	L	13 12.7	1.98	
24.0	294 13 3.4	+4 28 52.0	14 56.8	54 45.57	+0.870	2.0	24	U	1 36.4	1.97	
24.5	300 20 21.8	4 43 51.8	14 59.8	54 56.55	0.963	2.5	24	L	13 59.9	1.95	
25.0	306 30 9.3	4 55 39.4	15 3.1	55 8.69	1.059	3.0	25	U	2 23.2	1.93	
25.5	312 42 36.7	5 4 3.3	15 6.7	55 21.98	1.158	3.5	25	L	14 46.2	1.92	
26.0	318 57 55.9	5 8 53.5	15 10.7	55 36.50	1.261	4.0	26	U	3 9.2	1.91	
26.5	325 16 19.5	+5 10 1.8	15 15.0	55 52.25	+1.364	4.5	26	L	15 32.0	1.90	
27.0	331 38 1.2	5 7 22.1	15 19.6	56 9.25	1.470	5.0	27	U	3 54.8	1.90	
27.5	338 3 16.5	5 0 50.1	15 24.6	56 27.52	1.573	5.5	27	L	16 17.7	1.91	
28.0	344 32 21.0	4 50 24.2	15 29.9	56 46.99	1.671	6.0	28	U	4 40.7	1.93	
28.5	351 5 31.3	4 36 4.7	15 35.5	57 7.59	1.762	6.5	28	L	17 4.0	1.96	
29.0	357 43 4.1	+4 17 55.2	15 41.4	57 29.22	+1.841	7.0	29	U	5 27.7	1.99	
29.5	4 25 15.6	3 56 1.8	15 47.6	57 51.69	1.901	7.5	29	L	17 51.9	2.04	
30.0	11 12 20.5	3 30 34.6	15 53.8	58 14.74	1.936	8.0	30	U	6 16.8	2.10	
30.5	18 4 31.0	3 1 47.1	16 0.2	58 38.05	1.944	8.5	30	L	18 42.4	2.17	
31.0	25 1 56.0	2 29 57.2	16 6.5	59 1.26	1.917	9.0	31	U	7 8.9	2.25	
31.5	32 4 39.4	+1 55 27.6	16 12.7	59 23.88	+1.847	9.5	31	L	19 36.3	2.32	
32.0	39 12 38.8	+1 18 45.6	16 18.5	59 45.40	+1.732	10.0	32	U	8 4.6	2.40	

GREENWICH MEAN TIME

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Jan. 1	17 10 48.22	+ 5.040	-20 19 7.3	-23.90	9.943 4525	+4397.6	3.81	10.02	22 28.9
2	17 13 2.98	6.171	20 29 10.9	26.29	9.953 8697	4280.6	3.72	9.79	22 27.6
3	17 15 43.57	7.194	20 40 4.2	28.06	9.963 9876	4148.8	3.63	9.56	22 26.7
4	17 18 47.48	8.116	20 51 33.2	29.27	9.973 7762	4007.3	3.55	9.35	22 26.1
5	17 22 12.40	8.946	21 3 25.3	29.98	9.983 2181	3960.3	3.47	9.15	22 25.9
6	17 25 56.24	+ 9.694	-21 15 28.8	-30.24	9.992 3034	+3710.5	3.40	8.96	22 25.9
7	17 29 57.11	10.387	21 27 33.5	30.09	0.001 0281	3560.4	3.33	8.78	22 26.2
8	17 34 13.32	10.974	21 39 30.1	29.57	0.009 3943	3411.7	3.27	8.61	22 26.8
9	17 38 43.38	11.521	21 51 10.2	28.72	0.017 4064	3265.6	3.21	8.45	22 27.5
10	17 43 25.93	12.017	22 2 26.6	27.59	0.025 0721	3123.1	3.16	8.31	22 28.5
11	17 48 19.80	+12.465	-22 13 12.7	-26.21	0.032 4006	+2984.7	3.10	8.17	22 29.6
12	17 53 23.91	12.871	22 23 22.8	24.60	0.039 4022	2850.8	3.05	8.04	22 30.9
13	17 58 37.33	13.241	22 32 51.7	22.78	0.046 0880	2721.5	3.01	7.92	22 32.3
14	18 3 59.20	13.577	22 41 34.8	20.78	0.052 4693	2597.0	2.96	7.80	22 33.8
15	18 9 28.79	13.884	22 49 28.1	18.63	0.058 5576	2477.3	2.92	7.69	22 35.5
16	18 15 5.41	+14.164	-22 56 27.9	-16.33	0.064 3642	+2362.2	2.88	7.59	22 37.3
17	18 20 48.47	14.420	23 2 31.0	13.91	0.069 8998	2251.6	2.84	7.49	22 39.1
18	18 26 37.42	14.655	23 7 34.5	11.36	0.075 1755	2145.5	2.81	7.40	22 41.1
19	18 32 31.77	14.871	23 11 35.7	8.72	0.080 2012	2043.3	2.78	7.32	22 43.1
20	18 38 31.08	15.068	23 14 32.4	5.99	0.084 9864	1945.1	2.75	7.24	22 45.3
21	18 44 34.93	+15.250	-23 16 22.6	- 3.18	0.089 5408	+1850.7	2.72	7.16	22 47.5
22	18 50 42.97	15.417	23 17 4.2	- 0.28	0.093 8724	1759.7	2.69	7.09	22 49.7
23	18 56 54.86	15.571	23 16 35.4	+ 2.68	0.097 9900	1672.0	2.67	7.02	22 52.0
24	19 3 10.30	15.713	23 14 54.9	5.70	0.101 9005	1587.3	2.64	6.96	22 54.4
25	19 9 28.99	15.843	23 12 1.1	8.79	0.105 6113	1505.5	2.62	6.90	22 56.8
26	19 15 50.68	+15.963	-23 7 52.8	+11.91	0.109 1288	+1426.2	2.60	6.85	22 59.3
27	19 22 15.14	16.074	23 2 28.9	15.09	0.112 4590	1349.3	2.58	6.79	23 1.8
28	19 28 42.15	16.176	22 55 48.1	18.31	0.115 6073	1274.6	2.56	6.74	23 4.3
29	19 35 11.50	16.269	22 47 49.7	21.57	0.118 5787	1201.8	2.54	6.70	23 6.9
30	19 41 43.01	16.356	22 38 32.6	24.86	0.121 3774	1130.7	2.53	6.66	23 9.6
31	19 48 16.51	+16.435	-22 27 56.0	+28.19	0.124 0075	+1061.2	2.51	6.61	23 12.2
Feb. 1	19 54 51.83	16.508	22 15 59.3	31.54	0.126 4724	993.1	2.50	6.58	23 14.9
2	20 1 28.85	16.575	22 2 41.7	34.93	0.128 7753	926.1	2.48	6.54	23 17.6
3	20 8 7.41	16.637	21 48 2.6	38.34	0.130 9182	859.9	2.47	6.51	23 20.3
4	20 14 47.41	16.696	21 32 1.4	41.77	0.132 9035	794.5	2.46	6.48	23 23.1
5	20 21 28.72	+16.748	-21 14 37.5	+45.22	0.134 7324	+ 729.6	2.45	6.45	23 25.8
6	20 28 11.27	16.797	20 55 50.6	48.69	0.136 4060	665.1	2.44	6.43	23 28.6
7	20 34 54.95	16.843	20 35 40.1	52.19	0.137 9249	600.6	2.43	6.41	23 31.4
8	20 41 39.70	16.886	20 14 5.6	55.69	0.139 2887	535.9	2.43	6.39	23 34.3
9	20 48 25.44	16.926	19 51 6.8	59.21	0.140 4970	470.8	2.42	6.37	23 37.1
10	20 55 12.11	+16.964	-19 26 43.2	+62.75	0.141 5481	+ 405.1	2.41	6.35	23 40.0
11	21 1 59.68	17.000	19 0 54.7	66.30	0.142 4408	338.5	2.41	6.34	23 42.8
12	21 8 48.10	17.035	18 33 40.9	69.85	0.143 1717	270.4	2.40	6.33	23 45.7
13	21 15 37.33	17.068	18 5 1.8	73.41	0.143 7377	200.9	2.40	6.32	23 48.6
14	21 22 27.34	17.100	17 34 57.0	76.99	0.144 1347	130.7	2.40	6.32	23 51.5
15	21 29 18.12	+17.132	-17 3 26.5	+80.55	0.144 3583	+ 56.2	2.40	6.31	23 54.4
16	21 36 9.65	+17.162	-16 30 30.5	+84.12	0.144 4022	- 20.0	2.40	6.31	23 57.4

MERCURY, 1919.

135

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.		
	Hour.	Min.	Sec.		Hour.	Min.	Sec.								
	h	m	s	s	°	'	"	"			"	"	h	m	
Feb.	16	21	36	9.65	+17.163	-16	30	30.5	+ 84.12	0.144 4022	- 30.0	2.40	6.31	23 57.4	
	17	21	43	1.90	17.192	15	56	8.8	87.68	0.144 2601	99.0	2.40	6.31	
	18	21	49	54.86	17.221	15	20	21.8	91.23	0.143 9241	181.5	2.40	6.32	0 0.3	
	19	21	56	48.52	17.250	14	43	9.7	94.77	0.143 3857	267.8	2.40	6.33	0 3.3	
	20	22	3	42.85	17.278	14	4	33.0	98.28	0.142 6351	358.5	2.41	6.34	0 6.2	
	21	22	10	37.83	+17.304	-13	24	32.4	+101.77	0.141 6614	- 453.7	2.41	6.35	0 9.2	
	22	22	17	33.41	17.328	12	43	8.6	105.21	0.140 4529	554.4	2.42	6.37	0 12.2	
	23	22	24	29.56	17.350	12	0	22.9	108.60	0.138 9956	661.0	2.43	6.39	0 15.2	
	24	22	31	26.20	17.369	11	16	16.5	111.92	0.137 2750	774.0	2.44	6.42	0 18.2	
	25	22	38	23.24	17.383	10	30	51.3	115.16	0.135 2749	894.0	2.45	6.45	0 21.2	
	26	22	45	20.56	+17.392	- 9	44	9.5	+118.31	0.132 9778	-1021.6	2.46	6.48	0 24.3	
	27	22	52	18.01	17.393	8	56	13.6	121.33	0.130 3645	1157.5	2.48	6.52	0 27.3	
	28	22	59	15.37	17.385	8	7	6.9	124.20	0.127 4147	1302.2	2.49	6.56	0 30.3	
	Mar.	1	23	6	12.40	17.365	7	16	53.4	126.89	0.124 1062	1456.3	2.51	6.61	0 33.3
		2	23	13	8.76	17.330	6	25	37.7	129.38	0.120 4166	1619.9	2.53	6.67	0 36.3
		3	23	20	4.09	+17.277	- 5	33	25.3	+131.61	0.116 3223	-1793.7	2.56	6.73	0 39.3
		4	23	26	57.87	17.201	4	40	22.7	133.55	0.111 7984	1977.9	2.58	6.80	0 42.3
		5	23	33	49.54	17.100	3	46	37.6	135.15	0.106 8205	2172.1	2.61	6.88	0 45.2
		6	23	40	38.41	16.967	2	52	18.5	136.37	0.101 3646	2376.2	2.65	6.97	0 48.1
		7	23	47	23.69	16.799	1	57	35.4	137.14	0.095 4073	2589.7	2.68	7.06	0 50.9
		8	23	54	4.45	+16.590	- 1	2	39.5	+137.43	0.088 9274	-2811.5	2.72	7.17	0 53.6
		9	0	0	39.63	16.334	- 0	7	43.2	137.17	0.081 9064	3040.4	2.77	7.29	0 56.3
		10	0	7	8.05	16.026	+ 0	46	59.7	136.31	0.074 3290	3274.7	2.82	7.42	0 58.8
		11	0	13	28.41	15.661	1	41	14.6	134.82	0.066 1851	3512.2	2.87	7.56	1 1.2
		12	0	19	39.31	15.236	2	34	45.7	132.66	0.057 4699	3750.4	2.93	7.71	1 3.4
13		0	25	39.22	+14.745	+ 3	27	16.5	+129.79	0.048 1849	-3986.4	2.99	7.88	1 5.5	
14		0	31	26.56	14.189	4	18	30.1	126.22	0.038 3394	4217.1	3.06	8.06	1 7.3	
15		0	36	59.72	13.563	5	8	9.3	121.93	0.027 9498	4439.3	3.13	8.25	1 8.9	
16		0	42	17.03	12.869	5	55	57.1	116.94	0.017 0405	4649.5	3.21	8.46	1 10.2	
17		0	47	16.88	12.107	6	41	36.7	111.25	0.005 6445	4844.4	3.30	8.69	1 11.3	
18		0	51	57.66	+11.281	+ 7	24	52.1	+104.93	9.993 8019	-5021.1	3.39	8.93	1 12.0	
19		0	56	17.87	10.393	8	5	28.2	97.98	9.981 5605	5176.3	3.49	9.18	1 12.4	
20		1	0	16.09	9.449	8	43	10.6	90.46	9.968 9751	5307.4	3.59	9.45	1 12.4	
21		1	3	51.04	8.455	9	17	46.2	82.42	9.956 1065	5411.7	3.70	9.74	1 12.0	
22		1	7	1.59	7.417	9	49	3.0	73.90	9.943 0223	5486.9	3.81	10.03	1 11.2	
23		1	9	46.77	+ 6.343	+10	16	50.1	+ 64.96	9.929 7942	-5531.1	3.93	10.34	1 10.0	
24		1	12	5.82	5.241	10	40	57.9	55.64	9.916 4995	5542.2	4.05	10.67	1 8.4	
25		1	13	58.18	4.121	11	1	18.1	46.00	9.903 2194	5518.5	4.17	11.00	1 6.3	
26	1	15	23.56	2.993	11	17	43.5	36.08	9.890 0400	5458.3	4.31	11.34	1 3.7		
27	1	16	21.88	1.899	11	30	8.3	25.96	9.877 0496	5360.6	4.43	11.68	1 0.8		
28	1	16	53.41	+ 0.763	+11	38	28.3	+ 15.70	9.864 8404	-5224.0	4.57	12.03	0 57.3		
29	1	16	58.69	- 0.316	11	42	41.4	+ 5.39	9.852 0061	5048.0	4.70	12.37	0 53.5		
30	1	16	38.61	1.349	11	42	47.2	- 4.89	9.840 1418	4832.2	4.83	12.72	0 49.2		
31	1	15	54.40	2.324	11	38	48.0	15.01	9.828 8429	4577.1	4.95	13.05	0 44.5		
Apr.	1	1	14	47.66	3.224	11	30	48.8	24.86	9.818 2026	4263.6	5.08	13.37	0 39.5	
	2	1	13	20.35	- 4.096	+11	18	57.9	- 24.30	9.808 3110	-3953.6	5.19	13.68	0 34.1	
	3	1	11	34.76	- 4.745	+11	3	26.7	- 43.19	9.799 2523	-3890.0	5.30	13.97	0 28.4	

MERCURY, 1919.
GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.	
	h	m	s	s	°	'	"	"			"	"	h m
Apr.	1	1 14	47.66	- 3.224	+11 30	48.8		-24.86	9.818 2026	-4283.6	5.08	13.37	0 39.5
	2	1 13	20.35	4.036	11 18	57.9		34.30	9.808 3110	3953.6	5.19	13.68	0 34.1
	3	1 11	34.76	4.745	11 3	26.7		43.19	9.799 2523	3590.0	5.30	13.97	0 28.4
	4	1 9	33.50	5.340	10 44	30.5		51.37	9.791 1029	3196.7	5.41	14.24	0 22.5
	5	1 7	19.43	5.811	10 22	27.9		58.70	9.783 9284	2778.2	5.49	14.47	0 16.3
	6	1 4	55.64	- 6.150	+ 9 57	41.0		-65.03	9.777 7831	-2340.1	5.57	14.68	0 10.0
	7	1 2	25.33	6.354	9 30	35.2		70.26	9.772 7062	1899.0	5.64	14.85	0 3.6
	8	0 59	51.73	6.423	9 1	38.1		74.30	9.768 7212	1431.3	5.69	14.99	23 50.6
	9	0 57	18.06	6.361	8 31	18.9		77.09	9.765 8356	973.9	5.73	15.09	23 44.2
	10	0 54	47.40	6.174	8 0	8.1		78.61	9.764 0408	523.5	5.75	15.15	23 37.9
	11	0 52	22.65	- 5.871	+ 7 28	35.6		-78.89	9.763 3124	- 86.2	5.76	15.18	23 31.7
	12	0 50	6.42	5.465	6 57	11.1		77.97	9.763 6119	+ 332.3	5.76	15.17	23 25.7
	13	0 48	1.03	4.970	6 26	22.0		75.95	9.764 8890	727.8	5.74	15.12	23 19.9
	14	0 46	8.48	4.398	5 56	33.7		72.92	9.767 0840	1096.6	5.71	15.05	23 14.3
	15	0 44	30.40	3.766	5 28	8.6		69.03	9.770 1293	1436.1	5.67	14.94	23 9.0
	16	0 43	8.09	- 3.066	+ 5 1	26.2		-64.39	9.773 9527	+1745.0	5.62	14.81	23 4.0
	17	0 42	2.52	2 373	4 36	42.7		59.14	9.778 4804	2022.9	5.57	14.66	22 59.2
	18	0 41	14.34	1.639	4 14	11.2		53.42	9.783 6378	2369.8	5.50	14.48	22 54.8
	19	0 40	43.95	0.892	3 54	1.6		47.33	9.789 3517	2486.9	5.43	14.29	22 50.6
	20	0 40	31.52	- 0.144	3 36	21.3		41.00	9.795 5524	2675.7	5.35	14.09	22 46.8
	21	0 40	36.99	+ 0.598	+ 3 21	14.8		-34.52	9.802 1735	+2837.6	5.27	13.88	22 43.2
	22	0 41	0.15	1.329	3 8	45.1		27.96	9.809 1533	2975.2	5.19	13.66	22 39.9
	23	0 41	40.68	2.045	2 58	52.7		21.41	9.816 4364	3090.4	5.10	13.43	22 36.9
	24	0 42	38.15	2.740	2 51	37.0		14.92	9.823 9706	3185.0	5.01	13.20	22 34.2
	25	0 43	52.02	3.413	2 46	55.8		8.53	9.831 7101	3261.7	4.92	12.97	22 31.8
	26	0 45	21.77	+ 4.062	+ 2 44	46.4		- 2.28	9.839 6140	+3322.3	4.83	12.73	22 29.6
	27	0 47	6.79	4.686	2 45	5.0		+ 3.80	9.847 6459	3368.8	4.75	12.50	22 27.6
	28	0 49	6.48	5.285	2 47	47.5		9.71	9.855 7744	3403.0	4.66	12.27	22 25.9
	29	0 51	20.26	5.859	2 52	49.3		15.41	9.863 9715	3426.4	4.57	12.04	22 24.4
	30	0 53	47.54	6.410	3 0	5.5		20.91	9.872 2135	3440.5	4.48	11.81	22 23.1
May	1	0 56	27.76	+ 6.938	+ 3 9	31.2		+26.20	9.880 4795	+3446.6	4.40	11.59	22 22.0
	2	0 59	20.39	7.444	3 21	1.3		31.28	9.888 7518	3445.9	4.32	11.37	22 21.1
	3	1 2	24.93	7.931	3 34	31.0		36.15	9.897 0153	3439.4	4.24	11.16	22 20.4
	4	1 5	40.92	8.399	3 49	55.1		40.82	9.905 2571	3428.0	4.16	10.95	22 19.9
	5	1 9	7.96	8.851	4 7	8.9		45.30	9.913 4660	3412.1	4.08	10.74	22 19.6
	6	1 12	45.66	+ 9.288	+ 4 26	7.7		+49.57	9.921 6322	+3392.6	4.00	10.54	22 19.5
	7	1 16	33.67	9.712	4 46	46.6		53.64	9.929 7479	3369.9	3.93	10.35	22 19.5
	8	1 20	31.73	10.125	5 9	1.2		57.54	9.937 8054	3344.3	3.86	10.16	22 19.6
	9	1 24	39.57	10.527	5 32	47.2		61.26	9.945 7985	3316.3	3.79	9.97	22 20.0
	10	1 28	56.98	10.922	5 58	0.1		64.79	9.953 7218	3286.0	3.72	9.79	22 20.5
	11	1 33	23.79	+11.311	+ 6 24	35.8		+68.15	9.961 5696	+3263.6	3.65	9.61	22 21.1
	12	1 37	59.88	11.695	6 52	30.1		71.34	9.969 3375	3219.3	3.58	9.44	22 21.9
	13	1 42	45.14	12.076	7 21	38.9		74.36	9.977 0204	3182.8	3.52	9.28	22 22.9
	14	1 47	39.54	12.457	7 51	58.1		77.21	9.984 6136	3144.5	3.46	9.12	22 24.0
	15	1 52	43.05	12.836	8 23	23.8		79.90	9.992 1126	3104.3	3.40	8.96	22 25.2
	16	1 57	55.69	+13.218	+ 8 55	51.9		+82.42	9.999 5123	+3061.8	3.35	8.81	22 26.7
	17	2 3	17.52	+13.602	+ 9 29	18.5		+84.76	0.006 8075	+3017.1	3.29	8.66	22 28.2

MERCURY, 1919.

137

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.		
	h	m	s		°	'	"							h	m
May	17	2	3	17.52	+13.602	+	9	29	18.5	+84.76	0.006 8075	+3017.1	3.29	8.66	22 28.2
	18	2	8	48.62	13.991		10	3	39.2	86.94	0.013 9921	2969.7	3.24	8.52	22 29.9
	19	2	14	29.12	14.385		10	38	50.0	88.93	0.021 0598	2919.6	3.18	8.38	22 31.8
	20	2	20	19.16	14.786		11	14	46.4	90.74	0.028 0036	2866.3	3.13	8.25	22 33.9
	21	2	26	18.92	15.195		11	51	23.9	92.35	0.034 8153	2809.6	3.08	8.12	22 36.1
	22	2	32	28.60	+15.613	+12	28	37.8	+93.77	0.041 4863	+2748.9	3.04	8.00	22 38.5	
	23	2	38	48.41	16.040		13	6	23.0	94.96	0.048 0063	2683.8	2.99	7.88	22 41.0
	24	2	45	18.59	16.477		13	44	34.1	95.92	0.054 3645	2613.9	2.95	7.77	22 43.8
	25	2	51	59.39	16.924		14	23	5.3	96.64	0.060 5484	2538.4	2.91	7.66	22 46.7
	26	2	58	51.04	17.382		15	1	50.6	97.09	0.066 5441	2457.0	2.87	7.55	22 49.8
	27	3	5	53.80	+17.849	+15	40	43.1	+97.24	0.072 3366	+2369.0	2.83	7.45	22 53.1	
	28	3	13	7.86	18.325		16	19	35.7	97.09	0.077 9095	2273.8	2.79	7.35	22 56.5
	29	3	20	33.45	18.808		16	58	20.5	96.59	0.083 2445	2170.8	2.76	7.27	23 0.2
	30	3	28	10.69	19.296		17	36	48.9	95.72	0.088 3227	2059.4	2.73	7.18	23 4.1
	31	3	35	59.70	19.788		18	14	51.8	94.46	0.093 1226	1939.1	2.70	7.10	23 8.2
June	1	3	44	0.48	+20.277	+18	52	19.4	+92.77	0.097 6232	+1809.7	2.67	7.03	23 12.4	
	2	3	52	12.95	20.761		19	29	1.0	90.62	0.101 8013	1670.6	2.64	6.96	23 16.9
	3	4	0	36.93	21.235		20	4	45.5	88.01	0.105 6343	1521.9	2.62	6.90	23 21.6
	4	4	9	12.09	21.692		20	39	21.3	84.89	0.109 0988	1363.7	2.60	6.85	23 26.4
	5	4	17	57.96	22.126		21	12	36.1	81.26	0.112 1726	1196.3	2.58	6.80	23 31.4
	6	4	26	53.90	+22.530	+21	44	17.9	+77.13	0.114 8342	+1020.4	2.57	6.76	23 36.6	
	7	4	35	59.10	22.896		22	14	14.2	72.48	0.117 0647	837.0	2.55	6.72	23 41.9
	8	4	45	12.56	23.218		22	42	13.2	67.36	0.118 8470	647.4	2.54	6.69	23 47.3
	9	4	54	33.17	23.489		23	8	3.6	61.77	0.120 1683	453.0	2.53	6.67	23 52.8
	10	5	3	59.60	23.704		23	31	34.8	55.77	0.121 0192	255.7	2.53	6.66	23 58.4
	11	5	13	30.46	+23.857	+23	52	37.7	+49.42	0.121 3949	+ 57.4	2.53	6.65	...	
	12	5	23	4.23	23.946		24	11	4.5	42.78	0.121 2952	- 140.2	2.53	6.65	0 4.0
	13	5	32	39.34	23.969		24	26	49.3	35.92	0.120 7243	334.9	2.53	6.66	0 9.7
	14	5	42	14.22	23.927		24	39	47.6	28.92	0.119 6914	525.0	2.54	6.68	0 15.4
	15	5	51	47.32	23.821		24	49	57.1	21.86	0.118 2090	709.1	2.54	6.70	0 21.0
	16	6	1	17.14	+23.654	+24	57	17.1	+14.81	0.116 2939	- 885.6	2.56	6.73	0 26.6	
	17	6	10	42.28	23.432		25	1	48.6	7.84	0.113 9648	1053.8	2.57	6.77	0 32.1
	18	6	20	1.46	23.158		25	3	34.4	+ 1.01	0.111 2429	1212.9	2.59	6.81	0 37.5
	19	6	29	13.51	22.839		25	2	38.5	- 5.63	0.108 1507	1362.4	2.61	6.86	0 42.7
	20	6	38	17.40	22.479		24	59	5.9	12.04	0.104 7113	1502.1	2.62	6.91	0 47.9
	21	6	47	12.26	+22.087	+24	53	2.7	-18.18	0.100 9481	-1632.3	2.65	6.98	0 52.9	
	22	6	55	57.35	21.666		24	44	35.8	24.02	0.096 8837	1753.2	2.67	7.04	0 57.7
	23	7	4	32.03	21.221		24	33	52.3	29.55	0.092 5400	1865.1	2.70	7.11	1 2.3
	24	7	12	55.83	20.759		24	21	0.0	34.75	0.087 9380	1968.6	2.73	7.19	1 6.8
	25	7	21	8.33	20.281		24	6	6.7	39.63	0.083 0970	2064.2	2.76	7.27	1 11.0
	26	7	29	9.25	+19.794	+23	49	20.3	-44.18	0.078 0357	-2152.5	2.79	7.35	1 15.1	
	27	7	36	58.36	19.298		23	30	48.6	48.40	0.072 7703	2234.3	2.83	7.44	1 19.0
	28	7	44	35.51	18.797		23	10	39.6	52.30	0.067 3160	2309.9	2.86	7.54	1 22.7
	29	7	52	0.61	18.294		22	49	0.8	55.88	0.061 6869	2380.2	2.90	7.63	1 26.1
	30	7	59	13.61	17.789		22	25	59.7	59.16	0.055 8948	2445.6	2.94	7.74	1 29.4
July	1	8	6	14.49	+17.284	+22	1	43.6	-62.14	0.049 9515	-2506.5	2.98	7.84	1 32.5	
	2	8	13	3.26	+16.780	+21	36	19.5	-64.83	0.043 8664	-2563.7	3.02	7.95	1 35.	

MERCURY, 1919.
GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.	
	h	m	s	s	°	'	"	"			"	"	h m
July	1	8	6	14.49	+17.284	+22	1	43.6	-62.14	0.049 9515	-2506.5	2.98	7.84 1 32.5
	2	8	13	3.26	16.780	21	36	19.5	64.83	0.043 8664	2563.7	3.02	7.95 1 35.3
	3	8	19	39.95	16.278	21	9	54.2	67.24	0.037 6484	2617.4	3.06	8.07 1 38.0
	4	8	26	4.60	15.777	20	42	34.3	69.38	0.031 3053	2668.0	3.11	8.19 1 40.5
	5	8	32	17.25	15.278	20	14	26.2	71.26	0.024 8440	2716.0	3.16	8.31 1 42.7
	6	8	38	17.96	+14.781	+19	45	36.0	-72.89	0.018 2702	-2761.7	3.21	8.44 1 44.8
	7	8	44	6.76	14.285	19	16	9.7	74.27	0.011 5898	2805.0	3.25	8.57 1 46.6
	8	8	49	43.67	13.791	18	46	13.2	75.40	0.004 8075	2846.7	3.30	8.70 1 48.3
	9	8	55	8.72	13.297	18	15	52.2	76.31	9.997 9269	2886.8	3.36	8.84 1 49.8
	10	9	0	21.91	12.802	17	45	12.2	76.99	9.990 9524	2925.1	3.41	8.99 1 51.0
	11	9	5	23.20	+12.306	+17	14	18.7	-77.43	9.983 8878	-2961.9	3.47	9.13 1 52.1
	12	9	10	12.57	11.807	16	43	17.3	77.65	9.976 7364	2997.4	3.52	9.28 1 52.9
	13	9	14	49.92	11.305	16	12	13.2	77.65	9.969 5016	3031.4	3.58	9.44 1 53.6
	14	9	19	15.19	10.799	15	41	11.8	77.42	9.962 1868	3063.9	3.65	9.60 1 54.1
	15	9	23	28.23	10.287	15	10	18.6	76.97	9.954 7961	3094.8	3.71	9.77 1 54.3
	16	9	27	28.90	+ 9.768	+14	39	38.9	-76.29	9.947 3330	-3124.1	3.77	9.93 1 54.4
	17	9	31	17.01	9.240	14	9	18.5	75.38	9.939 8023	3151.1	3.84	10.11 1 54.2
	18	9	34	52.32	8.702	13	39	22.7	74.23	9.932 2093	3176.0	3.91	10.29 1 53.9
	19	9	38	14.59	8.152	13	9	57.5	72.83	9.924 5597	3198.2	3.98	10.47 1 53.3
	20	9	41	23.53	7.591	12	41	8.7	71.19	9.916 8606	3217.2	4.05	10.66 1 52.5
	21	9	44	18.82	+ 7.014	+12	13	2.5	-69.29	9.909 1202	-3232.5	4.12	10.85 1 51.4
	22	9	47	0.08	6.421	11	45	45.1	67.12	9.901 3481	3243.4	4.19	11.04 1 50.1
	23	9	49	26.91	5.812	11	19	23.2	64.66	9.893 5562	3249.0	4.27	11.24 1 48.6
	24	9	51	38.90	5.184	10	54	3.6	61.92	9.885 7578	3248.5	4.35	11.45 1 46.9
	25	9	53	35.59	4.537	10	29	53.5	58.88	9.877 9690	3240.9	4.43	11.66 1 44.9
	26	9	55	16.50	+ 3.869	+10	7	0.0	-55.52	9.870 2084	-3224.6	4.51	11.87 1 42.6
	27	9	56	41.14	3.181	9	45	31.1	51.84	9.862 4989	3198.4	4.59	12.08 1 40.0
	28	9	57	49.01	2.472	9	25	34.5	47.82	9.854 8654	3160.8	4.67	12.29 1 37.2
	29	9	58	39.62	1.743	9	7	18.4	43.46	9.847 3380	3109.7	4.75	12.51 1 34.1
	30	9	59	12.51	0.995	8	50	51.2	38.75	9.839 9510	3043.4	4.83	12.72 1 30.7
Aug.	31	9	59	27.26	+ 0.232	+ 8	36	21.3	-33.69	9.832 7434	-2969.9	4.91	12.93 1 27.0
	1	9	59	23.52	- 0.545	8	23	56.8	28.29	9.825 7593	2856.6	4.99	13.14 1 23.0
	2	9	59	1.03	1.330	8	13	46.1	22.55	9.819 0490	2731.6	5.07	13.35 1 18.6
	3	9	58	19.68	2.116	8	5	56.8	16.50	9.812 6668	2582.5	5.14	13.55 1 14.0
	4	9	57	19.48	2.898	8	0	36.2	10.17	9.806 6742	2406.9	5.21	13.73 1 9.1
	5	9	56	0.68	- 3.665	+ 7	57	50.4	- 3.61	9.801 1365	-2202.8	5.28	13.91 1 3.8
	6	9	54	23.76	4.407	7	57	44.6	+ 3.15	9.796 1247	1998.7	5.34	14.07 0 58.3
	7	9	52	29.46	5.111	8	0	22.5	10.01	9.791 7121	1703.0	5.40	14.22 0 52.4
	8	9	50	18.86	5.763	8	5	45.4	16.90	9.787 9759	1405.2	5.44	14.34 0 46.3
	9	9	47	53.39	6.347	8	13	53.0	23.71	9.784 9928	1075.3	5.48	14.44 0 40.0
	10	9	45	14.84	- 6.850	+ 8	24	41.9	+30.33	9.782 8392	- 714.4	5.51	14.51 0 33.4
	11	9	42	25.37	7.254	8	38	6.1	36.63	9.781 5866	- 324.9	5.52	14.55 0 26.7
	12	9	39	27.56	-7.543	8	53	56.5	42.49	9.781 3003	+ 90.3	5.53	14.56 0 19.8
	13	9	36	24.30	7.706	9	12	1.0	47.78	9.782 0368	526.4	5.52	14.54 0 12.9
	14	9	33	18.79	7.729	9	32	4.4	52.38	9.783 8397	978.2	5.50	14.48 { 0 5.9 23 58.9
	15	9	30	14.49	- 7.604	+ 9	53	49.0	+56.19	9.786 7396	+1439.3	5.46	14.38 23 52.0
	16	9	27	15.00	- 7.237	+10	16	54.7	+59.13	9.790 7496	+1902.4	5.41	14.25 23 45.2

MERCURY, 1919.

139

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Aug. 16	9 27 15.00	- 7.327	+10 16 54.7	+ 59.13	9.790 7499	+1902.4	5.41	14.25	23 45.2
17	9 24 24.01	6.397	10 40 59.6	61.12	9.795 8671	2300.4	5.35	14.08	23 38.6
18	9 21 45.15	6.316	11 5 40.6	62.13	9.802 0698	2806.0	5.27	13.88	23 32.3
19	9 19 21.97	5.592	11 30 33.9	62.15	9.809 3204	3232.4	5.18	13.65	23 26.3
20	9 17 17.77	4.736	11 55 15.8	61.19	9.817 5646	3633.0	5.08	13.39	23 20.7
21	9 15 35.58	- 3.761	+12 19 23.4	+ 59.29	9.826 7337	+4002.4	4.98	13.11	23 15.5
22	9 14 18.05	2.683	12 42 34.3	56.48	9.836 7478	4336.5	4.87	12.82	23 10.7
23	9 13 27.47	1.519	13 4 27.5	52.83	9.847 5175	4631.5	4.75	12.50	23 6.4
24	9 13 5.69	- 0.287	13 24 43.7	48.40	9.858 9458	4885.1	4.62	12.18	23 2.6
25	9 13 14.11	+ 0.995	13 43 5.0	43.26	9.870 9321	5096.2	4.50	11.85	22 59.3
26	9 13 53.72	+ 2.309	+13 59 15.2	+ 37.49	9.883 3731	+5264.1	4.37	11.51	22 56.5
27	9 15 5.06	3.638	14 13 0.0	31.15	9.896 1653	5388.9	4.25	11.18	22 54.3
28	9 16 48.31	4.965	14 24 6.3	24.30	9.909 2061	5471.5	4.12	10.85	22 52.5
29	9 19 3.22	6.274	14 32 22.8	17.01	9.922 3958	5513.2	3.99	10.52	22 51.3
30	9 21 49.19	7.551	14 37 40.0	9.36	9.935 6382	5515.7	3.88	10.21	22 50.7
31	9 25 5.32	+ 8.784	+14 39 49.7	+ 1.40	9.948 8416	+5481.1	3.76	9.90	22 50.4
Sept. 1	9 28 50.36	9.959	14 38 45.6	- 6.77	9.961 9194	5411.5	3.65	9.61	22 50.7
2	9 33 2.79	11.065	14 34 23.3	15.11	9.974 7911	5309.8	3.54	9.33	22 51.4
3	9 37 40.87	12.094	14 26 40.0	23.50	9.987 3830	5178.9	3.44	9.06	22 52.4
4	9 42 42.61	13.037	14 15 35.3	31.88	9.999 6289	5022.0	3.35	8.81	22 53.9
5	9 48 5.90	+13.888	+14 1 10.5	- 40.16	0.011 4705	+4842.5	3.25	8.57	22 55.6
6	9 53 48.48	14.644	13 43 29.1	48.25	0.022 8577	4644.0	3.17	8.35	22 57.7
7	9 59 48.05	15.303	13 22 36.7	56.07	0.033 7496	4430.3	3.09	8.14	22 59.9
8	10 6 2.25	15.864	12 58 40.7	63.53	0.044 1140	4205.2	3.02	7.95	23 2.4
9	10 12 28.78	16.331	12 31 50.3	70.59	0.053 9282	3972.3	2.95	7.77	23 5.1
10	10 19 5.43	+16.708	+12 2 15.9	- 77.19	0.063 1775	+3735.0	2.89	7.61	23 7.9
11	10 25 50.11	17.001	11 30 9.4	83.27	0.071 8556	3496.8	2.83	7.46	23 10.8
12	10 32 40.86	17.216	10 55 43.2	88.82	0.079 9635	3290.2	2.78	7.32	23 13.8
13	10 39 35.94	17.362	10 19 10.4	93.82	0.087 5079	3027.7	2.73	7.19	23 16.8
14	10 46 33.77	17.448	9 40 44.0	98.29	0.094 5016	2801.4	2.69	7.08	23 19.9
15	10 53 33.00	+17.480	+ 9 0 37.0	-102.21	0.100 9609	+2582.8	2.65	6.97	23 22.9
16	11 0 32.46	17.468	8 19 2.0	105.62	0.106 9060	2373.0	2.61	6.88	23 26.0
17	11 7 31.17	17.419	7 36 11.0	108.54	0.112 3589	2172.5	2.58	6.79	23 29.0
18	11 14 28.34	17.341	6 52 15.6	111.00	0.117 3422	1982.1	2.55	6.72	23 32.0
19	11 21 23.33	17.239	6 7 26.3	113.04	0.121 8810	1801.8	2.53	6.65	23 34.9
20	11 28 15.65	+17.119	+ 5 21 52.9	-114.69	0.125 9987	+1631.3	2.50	6.58	23 37.8
21	11 35 4.92	16.986	4 35 44.3	115.97	0.129 7192	1470.7	2.48	6.53	23 40.6
22	11 41 50.89	16.844	3 49 8.9	116.93	0.133 0655	1319.4	2.46	6.48	23 43.4
23	11 48 33.38	16.697	3 2 14.0	117.60	0.136 0595	1177.0	2.44	6.43	23 46.1
24	11 55 12.31	16.547	2 15 6.2	118.01	0.138 7216	1042.8	2.43	6.39	23 48.8
25	12 1 47.64	+16.397	+ 1 27 51.6	-118.17	0.141 0712	+ 916.5	2.42	6.36	23 51.3
26	12 8 19.40	16.249	+ 0 40 35.5	118.13	0.143 1266	797.4	2.40	6.33	23 53.9
27	12 14 47.64	16.105	- 0 6 37.3	117.90	0.144 9038	684.8	2.39	6.30	23 56.4
28	12 21 12.47	15.965	0 53 42.4	117.50	0.146 4185	578.4	2.39	6.28	23 58.8
29	12 27 34.00	15.830	1 40 36.0	116.94	0.147 6845	477.5	2.38	6.26	...
30	12 33 52.38	+15.702	- 2 27 14.6	-116.26	0.148 7143	+ 381.5	2.37	6.25	0 1.1
Oct. 1	12 40 7.75	+15.580	- 3 13 35.8	-115.45	0.149 5193	+ 290.0	2.37	6.24	0 3.5

MERCURY, 1919.
GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- ax.	Transit, Meridian of Green- wich.	
	Noon.				Noon.									
	h	m	s	s	°	'	"	"			"	"	h	m
Oct.	1	12	40	7.75	+15.580	-	3 13 35.3	-115.45	0.149 5193	+ 290.0	2.37	6.24	0	3.5
	2	12	46	20.29	15.466		3 59 35.1	114.52	0.150 1095	202.4	2.37	6.23	0	5.7
	3	12	52	30.16	15.358		4 45 11.5	113.50	0.150 4940	118.6	2.36	6.22	0	8.0
	4	12	58	37.54	15.258		5 30 22.3	112.39	0.150 6814	+ 37.9	2.36	6.22	0	10.1
	5	13	4	42.59	15.165		6 15 5.4	111.19	0.150 6780	- 40.1	2.36	6.22	0	12.3
	6	13	10	45.51	+15.079	-	6 59 18.8	-109.92	0.150 4907	- 115.7	2.36	6.22	0	14.4
	7	13	16	46.45	15.001		7 43 0.8	108.57	0.150 1244	189.2	2.37	6.23	0	16.5
	8	13	22	45.59	14.929		8 26 9.8	107.17	0.149 5841	260.9	2.37	6.24	0	18.5
	9	13	28	43.08	14.863		9 8 44.3	105.70	0.148 8733	331.2	2.37	6.25	0	20.5
	10	13	34	39.09	14.805		9 50 42.8	104.17	0.147 9951	400.4	2.38	6.26	0	22.5
	11	13	40	33.77	+14.752	-	10 32 3.9	-102.58	0.146 9522	- 468.7	2.38	6.27	0	24.5
	12	13	46	27.25	14.705		11 12 46.3	100.94	0.145 7459	536.4	2.39	6.29	0	26.4
	13	13	52	19.68	14.664		11 52 48.8	99.26	0.144 3776	603.8	2.40	6.31	0	28.4
	14	13	58	11.18	14.628		12 32 10.2	97.52	0.142 8476	671.2	2.41	6.33	0	30.3
	15	14	4	1.85	14.596		13 10 49.1	95.72	0.141 1558	738.8	2.42	6.36	0	32.2
	16	14	9	51.81	+14.568	-	13 48 44.4	- 93.88	0.139 3017	- 806.5	2.43	6.39	0	34.1
	17	14	15	41.13	14.543		14 25 54.9	91.99	0.137 2841	874.9	2.43	6.41	0	36.0
	18	14	21	29.89	14.521		15 2 19.3	90.04	0.135 1014	944.2	2.45	6.45	0	37.8
	19	14	27	18.16	14.501		15 37 56.4	88.04	0.132 7510	1014.6	2.46	6.48	0	39.7
	20	14	33	5.97	14.483		16 12 45.0	86.00	0.130 2306	1085.9	2.48	6.52	0	41.6
	21	14	38	53.36	+14.466	-	16 46 43.8	- 83.89	0.127 5372	-1159.0	2.49	6.56	0	43.4
	22	14	44	40.33	14.448		17 19 51.5	81.74	0.124 6662	1233.8	2.51	6.60	0	45.3
	23	14	50	26.86	14.429		17 52 6.7	79.52	0.121 6145	1310.0	2.53	6.65	0	47.1
	24	14	56	12.94	14.410		18 23 28.1	77.25	0.118 3766	1388.5	2.54	6.70	0	48.9
	25	15	1	58.50	14.387		18 53 54.3	74.92	0.114 9477	1469.3	2.56	6.75	0	50.7
	26	15	7	43.46	+14.359	-	19 23 23.8	- 72.53	0.111 3217	-1552.7	2.59	6.81	0	52.6
	27	15	13	27.70	14.327		19 51 55.2	70.07	0.107 4926	1638.7	2.61	6.87	0	54.3
	28	15	19	11.10	14.288		20 19 26.8	67.55	0.103 4533	1727.8	2.63	6.93	0	56.1
	29	15	24	53.45	14.241		20 45 57.0	64.96	0.099 1965	1820.0	2.66	7.00	0	57.9
	30	15	30	34.57	14.184		21 11 24.3	62.30	0.094 7144	1915.7	2.69	7.08	0	59.6
Nov.	31	15	36	14.16	+14.114	-	21 35 46.9	- 59.57	0.089 9981	-2015.1	2.72	7.15	1	1.4
	1	15	41	51.92	14.030		21 59 3.0	56.76	0.085 0389	2118.3	2.75	7.23	1	3.0
	2	15	47	27.49	13.931		22 21 10.7	53.87	0.079 8268	2225.7	2.78	7.32	1	4.7
	3	15	53	0.44	13.812		22 42 8.2	50.91	0.074 3520	2337.4	2.81	7.41	1	6.3
	4	15	58	30.27	13.670		23 1 53.5	47.86	0.068 6036	2453.7	2.85	7.51	1	7.9
	5	16	3	56.40	+13.503	-	23 20 24.6	- 44.72	0.062 5706	-2574.6	2.89	7.62	1	9.3
	6	16	9	18.18	13.306		23 37 39.2	41.49	0.056 2418	2700.3	2.94	7.73	1	10.8
	7	16	14	34.84	13.076		23 53 35.3	38.17	0.049 6053	2830.9	2.98	7.85	1	12.1
	8	16	19	45.52	12.807		24 8 10.6	34.75	0.042 6495	2966.4	3.03	7.98	1	13.3
	9	16	24	49.24	12.494		24 21 22.7	31.24	0.035 3627	3106.7	3.08	8.11	1	14.4
	10	16	29	44.84	+12.130	-	24 33 9.2	- 27.62	0.027 7339	-3251.4	3.14	8.26	1	15.4
	11	16	34	31.05	11.711		24 43 27.5	23.89	0.019 7526	3400.3	3.19	8.41	1	16.2
	12	16	39	6.43	11.226		24 52 14.9	20.04	0.011 4100	3552.4	3.25	8.57	1	16.9
	13	16	43	29.31	10.668		24 59 28.6	16.08	0.002 6992	3706.9	3.32	8.75	1	17.3
	14	16	47	37.85	10.029		25 5 5.6	11.98	9.993 6162	3862.2	3.39	8.93	1	17.5
	15	16	51	29.97	+ 9.298	-	25 9 2.7	- 7.75	9.984 1615	-4016.4	3.47	9.13	1	17.4
16	16	55	3.34	+ 8.465	-	25 11 16.4	- 3.37	9.974 3406	-4166.6	3.55	9.34	1	17.0	

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.	
	Hour.	Min.	Sec.		Hour.	Min.	Sec.							
	h	m	s	s	°	'	"	"			"	"	h	m
Nov. 16	16	55	3.34	+ 8.465	-25	11	16.4	- 3.37	9.974 3406	-4166.6	3.55	9.34	1	17.0
17	16	58	15.42	7.522	25	11	43.0	+ 1.18	9.964 1676	4309.5	3.63	9.56	1	16.2
18	17	1	3.40	6.456	25	10	18.2	5.91	9.953 6644	4440.6	3.72	9.79	1	15.1
19	17	3	24.25	5.260	25	6	57.7	10.84	9.942 8670	4553.8	3.81	10.04	1	13.4
20	17	5	14.78	3.927	25	1	36.2	15.99	9.931 8258	4642.4	3.91	10.30	1	11.3
21	17	6	31.65	+ 2.454	-24	54	8.3	+21.37	9.920 6104	-4697.4	4.01	10.57	1	8.6
22	17	7	11.55	+ 0.847	24	44	28.1	27.02	9.909 3136	4708.4	4.12	10.84	1	5.3
23	17	7	11.32	- 0.886	24	32	29.1	32.94	9.898 0546	4663.8	4.23	11.13	1	1.4
24	17	6	28.17	2.724	24	18	5.2	39.09	9.886 9822	4580.8	4.34	11.42	0	56.7
25	17	5	0.01	4.630	24	1	11.0	45.45	9.876 2766	4355.7	4.44	11.70	0	51.3
26	17	2	45.76	- 6.555	-23	41	42.7	+51.91	9.866 1509	-4665.8	4.55	11.98	0	45.1
27	16	59	45.75	8.431	23	19	39.7	58.31	9.856 8448	3671.2	4.65	12.24	0	38.2
28	16	56	2.10	10.178	22	55	6.3	64.40	9.848 6174	3166.4	4.73	12.47	0	30.5
29	16	51	38.99	11.704	22	28	13.7	69.84	9.841 7337	2552.5	4.81	12.67	0	22.2
30	16	46	42.82	12.917	21	59	22.2	74.24	9.836 4450	1839.6	4.87	12.82	0	13.4
Dec. 1	16	41	22.11	-13.737	-21	29	2.0	+77.17	9.832 9673	-1047.4	4.91	12.93	0 23	4.9 54.7
2	16	35	47.06	14.104	20	57	53.2	78.23	9.831 4584	- 204.2	4.92	12.97	23	45.2
3	16	30	8.95	13.992	20	26	44.3	77.14	9.831 9999	+ 655.1	4.92	12.96	23	35.8
4	16	24	39.23	13.409	19	56	28.7	73.78	9.834 5857	1493.2	4.89	12.88	23	26.7
5	16	19	28.71	12.402	19	28	0.1	68.26	9.839 1224	2275.6	4.84	12.75	23	18.1
6	16	14	46.75	-11.043	-19	2	7.6	+60.83	9.845 4412	+2974.0	4.77	12.56	23	10.1
7	16	10	40.74	9.421	18	39	32.2	51.92	9.853 3142	3568.5	4.69	12.34	23	2.8
8	16	7	15.91	7.628	18	20	43.3	42.04	9.862 4796	4050.2	4.59	12.08	22	56.2
9	16	4	35.30	5.749	18	5	58.2	31.68	9.872 6637	4417.9	4.48	11.80	22	50.3
10	16	2	40.07	3.857	17	55	22.6	21.31	9.883 5995	4678.2	4.37	11.50	22	45.1
11	16	1	29.78	- 2.011	-17	48	52.2	+11.31	9.895 0416	+4841.9	4.26	11.21	22	40.7
12	16	1	2.84	- 0.251	17	46	14.8	+ 1.93	9.906 7741	4922.6	4.14	10.91	22	37.0
13	16	1	16.85	+ 1.398	17	47	12.8	- 6.62	9.918 6148	4934.4	4.03	10.61	22	33.9
14	16	2	8.95	2.921	17	51	25.1	14.25	9.930 4149	4891.0	3.92	10.33	22	31.4
15	16	3	36.02	4.313	17	58	28.9	20.91	9.942 0572	4804.7	3.82	10.06	22	29.4
16	16	5	34.93	+ 5.575	-18	8	1.0	-26.61	9.953 4517	+4686.3	3.72	9.80	22	27.9
17	16	8	2.62	6.713	18	19	38.8	31.39	9.964 5329	4544.8	3.63	9.55	22	26.8
18	16	10	56.20	7.734	18	33	0.9	35.31	9.975 2540	4387.4	3.54	9.32	22	26.1
19	16	14	13.00	8.649	18	47	47.4	38.44	9.985 5847	4220.3	3.46	9.10	22	25.8
20	16	17	50.60	9.468	19	3	40.1	40.84	9.995 5070	4047.6	3.38	8.89	22	25.7
21	16	21	46.79	+10.201	-19	20	22.7	-42.60	0.005 0118	+3873.0	3.30	8.70	22	26.0
22	16	25	59.62	10.856	19	37	40.3	43.77	0.014 0982	3699.3	3.24	8.52	22	26.5
23	16	30	27.35	11.444	19	55	19.8	44.44	0.022 7704	3528.1	3.17	8.35	22	27.2
24	16	35	8.46	11.972	20	13	9.8	44.65	0.031 0361	3360.8	3.11	8.19	22	28.2
25	16	40	1.57	12.446	20	30	59.7	44.45	0.038 9062	3198.5	3.06	8.05	22	29.3
26	16	45	5.50	+12.874	-20	48	40.5	-43.90	0.046 3933	+3041.6	3.00	7.91	22	30.6
27	16	50	19.21	13.262	21	6	4.3	43.03	0.053 5108	2890.7	2.95	7.78	22	32.0
28	16	55	41.77	13.613	21	23	3.8	41.88	0.060 2735	2745.8	2.91	7.67	22	33.5
29	17	1	12.36	13.932	21	39	32.8	40.49	0.066 6953	2606.8	2.87	7.55	22	35.2
30	17	6	50.28	14.223	21	55	25.7	38.88	0.072 7908	2473.7	2.83	7.44	22	37.0
31	17	12	34.89	+14.490	-22	10	37.6	-37.08	0.078 5737	+2346.3	2.79	7.34	22 38.9	
32	17	18	25.64	....	-22	25	4.0	...	0.084 0579	....	2.75	7.25	22 40.9	

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		" ' "	" ' "	" "	" ' "	" "		
Jan.	1	162 32 59.4	4 30 29.2	- 9 53.3	+6 20 36.7	-13 57.8	9.563 1635	+68831
	2	166 59 7.7	4 21 51.1	11 2.3	6 5 44.9	15 43.0	9.570 0034	67903
	3	171 16 49.5	4 13 36.5	11 54.2	5 49 16.1	17 12.1	9.576 7323	66621
	4	175 26 29.0	4 5 46.7	12 29.2	5 31 25.6	18 26.7	9.583 3176	65040
	5	179 28 31.5	3 58 22.6	12 48.1	5 12 27.1	19 28.3	9.589 7320	63211
	6	183 23 22.9	3 51 24.6	-12 51.9	+4 52 32.9	-20 18.5	9.595 9530	+61179
	7	187 11 29.2	3 44 52.2	12 41.9	4 31 53.7	20 58.4	9.601 9623	58983
	8	190 53 15.8	3 38 45.3	12 19.2	4 10 39.1	21 29.5	9.607 7452	56655
	9	194 29 8.0	3 33 3.2	11 45.4	3 48 57.3	21 52.8	9.613 2898	54222
	10	197 59 30.1	3 27 44.9	11 1.6	3 26 55.7	22 9.4	9.618 5870	51710
	11	201 24 45.5	3 22 49.7	-10 9.3	+3 4 40.4	-22 20.2	9.623 6297	+49136
	12	204 45 17.0	3 18 16.9	9 9.8	2 42 16.9	22 26.0	9.628 4127	46516
	13	208 1 26.3	3 14 5.1	8 4.2	2 19 49.8	22 27.5	9.632 9320	43868
	14	211 13 34.0	3 10 13.6	6 53.9	1 57 23.1	22 25.2	9.637 1855	41197
	15	214 22 0.0	3 6 41.6	5 39.8	1 35 0.5	22 19.6	9.641 1709	38513
	16	217 27 3.3	3 3 28.0	- 4 23.1	+1 12 44.7	-22 11.4	9.644 8880	+35826
	17	220 29 1.9	3 0 32.2	3 4.6	0 50 38.4	22 0.7	9.648 3361	33137
	18	223 28 13.1	2 57 53.1	1 45.2	0 28 43.9	21 48.0	9.651 5156	30454
	19	226 24 53.4	2 55 30.2	- 0 25.9	+0 7 3.1	21 33.3	9.654 4271	27776
	20	229 19 18.7	2 53 22.9	+ 0 52.7	-0 14 22.2	21 17.1	9.657 0711	25107
	21	232 11 44.2	2 51 30.5	+ 2 9.9	-0 35 30.6	-20 59.5	9.659 4488	+22448
	22	235 2 24.6	2 49 52.6	3 25.0	0 56 20.8	20 40.5	9.661 5610	19799
	23	237 51 34.1	2 48 28.5	4 37.4	1 16 51.3	20 20.4	9.663 4089	17159
	24	240 39 26.2	2 47 18.0	5 46.6	1 37 1.2	19 59.1	9.664 9932	14530
	25	243 26 14.6	2 46 20.8	6 52.1	1 56 49.2	19 36.8	9.666 3151	11908
	26	246 12 12.0	2 45 36.2	+ 7 53.3	-2 16 14.4	-19 13.4	9.667 3751	+ 9294
	27	248 57 31.3	2 45 4.4	8 49.9	2 35 15.7	18 49.0	9.668 1741	6687
	28	251 42 24.9	2 44 44.9	9 41.4	2 53 52.1	18 23.6	9.668 7126	4084
	29	254 27 5.3	2 44 37.9	10 27.5	3 12 2.5	17 57.0	9.668 9909	+ 1482
	30	257 11 44.8	2 44 43.1	11 7.7	3 29 45.7	17 29.3	9.669 0091	- 1118
	31	259 56 35.5	2 45 0.4	+11 41.9	-3 47 0.7	-17 0.5	9.668 7673	- 3717
Feb.	1	262 41 49.6	2 45 29.9	12 9.6	4 3 46.2	16 30.2	9.668 2655	6321
	2	265 27 39.4	2 46 11.7	12 30.6	4 20 0.7	15 58.5	9.667 5030	8929
	3	268 14 17.2	2 47 5.9	12 44.7	4 35 42.8	15 25.4	9.666 4796	11542
	4	271 1 55.5	2 48 12.9	12 51.6	4 50 50.9	14 50.6	9.665 1944	14162
	5	273 50 47.2	2 49 32.5	+12 51.2	-5 5 23.3	-14 13.9	9.663 6469	-16790
	6	276 41 4.9	2 51 5.2	12 43.2	5 19 17.9	13 35.0	9.661 8360	19428
	7	279 33 2.1	2 52 51.5	12 27.5	5 32 32.5	12 53.9	9.659 7609	22076
	8	282 26 52.4	2 54 51.4	12 4.1	5 45 4.9	12 10.4	9.657 4205	24734
	9	285 22 49.6	2 57 5.5	11 32.9	5 56 52.4	11 24.1	9.654 8137	27402
	10	288 21 8.3	2 59 34.4	+10 54.0	-6 7 52.1	-10 34.8	9.651 9398	-30077
	11	291 22 3.4	3 2 18.4	10 7.3	6 18 0.8	9 42.1	9.648 7980	32761
	12	294 25 50.4	3 5 18.3	9 13.0	6 27 15.0	8 45.6	9.645 3875	35450
	13	297 32 45.4	3 8 34.5	8 11.4	6 35 30.7	7 45.2	9.641 7081	38137
	14	300 43 5.0	3 12 7.7	7 2.8	6 42 43.9	6 40.3	9.637 7602	40821
	15	303 57 6.7	3 15 58.6	+ 5 47.5	-6 48 49.7	- 5 30.5	9.633 5443	-43493
	16	307 15 8.4	3 20 7.9	+ 4 26.3	-6 53 43.2	- 4 15.5	9.629 0623	-46145

MERCURY, 1919.

143

FOR GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	° ' "	° ' "	' "	° ' "	' "		
eb. 16	307 15 8.4	3 20 7.9	+ 4 26.3	-6 53 43.2	- 4 15.5	9.629 0623	-46145
17	310 37 28.9	3 24 36.4	2 59.6	6 57 18.7	2 54.6	9.624 3162	48770
18	314 4 27.8	3 29 24.7	+ 1 28.4	6 59 30.3	- 1 27.5	9.619 3097	51352
19	317 36 25.2	3 34 33.5	- 0 6.3	7 0 11.4	+ 0 6.4	9.614 0478	53875
20	321 13 41.9	3 40 3.5	1 43.2	6 59 15.1	1 47.4	9.608 5373	56321
21	324 56 39.4	3 45 55.1	- 3 21.0	-6 56 34.0	+ 3 36.1	9.602 7870	-58665
22	328 45 39.6	3 52 9.0	4 57.9	6 52 0.1	5 33.1	9.596 8086	60681
23	332 41 5.0	3 58 45.5	6 32.1	6 45 25.1	7 38.3	9.590 6162	62936
24	336 43 18.1	4 5 44.4	8 1.4	6 36 40.6	9 52.1	9.584 2279	64794
25	340 52 41.2	4 13 5.6	9 23.5	6 25 38.0	12 14.6	9.577 6653	66415
26	345 9 36.6	4 20 48.7	-10 35.7	-6 12 8.5	+14 45.7	9.570 9546	-67744
27	349 34 25.4	4 28 52.3	11 35.4	5 56 3.9	17 24.8	9.564 1281	68724
28	354 7 27.6	4 37 15.1	12 19.7	5 37 16.6	20 11.0	9.557 2233	69299
lar. 1	358 49 1.3	4 45 54.8	12 46.0	5 15 40.0	23 3.1	9.550 2840	69401
2	3 39 21.8	4 54 48.1	12 51.7	4 51 9.1	25 50.2	9.543 3612	69657
3	8 38 40.8	5 3 51.2	-12 34.5	-4 23 41.1	+28 56.9	9.536 5131	-67896
4	13 47 5.9	5 12 50.2	11 52.9	3 53 15.9	31 52.9	9.529 8051	66141
5	19 4 38.7	5 22 5.7	10 46.0	3 19 57.2	34 43.2	9.523 3100	63630
6	24 31 14.4	5 31 3.7	9 14.2	2 43 52.8	37 23.4	9.517 1063	60303
7	30 6 40.4	5 39 44.8	7 19.1	2 5 15.5	39 48.1	9.511 2781	56116
8	35 50 35.2	5 47 59.6	- 5 3.6	-1 24 23.6	+41 51.6	9.505 9124	-51051
9	41 42 27.5	5 55 38.0	- 2 32.3	-0 41 41.3	43 28.0	9.501 0971	45111
10	47 41 35.6	6 2 29.5	+ 0 8.6	+0 2 21.5	44 31.7	9.496 9178	38342
11	53 47 7.3	6 8 23.5	2 52.0	0 47 9.5	44 57.7	9.493 4538	30820
12	59 57 59.9	6 13 9.6	5 29.8	1 32 3.1	44 42.3	9.490 7754	22653
13	66 13 0.9	6 16 39.0	+ 7 53.5	+2 16 19.5	+43 43.2	9.488 9394	-14000
14	72 30 49.9	6 18 44.5	9 55.5	2 59 14.8	42 0.2	9.487 9858	- 5034
15	78 50 0.3	6 19 21.1	11 28.8	3 40 5.8	39 35.2	9.487 9364	+ 4046
16	85 9 1.8	6 18 26.7	12 28.6	4 18 12.5	36 32.3	9.488 7920	13033
17	91 26 23.6	6 16 2.1	12 52.0	4 52 59.6	32 57.1	9.490 5333	21731
18	97 40 37.0	6 12 10.7	+12 38.6	+5 23 58.2	+28 56.6	9.493 1224	+29958
19	103 50 18.4	6 6 59.5	11 50.3	5 50 47.0	24 38.8	9.496 5039	37558
20	109 54 12.2	6 0 37.0	10 30.8	6 13 12.7	20 11.7	9.500 6092	44416
21	115 51 12.1	5 53 13.5	8 45.7	6 31 9.8	15 42.7	9.505 3594	50446
22	121 40 22.7	5 45 0.4	6 41.1	6 44 39.8	11 18.6	9.510 6693	55606
23	127 21 0.3	5 36 9.4	+ 4 23.8	+6 53 50.6	+ 7 5.0	9.516 4513	+59888
24	132 52 32.6	5 26 51.7	+ 2 0.3	6 58 54.8	+ 3 6.1	9.522 6181	63307
25	138 14 38.3	5 17 17.9	- 0 23.4	7 0 8.8	- 0 35.0	9.529 0853	65906
26	143 27 6.2	5 7 37.5	2 42.0	6 57 51.3	3 56.6	9.535 7737	67737
27	148 29 53.8	4 57 58.6	4 51.4	6 52 22.5	6 57.7	9.542 6095	68871
28	153 23 6.1	4 48 28.0	- 6 48.2	+6 44 2.8	- 9 38.4	9.549 5271	+69380
29	158 6 54.3	4 39 11.2	8 30.1	6 33 12.4	11 59.2	9.556 4671	69335
30	162 41 34.6	4 30 12.7	9 55.7	6 20 10.6	14 1.4	9.563 3781	68909
31	167 7 26.7	4 21 35.3	11 4.2	6 5 15.5	15 46.0	9.570 2151	67868
pr. 1	171 24 53.1	4 13 21.4	11 55.5	5 48 44.0	17 14.5	9.576 9399	66574
2	175 34 17.9	4 5 32.5	-12 30.0	+5 30 51.2	-18 28.8	9.583 5200	+64984
3	179 36 6.7	3 58 9.3	-12 48.4	+5 11 50.7	-19 30.1	9.589 9286	+63150

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		" ' "	" ' "	" "	" ' "	" "		
Apr.	1	171 24 53.1	4 13 21.4	-11 55.5	+5 48 44.0	-17 14.5	9.576 9399	+66574
	2	175 34 17.9	4 5 32.5	12 30.0	5 30 51.2	18 28.8	9.583 5200	64984
	3	179 36 6.7	3 58 9.3	12 48.4	5 11 50.7	19 30.1	9.589 9286	63150
	4	183 30 45.1	3 51 11.9	12 51.8	4 51 54.9	20 19.8	9.596 1432	61111
	5	187 18 39.1	3 44 40.4	12 41.4	4 31 14.5	20 59.5	9.602 1458	58913
	6	191 0 14.4	3 38 34.3	-12 18.4	+4 9 58.9	-21 30.3	9.607 9214	+56580
	7	194 35 55.9	3 32 52.9	11 44.2	3 48 16.5	21 53.4	9.613 4584	54145
	8	198 6 8.1	3 27 35.4	11 0.1	3 26 14.3	22 9.9	9.618 7478	51631
	9	201 31 14.4	3 22 41.0	10 7.6	3 3 58.7	22 20.5	9.623 7825	49055
	10	204 51 37.5	3 18 8.7	9 7.8	2 41 35.0	22 26.2	9.628 5573	46435
	11	208 7 38.9	3 13 57.6	- 8 2.1	+2 19 7.8	-22 27.5	9.633 0685	+43783
	12	211 19 39.4	3 10 6.8	6 51.6	1 56 41.3	22 25.0	9.637 3133	41113
	13	214 27 58.9	3 6 35.3	5 37.5	1 34 18.8	22 19.5	9.641 2907	38431
	14	217 32 56.2	3 3 22.2	4 20.6	1 12 3.3	22 11.2	9.644 9992	35741
	15	220 34 49.3	3 0 20.9	3 2.1	0 49 57.3	22 0.4	9.648 4390	33054
	16	223 33 55.6	2 57 48.4	- 1 42.8	+0 28 3.2	-21 47.5	9.651 6101	+30370
	17	226 30 31.5	2 55 26.1	- 0 23.4	+0 6 22.9	21 32.9	9.654 5132	27692
	18	229 24 52.9	2 53 19.2	+ 0 55.2	-0 15 2.0	21 16.7	9.657 1489	25025
	19	232 17 14.9	2 51 27.3	2 12.3	0 36 9.9	20 58.9	9.659 5185	22367
	20	235 7 52.3	2 49 49.8	3 27.3	0 56 59.4	20 39.9	9.661 6225	19715
	21	237 56 59.2	2 48 26.2	+ 4 39.6	-1 17 29.3	-20 19.7	9.663 4620	+17076
	22	240 44 49.2	2 47 16.1	5 48.7	1 37 38.5	19 58.5	9.665 0383	14448
	23	243 31 35.8	2 46 19.2	6 54.0	1 57 25.9	19 36.1	9.666 3519	11826
	24	246 17 31.8	2 45 35.0	7 55.1	2 16 50.3	19 12.7	9.667 4038	9213
	25	249 2 50.1	2 45 3.6	8 51.5	2 35 50.9	18 48.3	9.668 1947	6605
	26	251 47 43.2	2 44 44.6	+ 9 42.9	-2 54 26.5	-18 22.7	9.668 7249	+ 4002
	27	254 32 23.4	2 44 37.8	10 28.8	3 12 36.0	17 56.1	9.668 9952	+ 1403
	28	257 17 3.0	2 44 43.4	11 8.9	3 30 18.4	17 28.5	9.669 0054	- 1198
	29	260 1 54.3	2 45 1.1	11 42.8	3 47 32.5	16 59.5	9.668 7555	3800
	30	262 47 9.3	2 45 31.0	12 10.3	4 4 17.0	16 29.3	9.668 2454	6402
May	1	265 33 0.4	2 46 13.3	+12 31.2	-4 20 30.6	-15 57.6	9.667 4750	- 9008
	2	268 19 40.0	2 47 7.9	12 45.0	4 36 11.7	15 24.3	9.666 4435	11623
	3	271 7 20.4	2 48 15.1	12 51.7	4 51 18.7	14 49.4	9.665 1502	14243
	4	273 56 14.5	2 49 35.2	12 51.0	5 5 49.9	14 12.6	9.663 5947	16870
	5	276 46 35.2	2 51 8.4	12 42.8	5 19 43.3	13 33.8	9.661 7757	19511
	6	279 38 35.7	2 52 55.0	+12 26.9	-5 32 56.7	-12 52.6	9.659 6922	-22159
	7	282 32 29.7	2 54 55.3	12 3.3	5 45 27.7	12 8.9	9.657 3436	24815
	8	285 28 31.1	2 57 10.0	11 31.8	5 57 13.7	11 22.6	9.654 7287	27484
	9	288 26 54.5	2 59 39.3	10 52.6	6 8 11.9	10 33.2	9.651 8465	30160
	10	291 27 54.7	3 2 23.8	10 5.7	6 18 18.9	9 40.3	9.648 6965	32842
	11	294 31 47.3	3 5 24.1	+ 9 11.2	-6 27 31.3	- 8 43.8	9.645 2778	-35533
	12	297 38 48.3	3 8 40.8	8 9.4	6 35 45.2	7 43.2	9.641 5900	38220
	13	300 49 14.6	3 12 14.6	7 0.5	6 42 56.3	6 38.2	9.637 6340	40902
	14	304 3 23.4	3 16 6.1	5 45.1	6 49 0.0	5 28.3	9.633 4099	43576
	15	307 21 32.9	3 20 16.0	4 23.6	6 53 51.1	4 13.0	9.628 9195	46228
	16	310 44 1.8	3 24 45.0	+ 2 56.8	-6 57 24.1	- 2 52.0	9.624 1653	-48850
	17	314 11 9.6	3 29 33.9	+ 1 25.5	-6 59 33.0	- 1 24.7	9.619 1508	-51431

MERCURY, 1919.

145

FOR GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	" ' "	" ' "	" "	" ' "	" "		
ay 17	314 11 9.6	3 29 33.9	+ 1 25.5	-6 59 33.0	- 1 24.7	9.619 1508	-51431
18	317 43 16.5	3 34 43.4	- 0 9.3	7 0 11.2	+ 0 9.4	9.613 8811	53951
19	321 20 43.4	3 40 14.0	1 46.3	6 59 11.8	1 50.7	9.608 3632	56393
20	325 3 51.8	3 46 6.4	3 24.1	6 56 27.2	3 39.8	9.602 6058	58734
21	328 53 3.6	3 52 21.0	5 0.9	6 51 49.6	5 36.8	9.596 6207	60945
22	332 48 41.3	3 58 58.1	- 6 35.0	-6 45 10.8	+ 7 42.2	9.590 4221	-62997
23	336 51 7.3	4 5 57.7	8 4.1	6 36 22.2	9 56.4	9.584 0280	64849
24	341 0 44.1	4 13 19.6	9 25.9	6 25 15.1	12 19.2	9.577 4603	66460
25	345 17 53.7	4 21 3.2	10 37.8	6 11 40.9	14 50.5	9.570 7458	67777
26	349 42 57.4	4 29 7.6	11 37.0	5 55 31.4	17 29.8	9.563 9164	68749
27	354 16 15.2	4 37 31.0	-12 20.8	-5 36 38.9	+20 16.2	9.557 0097	-69311
28	358 58 4.9	4 46 11.0	12 46.5	5 14 57.0	23 8.5	9.550 0701	69395
29	3 48 41.8	4 55 4.7	12 51.5	4 50 20.6	26 4.7	9.543 1490	69932
30	8 48 17.6	5 4 8.1	12 33.6	4 22 47.1	29 2.3	9.536 3044	67851
31	13 56 59.5	5 13 16.0	11 51.2	3 52 16.5	31 58.2	9.529 6020	68075
ne 1	19 14 49.1	5 22 22.4	-10 43.5	-3 18 52.5	+34 48.4	9.523 1148	-63539
2	24 41 41.4	5 31 20.0	9 11.0	2 42 43.1	37 28.2	9.516 9215	60185
3	30 17 23.3	5 40 0.4	7 15.1	2 4 1.4	39 52.3	9.511 1064	55073
4	36 1 33.3	5 48 14.3	4 59.1	1 23 5.7	41 55.1	9.505 7563	50879
5	41 53 39.6	5 55 51.4	- 2 27.4	-0 40 20.4	43 30.5	9.500 9596	44914
6	47 53 0.3	6 2 41.2	+ 0 13.7	+0 3 44.3	+44 33.0	9.496 8011	-38121
7	53 58 42.7	6 8 33.1	2 57.1	0 48 33.1	44 57.8	9.493 3605	30575
8	60 9 43.9	6 13 17.2	5 34.5	1 33 26.1	44 41.1	9.490 7073	22393
9	66 24 51.3	6 16 44.0	7 57.7	2 17 40.7	43 40.6	9.488 8980	13727
10	72 42 43.9	6 18 46.8	9 58.9	3 0 32.7	41 56.3	9.487 9721	- 4754
11	79 1 55.3	6 19 20.7	+11 31.2	+3 41 19.3	+39 30.1	9.487 9507	+ 4324
12	85 20 54.9	6 18 23.4	12 29.9	4 19 20.3	36 26.1	9.488 8337	13305
13	91 38 12.1	6 15 56.1	12 52.1	4 54 0.7	32 49.9	9.490 6020	21991
14	97 52 18.2	6 12 2.2	12 37.6	5 24 51.8	28 48.9	9.493 2163	30198
15	104 1 49.9	6 6 48.6	11 48.2	5 51 32.7	24 30.7	9.496 6211	37777
16	110 5 31.8	6 0 24.1	+10 27.9	+6 13 50.1	+20 3.3	9.500 7472	+44609
17	116 2 17.9	5 52 58.9	8 42.1	6 31 38.8	15 34.5	9.505 5158	50615
18	121 51 13.2	5 44 44.5	6 37.0	6 45 0.7	11 10.6	9.510 8415	55749
19	127 31 34.4	5 35 52.6	4 19.4	6 54 3.6	6 57.3	9.516 6366	60096
20	133 2 49.5	5 26 34.2	+ 1 55.8	6 59 0.4	+ 2 59.0	9.522 8139	63398
21	138 24 37.5	5 17 0.0	- 0 27.7	+7 0 7.6	- 0 41.5	9.529 2891	+65972
22	143 36 47.4	5 7 19.5	2 46.2	6 57 43.9	4 2.5	9.535 9829	67782
23	148 39 17.1	4 57 40.8	4 55.2	6 52 9.5	7 3.0	9.542 8223	68895
24	153 32 11.8	4 48 10.6	6 51.6	6 43 44.8	9 43.0	9.549 7412	69385
25	158 15 42.9	4 38 54.4	8 33.0	6 32 50.1	12 3.3	9.556 6810	69325
26	162 50 6.6	4 29 56.4	- 9 58.1	+6 19 44.5	-14 4.9	9.563 5902	+68784
27	167 15 42.8	4 21 19.7	11 6.0	6 4 46.2	15 49.0	9.570 4241	67832
28	171 32 53.9	4 13 6.6	11 56.8	5 48 11.9	17 17.1	9.577 1449	66529
29	175 42 4.4	4 5 18.5	12 30.8	5 30 16.8	18 30.8	9.583 7201	64931
30	179 43 39.5	3 57 56.0	12 48.8	5 11 14.5	19 31.8	9.590 1230	63089
ily 1	183 38 5.1	3 50 59.5	-12 51.7	+4 51 17.1	-20 21.2	9.596 3312	+61047
2	187 25 47.1	3 44 28.8	-12 40.8	+4 30 35.5	-21 0.6	9.602 3270	+58843

5934°-1919-10

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		" ' "	" ' "	" ' "	" ' "	" ' "		
July	1	183 38 5.1	3 50 59.5	-12 51.7	+4 51 17.1	-20 21.2	9.596 3312	+61047
	2	187 25 47.1	3 44 28.8	12 40.8	4 30 35.5	21 0.6	9.602 3270	58843
	3	191 7 11.1	3 38 23.4	12 17.5	4 9 18.9	21 31.2	9.608 0954	56508
	4	194 42 42.1	3 32 42.7	11 42.9	3 47 35.7	21 54.0	9.613 6251	54069
	5	198 12 44.5	3 27 26.0	10 58.6	3 25 33.1	22 10.3	9.618 9066	51551
	6	201 37 41.8	3 22 32.3	-10 5.8	+3 3 17.1	-22 20.8	9.623 9333	+48975
	7	204 57 56.5	3 18 0.7	9 5.9	2 40 53.2	22 26.3	9.628 7000	46352
	8	208 13 50.3	3 13 50.2	8 0.0	2 18 26.0	22 27.5	9.633 2028	43701
	9	211 25 43.7	3 10 0.0	6 49.4	1 55 59.5	22 24.9	9.637 4395	41030
	10	214 33 56.8	3 6 29.2	5 35.1	1 33 37.2	22 19.3	9.641 4083	38346
	11	217 38 48.2	3 3 16.7	- 4 18.2	+1 11 21.9	-22 10.9	9.645 1085	+35658
	12	220 40 36.0	3 0 21.8	2 59.7	0 49 16.3	22 0.0	9.648 5399	32970
	13	223 39 37.4	2 57 43.8	1 40.3	0 27 22.6	21 47.1	9.651 7027	30287
	14	226 36 9.0	2 55 22.0	- 0 21.0	+0 5 42.7	21 32.4	9.654 5975	27611
	15	229 30 26.5	2 53 15.6	+ 0 57.6	-0 15 41.7	21 16.1	9.657 2251	24942
	16	232 22 45.2	2 51 24.1	+ 2 14.6	-0 36 49.0	-20 58.4	9.659 5862	+22283
	17	235 13 19.6	2 49 47.1	3 29.6	0 57 38.0	20 39.4	9.661 6821	19635
	18	238 2 24.0	2 48 23.9	4 41.8	1 18 7.3	20 19.1	9.663 5136	16996
	19	240 50 11.9	2 47 14.2	5 50.8	1 38 15.8	19 57.8	9.665 0817	14367
	20	243 36 56.8	2 46 17.7	6 56.0	1 58 2.5	19 35.4	9.666 3873	11747
	21	246 22 51.6	2 45 34.0	+ 7 57.0	-2 17 26.2	-19 11.9	9.667 4313	+ 9134
	22	249 8 9.0	2 45 2.9	8 53.2	2 36 26.0	18 47.5	9.668 2142	6525
	23	251 53 1.6	2 44 44.3	9 44.4	2 55 0.8	18 22.0	9.668 7365	3922
	24	254 37 41.7	2 44 38.0	10 30.1	3 13 9.6	17 55.3	9.668 9987	+ 1321
	25	257 22 21.6	2 44 43.8	11 10.0	3 30 51.1	17 27.5	9.669 0008	- 1278
	26	260 7 13.4	2 45 1.9	+11 43.8	-3 48 4.3	-16 58.6	9.668 7431	- 3878
	27	262 52 29.5	2 45 32.3	12 11.1	4 4 47.9	16 28.3	9.668 2251	6480
	28	265 38 22.0	2 46 14.8	12 31.7	4 21 0.4	15 56.5	9.667 4469	9088
	29	268 25 3.3	2 47 9.8	12 45.3	4 36 40.5	15 23.4	9.666 4073	11703
	30	271 12 45.9	2 48 17.5	12 51.8	4 51 46.5	14 48.3	9.665 1061	14322
	31	274 1 42.5	2 49 37.9	+12 50.9	-5 6 16.5	-14 11.4	9.663 5425	-16952
Aug.	1	276 52 6.1	2 51 11.5	12 42.4	5 20 8.7	13 32.5	9.661 7155	19589
	2	279 44 10.0	2 52 58.5	12 26.3	5 33 20.8	12 51.3	9.659 6243	22237
	3	282 38 7.7	2 54 59.3	12 2.4	5 45 50.4	12 7.6	9.657 2677	24896
	4	285 34 13.3	2 57 14.4	11 30.7	5 57 35.0	11 21.1	9.654 6448	27564
	5	288 32 41.3	2 59 44.1	+10 51.3	-6 8 31.6	-10 31.6	9.651 7546	-30240
	6	291 33 46.6	3 2 29.1	10 4.1	6 18 37.0	9 38.7	9.648 5965	32923
	7	294 37 44.7	3 5 29.8	9 9.4	6 27 47.7	8 42.0	9.645 1698	35611
	8	297 44 51.8	3 8 47.2	8 7.3	6 35 59.7	7 41.2	9.641 4743	38299
	9	300 55 24.7	3 12 21.4	6 58.3	6 43 8.7	6 36.1	9.637 5101	40982
	10	304 9 40.5	3 16 13.4	+ 5 42.7	-6 49 10.2	- 5 26.1	9.633 2782	-43655
	11	307 27 57.6	3 20 23.9	4 21.0	6 53 59.0	4 10.6	9.628 7798	46307
	12	310 50 34.7	3 24 53.5	2 54.0	6 57 29.4	2 49.3	9.624 0179	48925
	13	314 17 51.3	3 29 43.0	+ 1 22.6	6 59 35.6	- 1 21.9	9.618 9961	51503
	14	317 50 7.6	3 34 53.1	- 0 12.3	7 0 10.9	+ 0 12.5	9.613 7192	54023
	15	321 27 44.5	3 40 24.3	- 1 49.3	-6 59 8.3	+ 1 54.0	9.608 1942	-56462
	16	325 11 3.5	3 46 17.3	- 3 27.1	-6 56 20.4	+ 3 43.2	9.602 4302	-58799

MERCURY, 1919.

147

FOR GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	" ' "	" ' "	" ' "	" ' "	" ' "	" ' "	" ' "		
ig. 16	325 11 3.5	3 46 17.3	- 3 27.1	-6 56 20.4	+ 3 43.2	9.602 4302	-58799		
17	329 0 26.6	3 52 32.6	5 3.9	6 51 39.2	5 40.6	9.596 4387	61006		
18	332 56 16.2	3 59 10.3	6 37.9	6 44 56.4	7 46.3	9.590 2344	63050		
19	336 58 54.7	4 6 10.5	8 6.8	6 36 3.7	10 0.7	9.583 8353	64896		
20	341 8 44.7	4 13 33.1	9 28.3	6 24 52.1	12 23.8	9.577 2633	66498		
21	345 26 8.1	4 21 17.3	-10 39.8	-6 11 13.3	+14 55.2	9.570 5455	-67807		
22	349 51 26.2	4 29 22.2	11 38.6	5 54 58.9	17 34.8	9.563 7136	68767		
23	354 24 58.9	4 37 46.1	12 21.9	5 36 1.3	20 21.4	9.556 8059	69314		
24	359 7 3.0	4 46 26.5	12 47.0	5 14 14.1	23 13.8	9.549 8667	69385		
25	3 57 56.5	4 55 20.6	12 51.3	4 49 32.4	26 10.1	9.542 9473	68905		
26	8 57 48.3	5 4 24.1	-12 32.7	-4 21 53.5	+29 7.7	9.536 1065	-67802		
27	14 6 46.2	5 13 31.9	11 49.5	3 51 17.6	32 3.5	9.529 4101	66004		
28	19 24 51.6	5 22 38.2	10 41.1	3 17 48.5	34 53.3	9.522 9310	63446		
29	24 51 59.5	5 31 35.3	9 7.8	2 41 34.4	37 32.7	9.516 7483	60067		
30	30 27 56.4	5 40 15.0	7 11.3	2 2 48.3	39 56.3	9.510 9463	55828		
pt. 31	36 12 20.5	5 48 27.8	- 4 54.7	-1 21 49.0	+41 58.2	9.505 6120	-50711		
1	42 4 39.7	5 56 3.7	- 2 22.6	-0 39 1.0	43 32.7	9.500 8332	44721		
2	48 4 12.0	6 2 52.0	+ 0 18.7	+0 5 5.5	44 34.3	9.496 6954	37903		
3	54 10 4.2	6 8 41.9	3 2.0	0 49 55.0	44 57.9	9.493 2776	30338		
4	60 21 13.1	6 13 23.7	5 39.1	1 34 47.4	44 39.8	9.490 6489	22141		
5	66 36 25.8	6 16 48.2	+ 8 1.7	+2 19 0.0	+43 38.0	9.488 8654	-13463		
6	72 54 21.4	6 18 48.5	10 2.1	3 1 48.8	41 52.4	9.487 9663	- 4485		
7	79 13 33.0	6 19 19.6	11 33.5	3 42 30.8	39 25.0	9.487 9717	+ 4592		
8	85 32 30.2	6 18 19.7	12 31.1	4 20 26.2	36 19.9	9.488 8813	13567		
9	91 49 42.3	6 15 49.6	12 52.2	4 55 0.0	32 42.9	9.490 6750	22241		
10	98 3 40.7	6 11 53.4	+12 36.6	+5 25 43.8	+28 41.2	9.493 3134	+30433		
11	104 13 2.5	6 6 37.7	11 46.3	5 52 16.8	24 22.7	9.496 7403	37988		
12	110 16 32.4	6 0 11.1	10 25.1	6 14 26.2	19 55.2	9.500 8861	44797		
13	116 13 4.7	5 52 44.4	8 38.6	6 32 6.8	15 26.4	9.505 6720	50777		
14	122 1 44.9	5 44 28.8	6 33.0	6 45 20.7	11 2.8	9.511 0123	55882		
15	127 41 49.9	5 35 35.9	+ 4 15.2	+6 54 16.0	+ 6 50.0	9.516 8192	+60111		
16	133 12 48.1	5 26 17.1	+ 1 51.5	6 59 5.7	+ 2 52.2	9.523 0059	63481		
17	138 34 18.8	5 16 42.8	- 0 32.0	7 0 6.3	- 0 47.8	9.529 4880	66030		
18	143 46 11.4	5 7 2.3	2 50.2	6 57 36.6	4 8.2	9.536 1866	67820		
19	148 48 23.8	4 57 23.6	4 58.9	6 51 56.8	7 8.1	9.543 0288	68915		
20	153 41 1.5	4 47 53.7	- 6 54.9	+6 43 27.3	- 9 47.6	9.549 9489	+69388		
21	158 24 16.0	4 38 38.1	8 35.8	6 32 28.3	12 7.3	9.556 8880	69310		
22	162 58 23.8	4 29 40.7	10 0.4	6 19 19.0	14 8.3	9.563 7951	68757		
23	167 23 44.6	4 21 4.8	11 7.8	6 4 17.6	15 51.8	9.570 6258	67795		
24	171 40 41.2	4 12 52.5	11 58.1	5 47 40.7	17 19.5	9.577 3424	66482		
25	175 49 37.8	4 5 5.1	-12 31.6	+5 29 43.3	-18 33.0	9.583 9124	+64876		
26	179 50 59.9	3 57 43.4	12 49.1	5 10 39.1	19 33.4	9.590 3095	63028		
27	183 45 13.3	3 50 47.6	12 51.6	4 50 40.3	20 22.5	9.596 5114	60980		
28	187 32 43.8	3 44 17.7	12 40.3	4 29 57.4	21 1.7	9.602 5002	58771		
29	191 13 57.1	3 38 13.2	12 16.6	4 8 39.9	21 32.0	9.608 2614	56434		
30	194 49 18.3	3 32 33.2	-11 41.7	+3 46 56.0	-21 54.7	9.613 7836	+53993		
ct. 1	198 19 11.4	3 27 17.1	-10 57.1	+3 24 52.8	-22 10.7	9.619 0674	+51473		

MERCURY. 1919.
FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		° ' "	° ' "	' "	° ' "	' "		
Oct.	1	198 19 11.4	3 27 17.1	-10 57.1	+3 24 52.8	-22 10.7	9.619 0574	+51473
	2	201 44 0.2	3 22 24.1	10 4.1	3 2 36.5	22 21.0	9.624 0763	48895
	3	205 4 7.0	3 17 53.1	9 3.9	2 40 12.4	22 26.4	9.628 8349	46273
	4	208 19 53.5	3 13 43.3	7 57.9	2 17 45.1	22 27.5	9.633 3299	43623
	5	211 31 40.3	3 9 53.6	6 47.2	1 55 18.7	22 24.8	9.637 5587	40949
	6	214 39 47.2	3 6 23.3	- 5 32.8	+1 32 56.5	-22 19.1	9.641 5194	+38264
	7	217 44 33.1	3 3 11.4	4 15.8	1 10 41.4	22 10.6	9.645 2115	35679
	8	220 46 15.8	3 0 17.0	2 57.2	0 48 36.1	21 59.7	9.648 6351	32892
	9	223 45 12.8	2 57 39.6	1 37.9	0 26 42.7	21 46.8	9.651 7899	30207
	10	226 41 40.3	2 55 18.2	- 0 18.5	+0 5 3.2	21 31.9	9.654 6767	27530
	11	229 35 54.3	2 53 12.4	+ 1 0.0	-0 16 20.6	-21 15.6	9.657 2962	+24862
	12	232 28 9.8	2 51 21.2	2 17.0	0 37 27.5	20 57.9	9.659 6495	22206
	13	235 18 41.5	2 49 44.5	3 31.8	0 58 15.9	20 38.7	9.661 7376	19558
	14	238 7 43.5	2 48 21.8	4 44.0	1 18 44.6	20 18.5	9.663 5613	16918
	15	240 55 29.6	2 47 12.5	5 52.9	1 38 52.5	19 57.1	9.665 1216	14290
	16	243 42 12.9	2 46 16.3	+ 6 57.9	-1 58 38.5	-19 34.7	9.666 4195	+11669
	17	246 28 6.5	2 45 33.1	7 58.8	2 18 1.6	19 11.2	9.667 4557	9055
	18	249 13 23.2	2 45 2.3	8 54.9	2 37 0.6	18 46.7	9.668 2308	6448
	19	251 58 15.3	2 44 44.0	9 45.9	2 55 34.7	18 21.2	9.668 7455	3846
	20	254 42 55.4	2 44 38.1	10 31.4	3 13 42.6	17 54.5	9.669 0000	+ 1246
	21	257 27 35.6	2 44 44.3	+11 11.2	-3 31 23.3	-17 26.7	9.668 9946	- 1355
	22	260 12 28.1	2 45 2.8	11 44.7	3 48 35.6	16 57.7	9.668 7290	2957
	23	262 57 45.2	2 45 33.5	12 11.8	4 5 18.3	16 27.3	9.668 2032	6559
	24	265 43 39.1	2 46 16.4	12 32.2	4 21 29.8	15 55.5	9.667 4170	9166
	25	268 30 22.1	2 47 11.8	12 45.7	4 37 8.9	15 22.3	9.666 3698	11780
	26	271 18 6.9	2 48 19.8	+12 51.9	-4 52 13.8	-14 47.2	9.665 0608	-14401
	27	274 7 6.0	2 49 40.6	12 50.7	5 6 42.7	14 10.2	9.663 4894	17029
	28	276 57 32.5	2 51 14.6	12 42.0	5 20 33.6	13 31.3	9.661 6546	19669
	29	279 49 39.7	2 53 2.0	12 25.7	5 33 44.5	12 50.0	9.659 5554	22316
	30	282 43 41.1	2 55 3.2	12 1.5	5 46 12.8	12 6.2	9.657 1910	24975
Nov.	31	285 39 50.9	2 57 18.7	+11 29.6	-5 57 56.0	-11 19.7	9.654 5601	-27644
	1	288 38 23.4	2 59 48.9	10 49.9	6 8 51.1	10 30.0	9.651 6619	30321
	2	291 39 33.8	3 2 34.4	10 2.5	6 18 54.8	9 36.9	9.648 4957	33003
	3	294 43 37.4	3 5 35.6	9 7.6	6 28 3.7	8 40.2	9.645 0611	35692
	4	297 50 50.5	3 8 53.3	8 5.3	6 36 13.8	7 39.3	9.641 3573	38381
	5	301 1 29.8	3 12 28.2	+ 6 56.1	-6 43 20.9	- 6 34.0	9.637 3851	-41063
	6	304 15 52.8	3 16 20.8	5 40.2	6 49 20.2	5 23.8	9.633 1451	43734
	7	307 34 17.5	3 20 31.8	4 18.4	6 54 6.7	4 8.2	9.628 6390	46385
	8	310 57 2.8	3 25 2.0	2 51.3	6 57 34.6	2 46.7	9.623 8691	49005
	9	314 24 28.2	3 29 52.1	+ 1 19.7	6 59 38.1	- 1 19.2	9.618 8395	51580
	10	317 56 53.9	3 35 2.8	- 0 15.2	-7 0 10.5	+ 0 15.4	9.613 5550	-54098
	11	321 34 40.9	3 40 34.7	1 52.3	6 59 4.8	1 57.2	9.608 0226	56534
	12	325 18 10.6	3 46 28.4	3 30.1	6 56 13.5	3 46.7	9.602 2516	58867
	13	329 7 45.1	3 52 44.3	5 6.8	6 51 28.7	5 44.3	9.596 2534	61072
	14	333 3 46.7	3 59 22.7	6 40.7	6 44 42.1	7 50.3	9.590 0427	63110
	15	337 6 38.0	4 6 23.7	- 8 9.4	-6 35 45.2	+10 4.9	9.583 6380	-64949
	16	341 16 41.5	4 13 47.0	- 9 30.6	-6 24 29.3	+12 28.3	9.577 0611	-66543

MERCURY, 1919.

149

FOR GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	" ' "	" ' "	" "	" ' "	" "		
v. 16	341 16 41.5	4 13 47.0	- 9 30.6	-6 24 29.3	+12 28.3	9.577 0611	-66543
17	345 34 19.1	4 21 31.7	10 41.8	6 10 45.8	15 0.2	9.570 3392	67842
18	349 59 51.9	4 29 37.2	11 40.2	5 54 26.5	17 39.8	9.563 5044	68791
19	354 33 39.9	4 38 1.7	12 23.0	5 35 23.9	20 26.6	9.556 5949	69325
20	359 16 0.8	4 46 42.6	12 47.5	5 13 31.4	23 19.2	9.549 6555	69378
21	4 7 9.6	4 55 37.0	-12 51.1	-4 48 44.3	+26 15.6	9.542 7376	-68881
22	9 7 17.9	5 4 40.8	12 31.7	4 20 59.9	29 13.1	9.535 9001	67759
23	14 16 32.5	5 13 48.7	11 47.8	3 50 18.7	32 8.7	9.529 2091	65939
24	19 34 54.6	5 22 54.7	10 38.6	3 16 44.4	34 58.5	9.522 7377	63357
25	25 2 18.8	5 31 51.5	9 4.6	2 40 25.3	37 37.4	9.516 5651	59953
26	30 38 31.6	5 40 30.5	- 7 7.4	-2 1 34.9	+40 0.3	9.510 7759	-55687
27	36 23 10.7	5 48 42.4	4 50.2	1 20 31.9	42 1.6	9.505 4571	50542
28	42 15 43.9	5 56 17.0	- 2 17.8	-0 37 41.0	43 35.2	9.500 6966	44526
29	48 15 28.7	6 3 3.6	+ 0 23.7	+0 6 27.4	44 35.6	9.496 5795	37685
30	54 21 31.6	6 8 51.7	3 6.9	0 51 17.5	44 58.0	9.493 1845	30099
c. 1	60 32 49.2	6 13 31.2	+ 5 43.7	+1 36 9.4	+44 38.6	9.490 5808	-21882
2	66 48 8.2	6 16 53.2	8 5.8	2 20 20.1	43 35.4	9.488 8239	13193
3	73 6 7.5	6 18 50.8	10 5.3	3 3 5.6	41 48.5	9.487 9520	- 4211
4	79 25 20.1	6 19 19.3	11 35.8	3 43 43.2	39 19.9	9.487 9850	+ 4868
5	85 44 15.6	6 18 16.5	12 32.3	4 21 32.9	36 13.7	9.488 9220	13837
6	92 1 23.1	6 15 43.7	+12 52.3	+4 56 0.0	+32 35.8	9.490 7421	+22498
7	98 15 14.4	6 11 45.0	12 35.6	5 26 36.4	28 33.5	9.493 4053	30671
8	104 24 26.7	6 6 27.0	11 44.2	5 53 1.5	24 14.6	9.496 8551	38207
9	110 27 44.9	5 59 58.5	10 22.2	6 15 2.7	19 47.0	9.501 0217	44992
10	116 24 3.7	5 52 30.2	8 35.0	6 32 35.1	15 18.2	9.505 8258	50945
11	122 12 28.9	5 44 13.2	+ 6 29.0	+6 45 41.0	+10 54.9	9.511 1817	+56027
12	127 52 17.7	5 35 19.3	4 10.8	6 54 28.5	6 42.4	9.517 0018	60229
13	133 22 58.9	5 25 59.8	+ 1 47.1	6 59 10.9	+ 2 45.1	9.523 1988	63571
14	138 44 12.2	5 16 25.1	- 0 36.3	7 0 4.7	- 0 54.3	9.529 6888	66098
15	143 55 47.1	5 6 44.5	2 54.3	6 57 28.9	4 14.0	9.536 3930	67864
16	148 57 41.9	4 57 6.0	- 5 2.7	+6 51 43.5	- 7 13.3	9.543 2386	+68939
17	153 50 2.2	4 47 36.6	6 58.2	6 43 9.2	9 52.1	9.550 1601	69392
18	158 32 59.9	4 38 21.4	8 38.7	6 32 5.9	12 11.3	9.557 0989	69300
19	163 6 51.2	4 29 24.7	10 2.7	6 18 52.9	14 11.7	9.564 0044	68735
20	167 31 56.4	4 20 49.4	11 9.6	6 3 48.3	15 54.7	9.570 8322	67760
21	171 48 37.9	4 12 37.7	-11 59.3	+5 47 8.7	-17 22.0	9.577 5448	+66438
22	175 57 20.3	4 4 51.2	12 32.3	5 29 9.1	18 35.0	9.584 1101	64824
23	179 58 28.9	3 57 30.3	12 49.4	5 10 3.0	19 35.2	9.590 5016	62969
24	183 52 29.6	3 50 35.3	12 51.4	4 50 2.6	20 23.8	9.596 6973	60917
25	187 39 48.2	3 44 6.2	12 39.8	4 29 18.6	21 2.7	9.602 6796	58704
26	191 20 50.4	3 38 2.3	-12 15.7	+4 8 0.1	-21 32.8	9.608 4338	+56361
27	194 56 1.1	3 32 23.1	11 40.5	3 46 15.5	21 55.2	9.613 9485	53917
28	198 25 44.6	3 27 7.8	10 55.6	3 24 11.8	22 11.1	9.619 2147	51396
29	201 50 24.3	3 22 15.4	10 2.3	3 1 55.2	22 21.3	9.624 2258	48816
30	205 10 22.8	3 17 45.2	9 2.0	2 39 30.9	22 26.5	9.628 9765	46193
31	208 26 1.7	3 13 36.0	- 7 55.8	+2 17 3.6	-22 27.4	9.633 4634	+43540
32	211 37 41.5	.....	- 6 44.9	+1 54 37.3	.....	9.637 6838	.....

VENUS, 1919. GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Jan. 1	19 24 12.78	+13.566	-23 6 19.3	+22.62	0.225 5322	-167.7	5.09	5.24	0 43.9
2	19 29 37.97	13.533	22 56 55.3	24.38	0.225 1245	172.1	5.09	5.24	0 45.4
3	19 35 2.34	13.498	22 46 49.3	26.12	0.224 7062	176.5	5.10	5.25	0 46.9
4	19 40 25.84	13.460	22 36 1.7	27.84	0.224 2774	180.9	5.10	5.25	0 48.3
5	19 45 48.42	13.421	22 24 32.9	29.55	0.223 8380	185.3	5.11	5.26	0 49.7
6	19 51 10.03	+13.380	-22 12 23.4	+31.24	0.223 3878	-189.8	5.11	5.26	0 51.1
7	19 56 30.63	13.337	21 59 33.8	32.89	0.222 9270	194.2	5.12	5.27	0 52.5
8	20 1 50.17	13.292	21 46 4.7	34.53	0.222 4556	198.6	5.12	5.27	0 53.9
9	20 7 8.62	13.246	21 31 56.5	36.15	0.221 9737	203.0	5.13	5.28	0 55.3
10	20 12 25.95	13.198	21 17 9.9	37.74	0.221 4812	207.4	5.13	5.28	0 56.7
11	20 17 42.12	+13.149	-21 1 45.4	+39.30	0.220 9782	-211.8	5.14	5.29	0 58.0
12	20 22 57.10	13.099	20 45 43.7	40.84	0.220 4648	216.1	5.15	5.30	0 59.3
13	20 28 10.88	13.049	20 29 5.5	42.35	0.219 9409	220.5	5.15	5.30	1 0.6
14	20 33 23.43	12.997	20 11 51.3	43.83	0.219 4066	224.8	5.16	5.31	1 1.9
15	20 38 34.73	12.945	19 54 1.8	45.29	0.218 8619	229.1	5.17	5.32	1 3.1
16	20 43 44.77	+12.892	-19 35 37.6	+46.72	0.218 3067	-233.5	5.17	5.32	1 4.3
17	20 48 53.53	12.838	19 16 39.4	48.12	0.217 7411	237.8	5.18	5.33	1 5.5
18	20 54 1.01	12.785	18 57 8.0	49.49	0.217 1650	242.3	5.19	5.34	1 6.7
19	20 59 7.20	12.731	18 37 4.1	50.83	0.216 5782	246.7	5.19	5.34	1 7.9
20	21 4 12.09	12.677	18 16 28.4	52.14	0.215 9807	251.2	5.20	5.35	1 9.0
21	21 9 15.69	+12.623	-17 55 21.6	+53.42	0.215 3725	-255.7	5.21	5.36	1 10.1
22	21 14 17.98	12.568	17 33 44.4	54.67	0.214 7533	260.3	5.22	5.37	1 11.2
23	21 19 18.98	12.515	17 11 37.7	55.88	0.214 1231	264.9	5.23	5.38	1 12.3
24	21 24 18.70	12.461	16 49 2.2	57.07	0.213 4818	269.5	5.23	5.38	1 13.4
25	21 29 17.13	12.408	16 25 58.6	58.22	0.212 8292	274.3	5.24	5.39	1 14.4
26	21 34 14.28	+12.355	-16 2 27.7	+59.34	0.212 1651	-279.1	5.25	5.40	1 15.4
27	21 39 10.17	12.303	15 38 30.3	60.43	0.211 4895	283.9	5.26	5.41	1 16.4
28	21 44 4.81	12.251	15 14 7.2	61.49	0.210 8021	288.9	5.27	5.42	1 17.3
29	21 48 58.21	12.199	14 49 19.1	62.51	0.210 1029	293.8	5.27	5.42	1 18.3
30	21 53 50.38	12.149	14 24 6.9	63.50	0.209 3917	298.8	5.28	5.43	1 19.2
31	21 58 41.35	+12.099	-13 58 31.3	+64.46	0.208 6684	-303.9	5.29	5.44	1 20.1
Feb. 1	22 3 31.13	12.050	13 32 33.2	65.38	0.207 9328	309.1	5.30	5.45	1 21.0
2	22 8 19.74	12.001	13 6 13.3	66.27	0.207 1849	314.2	5.30	5.46	1 21.9
3	22 13 7.20	11.954	12 39 32.5	67.12	0.206 4244	319.5	5.31	5.47	1 22.7
4	22 17 53.54	11.908	12 12 31.6	67.95	0.205 6513	324.8	5.32	5.48	1 23.5
5	22 22 38.77	+11.862	-11 45 11.3	+68.74	0.204 8655	-330.1	5.33	5.49	1 24.3
6	22 27 22.92	11.818	11 17 32.5	69.49	0.204 0670	335.4	5.34	5.50	1 25.1
7	22 32 6.03	11.775	10 49 35.9	70.22	0.203 2558	340.6	5.35	5.51	1 25.9
8	22 36 48.12	11.733	10 21 22.4	70.91	0.202 4319	346.0	5.36	5.52	1 26.7
9	22 41 29.22	11.692	9 52 52.7	71.56	0.201 5952	351.3	5.37	5.53	1 27.4
10	22 46 9.36	+11.653	-9 24 7.6	+72.19	0.200 7456	-356.7	5.38	5.54	1 28.1
11	22 50 48.58	11.615	8 55 7.9	72.78	0.199 8831	362.1	5.39	5.55	1 28.8
12	22 55 26.91	11.579	8 25 54.3	73.34	0.199 0077	367.5	5.41	5.57	1 29.5
13	23 0 4.40	11.545	7 56 27.7	73.87	0.198 1193	372.9	5.42	5.58	1 30.2
14	23 4 41.07	11.512	7 26 48.7	74.37	0.197 2179	378.3	5.43	5.59	1 30.9
15	23 9 16.97	+11.480	-6 56 58.1	+74.84	0.196 3034	-383.8	5.44	5.60	1 31.6
16	23 13 52.14	+11.451	-6 26 56.7	+75.27	0.195 3756	-389.3	5.45	5.61	1 32.2

GREENWICH MEAN TIME.

Date.	Apparent Light Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.	
	Noon.				Noon.									
	h	m	s	s	°	'	"	"	"	"	"	"	h	m
16	23	13	52.14	+11.451	- 6	26	56.7	+75.27	0.195 3756	-389.3	5.45	5.61	1	32.2
17	23	18	26.61	11.423	5	56	45.2	75.68	0.194 4345	394.9	5.46	5.62	1	32.9
18	23	23	0.44	11.397	5	26	24.4	76.05	0.193 4800	400.5	5.48	5.64	1	33.5
19	23	27	33.66	11.372	4	55	55.0	76.40	0.192 5118	406.3	5.49	5.65	1	34.1
20	23	32	6.31	11.349	4	25	17.7	76.71	0.191 5298	412.1	5.50	5.66	1	34.7
21	23	36	38.43	+11.328	- 3	54	33.4	+76.98	0.190 5339	-417.9	5.52	5.68	1	35.3
22	23	41	10.07	11.309	3	23	42.7	77.23	0.189 5239	423.8	5.53	5.69	1	35.9
23	23	45	41.27	11.291	2	52	46.4	77.45	0.188 4996	429.8	5.54	5.70	1	36.5
24	23	50	12.07	11.276	2	21	45.2	77.64	0.187 4608	435.9	5.55	5.71	1	37.0
25	23	54	42.51	11.262	1	50	39.9	77.80	0.186 4072	442.1	5.57	5.73	1	37.6
26	23	59	12.64	+11.250	- 1	19	31.3	+77.92	0.185 3386	-448.4	5.58	5.74	1	38.1
27	0	3	42.50	11.239	0	48	20.0	78.02	0.184 2549	454.7	5.60	5.76	1	38.7
28	0	8	12.13	11.230	- 0	17	6.8	78.08	0.183 1558	461.2	5.61	5.77	1	39.2
1	0	12	41.57	11.223	+ 0	14	7.5	78.11	0.182 0411	467.8	5.63	5.79	1	39.8
2	0	17	10.87	11.218	0	45	22.2	78.11	0.180 9105	474.4	5.64	5.80	1	40.3
3	0	21	40.05	+11.214	+ 1	16	36.5	+78.08	0.179 7638	-481.2	5.65	5.82	1	40.9
4	0	26	9.17	11.212	1	47	49.6	78.01	0.178 6009	487.9	5.66	5.83	1	41.4
5	0	30	38.26	11.212	2	19	0.9	77.92	0.177 4216	494.8	5.68	5.85	1	42.0
6	0	35	7.35	11.213	2	50	9.5	77.79	0.176 2258	501.7	5.70	5.87	1	42.5
7	0	39	36.49	11.216	3	21	14.8	77.64	0.175 0132	508.7	5.71	5.88	1	43.0
8	0	44	5.72	+11.220	+ 3	52	15.9	+77.45	0.173 7838	-515.7	5.73	5.90	1	43.6
9	0	48	35.08	11.226	4	23	12.2	77.23	0.172 5376	522.8	5.75	5.92	1	44.1
10	0	53	4.60	11.234	4	54	2.8	76.98	0.171 2744	529.9	5.76	5.93	1	44.7
11	0	57	34.32	11.243	5	24	47.2	76.71	0.169 9941	537.0	5.78	5.95	1	45.2
12	1	2	4.28	11.254	5	55	24.5	76.40	0.168 6967	544.2	5.80	5.97	1	45.8
13	1	6	34.53	+11.267	+ 6	25	54.0	+76.06	0.167 3820	-551.4	5.82	5.99	1	46.4
14	1	11	5.11	11.281	6	56	15.0	75.69	0.166 0499	558.7	5.83	6.00	1	46.9
15	1	15	36.05	11.297	7	26	26.8	75.29	0.164 7004	565.9	5.85	6.02	1	47.5
16	1	20	7.39	11.315	7	56	28.6	74.86	0.163 3333	573.3	5.87	6.04	1	48.1
17	1	24	39.17	11.334	8	26	19.8	74.40	0.161 9485	580.7	5.89	6.06	1	48.7
18	1	29	11.43	+11.355	+ 8	55	59.6	+73.91	0.160 5458	-588.2	5.91	6.08	1	49.3
19	1	33	44.20	11.377	9	25	27.3	73.39	0.159 1250	595.8	5.93	6.10	1	49.9
20	1	38	17.53	11.401	9	54	42.1	72.84	0.157 6859	603.4	5.95	6.12	1	50.5
21	1	42	51.45	11.426	10	23	43.3	72.26	0.156 2284	611.2	5.97	6.14	1	51.1
22	1	47	26.00	11.453	10	52	30.2	71.65	0.154 7522	619.0	5.99	6.16	1	51.7
23	1	52	1.20	+11.481	+11	21	2.1	+71.01	0.153 2571	-626.9	6.00	6.18	1	52.4
24	1	56	37.09	11.510	11	49	18.2	70.33	0.151 7429	634.9	6.03	6.21	1	53.0
25	2	1	13.71	11.541	12	17	17.8	69.63	0.150 2094	643.0	6.05	6.23	1	53.7
26	2	5	51.07	11.573	12	45	0.2	68.90	0.148 6562	651.3	6.07	6.25	1	54.4
27	2	10	29.21	11.606	13	12	24.6	68.13	0.147 0832	659.6	6.09	6.27	1	55.1
28	2	15	8.16	+11.640	+13	39	30.2	+67.33	0.145 4899	-668.1	6.11	6.29	1	55.8
29	2	19	47.94	11.675	14	6	16.4	66.51	0.143 8762	676.7	6.14	6.32	1	56.5
30	2	24	28.57	11.711	14	32	42.4	65.65	0.142 2417	685.4	6.16	6.34	1	57.2
31	2	29	10.07	11.748	14	58	47.5	64.77	0.140 5861	694.2	6.19	6.37	1	58.0
r. 1	2	33	52.47	11.785	15	24	30.9	63.84	0.138 9092	703.2	6.21	6.39	1	58.8
2	2	38	35.77	+11.823	+15	49	51.8	+62.89	0.137 2106	-712.3	6.24	6.42	1	59.5
3	2	43	19.98	+11.861	+16	14	49.5	+61.91	0.135 4901	-721.5	6.26	6.44	2	0.2

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Apr. 1	2 33 52.47	+14.785	+15 24 30.9	+63.84	0.138 9092	- 703.2	6.21	6.39	1 58.8
2	2 38 35.77	11.823	15 49 51.8	62.89	0.137 2106	712.3	6.24	6.42	1 59.5
3	2 43 19.98	11.861	16 14 49.5	61.91	0.135 4901	721.5	6.26	6.44	2 0.3
4	2 48 5.12	11.900	16 39 23.3	60.90	0.133 7474	730.7	6.29	6.47	2 1.1
5	2 52 51.20	11.940	17 3 32.5	59.86	0.131 9825	740.1	6.31	6.49	2 2.0
6	2 57 38.22	+11.979	+17 27 16.3	+58.79	0.130 1950	- 749.5	6.33	6.52	2 2.8
7	3 2 26.19	12.019	17 50 34.0	57.69	0.128 3849	759.0	6.36	6.55	2 3.7
8	3 7 15.11	12.058	18 13 25.0	56.56	0.126 5520	768.4	6.38	6.57	2 4.6
9	3 12 4.98	12.098	18 35 48.5	55.40	0.124 6963	778.0	6.41	6.60	2 5.5
10	3 16 55.81	12.138	18 57 43.8	54.21	0.122 8175	787.7	6.44	6.63	2 6.4
11	3 21 47.59	+12.177	+19 19 10.3	+53.00	0.120 9155	- 797.3	6.47	6.66	2 7.3
12	3 26 40.32	12.217	19 40 7.3	51.75	0.118 9903	807.0	6.50	6.69	2 8.2
13	3 31 34.00	12.256	20 0 34.1	50.48	0.117 0416	816.9	6.53	6.72	2 9.1
14	3 36 28.62	12.295	20 20 30.0	49.18	0.115 0692	826.8	6.56	6.75	2 10.1
15	3 41 24.17	12.334	20 39 54.4	47.85	0.113 0729	836.8	6.59	6.78	2 11.1
16	3 46 20.64	+12.372	+20 58 46.7	+46.50	0.111 0526	- 846.8	6.63	6.82	2 12.1
17	3 51 18.01	12.409	21 17 6.3	45.12	0.109 0081	856.9	6.66	6.85	2 13.1
18	3 56 16.27	12.446	21 34 52.5	43.72	0.106 9392	867.2	6.68	6.88	2 14.1
19	4 1 15.41	12.482	21 52 4.8	42.30	0.104 8456	877.5	6.71	6.91	2 15.2
20	4 6 15.39	12.517	22 8 42.6	40.85	0.102 7272	887.9	6.75	6.95	2 16.3
21	4 11 16.20	+12.551	+22 24 45.3	+39.37	0.100 5836	- 898.4	6.78	6.98	2 17.3
22	4 16 17.81	12.583	22 40 12.4	37.88	0.098 4147	909.0	6.82	7.02	2 18.4
23	4 21 20.19	12.615	22 55 3.3	36.36	0.096 2201	919.8	6.85	7.05	2 19.5
24	4 26 23.30	12.645	23 9 17.5	34.82	0.093 9995	930.7	6.89	7.09	2 20.6
25	4 31 27.12	12.673	23 22 54.6	33.26	0.091 7525	941.8	6.92	7.12	2 21.8
26	4 36 31.60	+12.700	+23 35 54.0	+31.69	0.089 4788	- 953.0	6.96	7.16	2 22.9
27	4 41 36.70	12.725	23 48 15.4	30.09	0.087 1781	964.3	7.00	7.20	2 24.1
28	4 46 42.38	12.748	23 59 58.3	28.48	0.084 8499	975.8	7.03	7.24	2 25.2
29	4 51 48.59	12.769	24 11 2.2	26.85	0.082 4939	987.5	7.07	7.28	2 26.3
30	4 56 55.28	12.788	24 21 26.9	25.20	0.080 1096	999.4	7.11	7.32	2 27.5
May 1	5 2 2.39	+12.804	+24 31 11.9	+23.54	0.077 6968	-1011.4	7.15	7.36	2 28.7
2	5 7 9.86	12.818	24 40 16.9	21.87	0.075 2550	1023.5	7.19	7.40	2 29.9
3	5 12 17.64	12.830	24 48 41.7	20.19	0.072 7840	1035.7	7.23	7.44	2 31.1
4	5 17 25.66	12.838	24 56 26.0	18.50	0.070 2836	1048.0	7.27	7.48	2 32.3
5	5 22 33.85	12.844	25 3 29.5	16.79	0.067 7535	1060.4	7.32	7.53	2 33.5
6	5 27 42.15	+12.847	+25 9 52.0	+15.08	0.065 1934	-1073.0	7.36	7.57	2 34.7
7	5 32 50.50	12.848	25 15 33.4	13.37	0.062 6032	1085.6	7.40	7.62	2 35.9
8	5 37 58.83	12.846	25 20 33.5	11.64	0.059 9826	1098.3	7.45	7.67	2 37.1
9	5 43 7.07	12.841	25 24 52.2	9.91	0.057 3314	1111.1	7.49	7.71	2 38.3
10	5 48 15.16	12.833	25 28 29.4	8.19	0.054 6494	1123.9	7.54	7.76	2 39.5
11	5 53 23.03	+12.822	+25 31 25.1	+ 6.45	0.051 9364	-1136.9	7.59	7.81	2 40.6
12	5 58 30.61	12.809	25 33 39.2	4.72	0.049 1923	1149.9	7.64	7.86	2 41.8
13	6 3 37.82	12.792	25 35 11.8	2.99	0.046 4167	1163.1	7.69	7.91	2 43.0
14	6 8 44.59	12.772	25 36 2.9	+ 1.26	0.043 6095	1176.3	7.73	7.96	2 44.2
15	6 13 50.87	12.750	25 36 12.5	- 0.46	0.040 7704	1189.6	7.78	8.01	2 45.3
16	6 18 56.58	+12.725	+25 35 40.8	- 2.18	0.037 8992	-1203.1	7.83	8.06	2 46.5
17	6 24 1.66	+12.697	+25 34 28.0	- 3.89	0.034 9956	-1216.7	7.89	8.12	2 47.6

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- ax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"		"	"	"	h m
ay 17	6 24 1.66	+12.697	+25 34 28.0	- 3.89	0.034 9956	-1216.7	7.89	8.12	2 47.6
18	6 29 6.04	12.667	25 32 34.1	5.60	0.032 0592	1230.3	7.94	8.17	2 48.8
19	6 34 9.67	12.634	25 29 59.4	7.29	0.029 0899	1244.1	8.00	8.23	2 49.9
20	6 39 12.47	12.599	25 26 44.0	8.98	0.026 0873	1258.1	8.05	8.29	2 51.0
21	6 44 14.38	12.560	25 22 48.3	10.66	0.023 0510	1272.2	8.11	8.35	2 52.1
22	6 49 15.33	+12.519	+25 18 12.5	-12.22	0.019 9808	-1286.4	8.16	8.40	2 53.1
23	6 54 15.27	12.475	25 12 56.9	13.98	0.016 8762	1300.8	8.22	8.46	2 54.2
24	6 59 14.13	12.429	25 7 1.8	15.61	0.013 7368	1315.4	8.29	8.53	2 55.2
25	7 4 11.85	12.380	25 0 27.7	17.23	0.010 5620	1330.2	8.35	8.59	2 56.2
26	7 9 8.37	12.329	24 53 14.8	18.84	0.007 3515	1345.2	8.40	8.65	2 57.2
27	7 14 3.63	+12.276	+24 45 23.7	-20.42	0.004 1047	-1360.5	8.47	8.72	2 58.2
28	7 18 57.58	12.219	24 36 54.8	21.98	0.000 8210	1375.9	8.53	8.78	2 59.2
29	7 23 50.14	12.161	24 27 48.6	23.53	9.997 5000	1391.6	8.60	8.85	3 0.1
30	7 28 41.27	12.100	24 18 5.5	25.06	9.994 1410	1407.5	8.67	8.92	3 1.0
31	7 33 30.91	12.036	24 7 46.1	26.56	9.990 7437	1423.6	8.73	8.99	3 1.9
me 1	7 38 18.99	+11.970	+23 56 51.0	-28.03	9.987 3075	-1439.9	8.80	9.06	3 2.8
2	7 43 5.46	11.902	23 45 20.7	29.49	9.983 8322	1456.3	8.87	9.13	3 3.6
3	7 47 50.27	11.832	23 33 15.9	30.91	9.980 3172	1472.9	8.95	9.21	3 4.4
4	7 52 33.37	11.759	23 20 37.1	32.31	9.976 7621	1489.7	9.02	9.28	3 5.2
5	7 57 14.71	11.685	23 7 25.0	33.69	9.973 1667	1506.5	9.09	9.36	3 5.9
6	8 1 54.25	+11.609	+22 53 40.2	-35.04	9.969 5306	-1523.6	9.17	9.44	3 6.6
7	8 6 31.94	11.531	22 39 23.4	36.36	9.965 8534	1540.8	9.25	9.52	3 7.3
8	8 11 7.74	11.452	22 24 35.2	37.65	9.962 1348	1558.1	9.33	9.60	3 7.9
9	8 15 41.61	11.370	22 9 16.4	38.91	9.958 3745	1575.5	9.41	9.69	3 8.6
10	8 20 13.51	11.288	21 53 27.5	40.15	9.954 5721	1593.1	9.49	9.77	3 9.2
11	8 24 43.41	+11.204	+21 37 9.3	-41.36	9.950 7273	-1610.9	9.58	9.86	3 9.7
12	8 29 11.28	11.118	21 20 22.5	42.54	9.946 8398	1628.8	9.67	9.95	3 10.2
13	8 33 37.08	11.032	21 3 7.8	43.68	9.942 9091	1646.8	9.75	10.04	3 10.7
14	8 38 0.80	10.944	20 45 25.9	44.80	9.938 9350	1665.0	9.84	10.13	3 11.1
15	8 42 22.40	10.856	20 27 17.5	45.89	9.934 9169	1683.4	9.93	10.22	3 11.6
16	8 46 41.86	+10.766	+20 8 43.4	-46.95	9.930 8545	-1702.0	10.03	10.32	3 11.9
17	8 50 59.16	10.676	19 49 44.3	47.97	9.926 7474	1720.7	10.12	10.42	3 12.3
18	8 55 14.28	10.584	19 30 20.9	48.97	9.922 5952	1739.5	10.22	10.52	3 12.6
19	8 59 27.19	10.492	19 10 34.0	49.94	9.918 3974	1758.7	10.32	10.62	3 12.9
20	9 3 37.88	10.399	18 50 24.2	50.87	9.914 1534	1778.0	10.42	10.72	3 13.1
21	9 7 46.33	+10.305	+18 29 52.4	-51.78	9.909 8626	-1797.6	10.52	10.83	3 13.3
22	9 11 52.53	10.211	18 8 59.2	52.65	9.905 5245	1817.5	10.63	10.94	3 13.4
23	9 15 56.46	10.116	17 47 45.5	53.49	9.901 1384	1837.6	10.74	11.05	3 13.5
24	9 19 58.09	10.020	17 26 12.0	54.29	9.896 7036	1858.1	10.84	11.16	3 13.6
25	9 23 57.41	9.923	17 4 19.6	55.07	9.892 2194	1878.8	10.96	11.28	3 13.6
26	9 27 54.40	+ 9.826	+16 42 8.9	-55.81	9.887 6850	-1899.9	11.08	11.40	3 13.6
27	9 31 49.03	9.727	16 19 40.8	56.52	9.883 0997	1921.2	11.19	11.52	3 13.6
28	9 35 41.29	9.628	15 56 56.1	57.20	9.878 4628	1942.9	11.31	11.64	3 13.5
29	9 39 31.14	9.526	15 33 55.6	57.84	9.873 7736	1964.8	11.44	11.77	3 13.4
30	9 43 18.55	9.424	15 10 40.2	58.44	9.869 0314	1987.1	11.56	11.90	3 13.2
July 1	9 47 3.50	+ 9.321	+14 47 10.6	-59.01	9.864 2355	-2009.5	11.69	12.03	3 13.0
2	9 50 45.96	+ 9.217	+14 23 27.8	-59.55	9.859 3855	-2032.2	11.81	12.16	3 12.8

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit Meridian of Green- wich.		
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.			
July	h	m	s	s	°	'	"	"			"	"	h	m	
	1	9	47	3.50	+9.321	+14	47	10.6	-59.01	9.864 2355	-2009.5	11.69	12.03	3	13.0
	2	9	50	45.96	9.217	14	23	27.8	59.55	9.859 3855	2032.2	11.81	12.16	3	12.8
	3	9	54	25.90	9.111	13	59	32.5	60.06	9.854 4807	2055.1	11.95	12.30	3	12.5
	4	9	58	3.28	9.004	13	35	25.6	60.52	9.849 5207	2078.2	12.09	12.44	3	12.2
	5	10	1	38.08	8.896	13	11	7.9	60.95	9.844 5051	2101.5	12.23	12.59	3	11.8
	6	10	5	10.26	+8.786	+12	46	40.2	-61.35	9.839 4333	-2125.0	12.38	12.74	3	11.4
	7	10	8	39.78	8.675	12	22	3.4	61.71	9.834 3050	2148.6	12.52	12.89	3	11.0
	8	10	12	6.61	8.561	11	57	18.3	62.04	9.829 1197	2172.4	12.67	13.04	3	10.5
	9	10	15	30.71	8.447	11	32	25.7	62.34	9.823 8772	2196.4	12.83	13.20	3	9.9
	10	10	18	52.04	8.331	11	7	26.4	62.60	9.818 5770	2220.5	12.98	13.36	3	9.3
	11	10	22	10.57	+8.213	+10	42	21.3	-62.82	9.813 2188	-2244.7	13.15	13.53	3	8.7
	12	10	25	26.25	8.098	10	17	11.3	63.02	9.807 8025	2269.0	13.31	13.70	3	8.0
	13	10	28	39.03	7.972	9	51	57.1	63.16	9.802 3277	2293.4	13.48	13.87	3	7.3
	14	10	31	48.88	7.849	9	26	39.7	63.28	9.796 7943	2317.8	13.65	14.05	3	6.5
	15	10	34	55.74	7.723	9	1	19.7	63.37	9.791 2020	2342.4	13.83	14.23	3	5.7
	16	10	37	59.56	+7.595	+ 8	35	58.2	-63.42	9.785 5506	-2367.1	14.01	14.42	3	4.8
	17	10	41	0.28	7.465	8	10	35.9	63.48	9.779 8400	2391.8	14.20	14.61	3	3.8
	18	10	43	57.86	7.333	7	45	13.8	63.41	9.774 0700	2416.6	14.39	14.81	3	2.8
	19	10	46	52.23	7.198	7	19	52.7	63.35	9.768 2404	2441.5	14.58	15.01	3	1.8
	20	10	49	43.32	7.060	6	54	33.4	63.25	9.762 3510	2466.4	14.78	15.21	3	0.7
	21	10	52	31.08	+6.919	+ 6	29	17.0	-63.11	9.756 4018	-2491.3	14.98	15.42	2	59.6
	22	10	55	15.42	6.775	6	4	4.3	62.94	9.750 3925	2516.4	15.19	15.63	2	58.4
	23	10	57	56.27	6.628	5	38	56.4	62.72	9.744 3230	2541.5	15.40	15.85	2	57.1
	24	11	0	33.53	6.477	5	13	54.2	62.46	9.738 1932	2566.6	15.62	16.08	2	55.8
	25	11	3	7.12	6.322	4	48	58.8	62.15	9.732 0033	2591.7	15.85	16.31	2	54.4
	26	11	5	36.93	+6.162	+ 4	24	11.2	-61.80	9.725 7533	-2616.7	16.08	16.55	2	52.9
	27	11	8	2.86	5.998	3	59	32.6	61.41	9.719 4435	2641.5	16.31	16.79	2	51.4
	28	11	10	24.77	5.828	3	35	4.1	60.96	9.713 0744	2666.1	16.56	17.04	2	49.8
	29	11	12	42.55	5.653	3	10	47.0	60.46	9.706 6467	2690.3	16.80	17.29	2	48.1
	30	11	14	56.07	5.472	2	46	42.5	59.91	9.700 1613	2714.1	17.05	17.55	2	46.4
31	11	17	5.18	+5.286	+ 2	22	51.9	-59.30	9.693 6194	-2737.3	17.31	17.82	2	44.6	
Aug.	1	11	19	9.75	5.094	1	59	16.4	58.64	9.687 0226	2759.9	17.58	18.09	2	42.7
	2	11	21	9.62	4.894	1	35	57.5	57.92	9.680 3725	2781.7	17.85	18.37	2	40.8
	3	11	23	4.63	4.688	1	12	56.5	57.15	9.673 6712	2802.6	18.13	18.66	2	38.8
	4	11	24	54.61	4.476	0	50	14.9	56.31	9.666 9210	2822.4	18.41	18.95	2	36.7
	5	11	26	39.40	+4.256	+ 0	27	54.2	-55.40	9.660 1247	-2841.0	18.70	19.25	2	34.5
	6	11	28	18.83	4.029	+ 0	5	56.0	54.43	9.653 2855	2858.2	18.99	19.55	2	32.2
	7	11	29	52.72	3.794	- 0	15	38.1	53.40	9.646 4068	2873.8	19.30	19.86	2	29.8
	8	11	31	20.87	3.551	0	36	46.4	52.29	9.639 4926	2887.7	19.61	20.18	2	27.3
	9	11	32	43.11	3.301	0	57	27.2	51.10	9.632 5475	2899.6	19.93	20.51	2	24.7
	10	11	33	59.25	+3.043	- 1	17	38.6	-49.84	9.625 5764	-2909.3	20.25	20.84	2	22.0
	11	11	35	9.09	2.776	1	37	18.8	48.50	9.618 5847	2916.7	20.58	21.18	2	19.2
	12	11	36	12.44	2.502	1	56	25.8	47.08	9.611 5786	2921.3	20.91	21.52	2	16.3
	13	11	37	9.12	2.220	2	14	57.5	45.56	9.604 5648	2923.0	21.25	21.87	2	13.4
	14	11	37	58.94	1.930	2	32	52.0	43.97	9.597 5506	2921.6	21.60	22.23	2	10.3
	15	11	38	41.71	+1.633	- 2	50	7.1	-42.28	9.590 5437	-2916.9	21.95	22.59	2	7.0
	16	11	39	17.25	+1.328	- 3	6	40.6	-40.50	9.583 5526	-2908.4	22.31	22.96	2	3.7

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Aug. 16	11 39 17.25	+1.328	-3 6 40.6	-40.50	9.583 5526	-2903.4	22.31	22.96	2 3.7
17	11 39 45.40	1.017	3 22 30.1	38.62	9.576 5866	2895.9	22.67	23.33	2 0.2
18	11 40 6.00	0.698	3 37 33.4	36.64	9.569 6555	2879.2	23.03	23.70	1 56.6
19	11 40 18.87	0.373	3 51 47.8	34.55	9.562 7701	2857.9	23.40	24.08	1 52.9
20	11 40 23.87	+0.042	4 5 10.9	32.35	9.555 9417	2831.6	23.77	24.46	1 49.0
21	11 40 20.87	-0.293	-4 17 40.0	-30.06	9.549 1829	-2799.9	24.14	24.85	1 45.0
22	11 40 9.77	0.633	4 29 12.8	27.65	9.542 5067	2762.6	24.51	25.23	1 40.9
23	11 39 50.44	0.978	4 39 46.3	25.12	9.535 9274	2719.2	24.89	25.62	1 36.6
24	11 39 22.82	1.324	4 49 17.8	22.48	9.529 4598	2669.4	25.26	26.00	1 32.2
25	11 38 46.88	1.671	4 57 44.7	19.74	9.523 1198	2612.8	25.64	26.39	1 27.7
26	11 38 2.61	-2.018	-5 5 4.6	-16.90	9.516 9244	-2548.7	26.00	26.76	1 23.0
27	11 37 10.02	2.363	5 11 14.8	13.94	9.510 8925	2476.7	26.37	27.14	1 18.2
28	11 36 9.20	2.704	5 16 12.8	10.88	9.505 0428	2396.7	26.73	27.51	1 13.3
29	11 35 0.28	3.039	5 19 56.5	7.74	9.499 3949	2308.5	27.08	27.87	1 8.2
30	11 33 43.41	3.365	5 22 23.7	4.52	9.493 9688	2211.7	27.42	28.22	1 3.0
31	11 32 18.84	-3.681	-5 23 32.9	-1.23	9.488 7857	-2106.1	27.75	28.56	0 57.6
Sept. 1	11 30 46.84	3.982	5 23 22.6	+2.10	9.483 8665	1991.7	28.06	28.88	0 52.2
2	11 29 7.86	4.266	5 21 52.0	5.46	9.479 2326	1868.4	28.36	29.19	0 46.6
3	11 27 22.24	4.532	5 19 0.3	8.85	9.474 9051	1736.4	28.64	29.48	0 40.9
4	11 25 30.52	4.775	5 14 47.4	12.22	9.470 9045	1596.0	28.91	29.76	0 35.1
5	11 23 33.24	-4.994	-5 9 13.8	+15.57	9.467 2508	-1447.4	29.16	30.01	0 29.3
6	11 21 31.05	5.184	5 2 20.6	18.85	9.463 9632	1291.0	29.38	30.24	0 23.3
7	11 19 24.62	5.346	4 54 9.3	22.06	9.461 0596	1127.6	29.58	30.44	0 17.3
8	11 17 14.69	5.475	4 44 42.5	25.15	9.458 5559	957.9	29.74	30.61	0 11.2
9	11 15 2.08	5.570	4 34 3.2	28.10	9.456 4662	782.7	29.89	30.76	0 5.1 23 58.9
10	11 12 47.61	-5.630	-4 22 15.0	+30.89	9.454 8025	-603.0	30.00	30.88	23 52.7
11	11 10 32.15	5.652	4 9 21.9	33.50	9.453 5745	419.9	30.09	30.97	23 46.6
12	11 8 16.59	5.638	3 55 28.8	35.89	9.452 7887	234.7	30.14	31.02	23 40.4
13	11 6 1.82	5.586	3 40 41.0	38.05	9.452 4489	-48.5	30.17	31.05	23 34.3
14	11 3 48.74	5.498	3 25 4.3	39.96	9.452 5558	+137.5	30.16	31.04	23 28.2
15	11 1 38.21	-5.374	-3 8 44.8	+41.61	9.453 1076	+322.0	30.12	31.00	23 22.2
16	10 59 31.07	5.215	2 51 49.0	42.99	9.454 0994	503.9	30.05	30.93	23 16.2
17	10 57 28.13	5.025	2 34 23.5	44.09	9.455 5236	682.2	29.95	30.83	23 10.3
18	10 55 30.13	4.803	2 16 34.8	44.92	9.457 3702	855.8	29.83	30.70	23 4.5
19	10 53 37.79	4.554	1 58 29.3	45.49	9.459 6269	1023.8	29.67	30.54	22 58.8
20	10 51 51.72	-4.280	-1 40 13.7	+45.77	9.462 2794	+1185.5	29.49	30.35	22 53.2
21	10 50 12.51	3.984	1 21 54.5	45.79	9.465 3120	1340.4	29.28	30.14	22 47.7
22	10 48 40.67	3.666	1 3 37.6	45.57	9.468 7074	1487.8	29.06	29.91	22 42.4
23	10 47 16.66	3.332	0 45 29.0	45.11	9.472 4472	1627.3	28.81	29.65	22 37.2
24	10 46 0.83	2.984	0 27 34.0	44.43	9.476 5118	1758.5	28.54	29.37	22 32.2
25	10 44 53.51	-2.624	-0 9 58.0	+43.54	9.480 8812	+1881.2	28.25	29.08	22 27.3
26	10 43 54.95	2.255	+0 7 14.4	42.46	9.485 5350	1995.6	27.95	28.77	22 22.5
27	10 43 5.35	1.878	0 23 58.6	41.20	9.490 4531	2101.4	27.64	28.45	22 17.9
28	10 42 24.85	1.496	0 40 10.6	39.78	9.495 6151	2198.8	27.31	28.11	22 13.4
29	10 41 53.54	1.112	0 55 46.8	38.22	9.501 0008	2287.9	26.97	27.76	22 9.1
30	10 41 31.46	-0.728	+1 10 44.0	+36.53	9.506 5904	+2368.8	26.63	27.41	22 4.9
Oct. 1	10 41 18.60	-0.344	+1 24 59.5	+34.74	9.512 3646	+2441.8	26.28	27.05	22 0.

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.	
	h	m	s	s	°	'	"	"			"	"	h m
Oct. 1	10	41	18.60	-0.344	+1	24	59.5	+34.74	9.512 3646	+2441.8	26.28	27.05	22 0.9
2	10	41	14.92	+0.037	1	38	30.8	32.85	9.518 3048	2507.1	25.92	26.68	21 57.1
3	10	41	20.35	0.415	1	51	15.7	30.88	9.524 3930	2565.2	25.56	26.31	21 53.4
4	10	41	34.78	0.787	2	3	12.4	28.84	9.530 6121	2616.3	25.19	25.93	21 49.8
5	10	41	58.07	1.153	2	14	19.6	26.74	9.536 9462	2661.0	24.83	25.56	21 46.4
6	10	42	30.06	+1.512	+2	24	36.0	+24.61	9.543 3799	+2699.4	24.46	25.18	21 43.1
7	10	43	10.57	1.863	2	34	0.8	22.44	9.549 8987	2731.9	24.11	24.81	21 40.0
8	10	43	59.43	2.207	2	42	33.1	20.25	9.556 4888	2758.9	23.74	24.43	21 37.0
9	10	44	56.43	2.541	2	50	12.5	18.04	9.563 1373	2780.7	23.38	24.06	21 34.1
10	10	46	1.33	2.866	2	56	58.8	15.82	9.569 8322	2797.6	23.02	23.69	21 31.4
11	10	47	13.93	+3.182	+3	2	51.9	+13.60	9.576 5622	+2810.1	22.67	23.33	21 28.8
12	10	48	33.98	3.488	3	7	51.8	11.39	9.583 3171	2818.3	22.32	22.97	21 26.3
13	10	50	1.26	3.783	3	11	58.8	9.19	9.590 0870	2822.6	21.97	22.61	21 23.9
14	10	51	35.50	4.068	3	15	13.3	7.02	9.596 8629	2823.4	21.63	22.26	21 21.6
15	10	53	16.45	4.343	3	17	35.9	4.87	9.603 6366	2820.9	21.30	21.92	21 19.5
16	10	55	3.87	+4.607	+3	19	7.1	+ 2.74	9.610 4010	+2815.6	20.97	21.58	21 17.4
17	10	56	57.50	4.861	3	19	47.7	+ 0.65	9.617 1495	2807.7	20.65	21.25	21 15.5
18	10	58	57.10	5.104	3	19	38.5	- 1.41	9.623 8763	2797.6	20.33	20.92	21 13.6
19	11	1	2.42	5.338	3	18	40.2	3.44	9.630 5761	2785.3	20.01	20.60	21 11.8
20	11	3	13.23	5.562	3	16	53.8	5.42	9.637 2442	2771.3	19.71	20.29	21 10.1
21	11	5	29.30	+5.776	+3	14	20.2	- 7.27	9.643 8771	+2755.7	19.41	19.98	21 8.5
22	11	7	50.40	5.981	3	11	0.2	9.28	9.650 4704	2738.6	19.12	19.68	21 7.0
23	11	10	16.33	6.178	3	6	54.9	11.15	9.657 0216	2720.4	18.83	19.38	21 5.6
24	11	12	46.87	6.366	3	2	5.2	12.98	9.663 5279	2701.3	18.56	19.10	21 4.2
25	11	15	21.82	6.546	2	56	32.1	14.77	9.669 9871	2681.2	18.28	18.81	21 2.9
26	11	18	1.00	+6.718	+2	50	16.6	-16.52	9.676 3971	+2660.3	18.01	18.54	21 1.7
27	11	20	44.23	6.883	2	43	19.6	18.22	9.682 7562	2638.8	17.75	18.27	21 0.5
28	11	23	31.35	7.042	2	35	42.2	19.89	9.689 0628	2616.7	17.50	18.01	20 59.4
29	11	26	22.18	7.193	2	27	25.3	21.52	9.695 3160	2594.2	17.25	17.75	20 58.4
30	11	29	16.57	7.338	2	18	29.8	23.10	9.701 5146	2571.3	17.00	17.50	20 57.4
31	11	32	14.38	+7.478	+2	8	56.8	-24.64	9.707 6579	+2548.1	16.76	17.25	20 56.5
Nov. 1	11	35	15.46	7.611	1	58	47.3	26.14	9.713 7451	2524.6	16.53	17.01	20 55.6
2	11	38	19.68	7.740	1	48	2.2	27.61	9.719 7757	2500.9	16.30	16.78	20 54.8
3	11	41	26.92	7.863	1	36	42.5	29.03	9.725 7494	2477.1	16.08	16.55	20 54.0
4	11	44	37.07	7.982	1	24	49.0	30.42	9.731 6658	2453.2	15.86	16.32	20 53.3
5	11	47	50.01	+8.096	+1	12	22.8	-31.76	9.737 5246	+2429.2	15.65	16.11	20 52.6
6	11	51	5.65	8.207	0	59	24.7	33.07	9.743 3258	2406.1	15.44	15.89	20 51.9
7	11	54	23.89	8.313	0	45	55.9	34.33	9.749 0690	2380.9	15.23	15.68	20 51.3
8	11	57	44.64	8.415	0	31	57.2	35.55	9.754 7541	2356.7	15.04	15.48	20 50.8
9	12	1	7.80	8.515	0	17	29.8	36.73	9.760 3809	2332.3	14.85	15.28	20 50.3
10	12	4	33.31	+8.610	+0	2	34.4	-37.88	9.765 9492	+2308.0	14.65	15.08	20 49.8
11	12	8	1.07	8.708	-0	12	48.0	38.98	9.771 4591	2283.6	14.47	14.89	20 49.3
12	12	11	31.02	8.792	0	28	36.2	40.03	9.776 9105	2259.3	14.29	14.71	20 48.9
13	12	15	3.06	8.878	0	44	49.2	41.05	9.782 3036	2234.9	14.12	14.53	20 48.5
14	12	18	37.14	8.961	1	1	26.1	42.02	9.787 6383	2210.7	13.94	14.35	20 48.2
15	12	22	13.18	+9.042	-1	18	25.9	-42.96	9.792 9151	+2186.6	13.78	14.18	20 47.9
16	12	25	51.12	+9.120	-1	35	47.6	-43.85	9.798 1343	+2162.7	13.61	14.01	20 47.6

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
ov. 16	12 25 51.12	+ 9.120	- 1 35 47.6	-43.85	9.798 1343	+2162.7	13.61	14.01	20 47.6
17	12 29 30.90	9.198	1 53 30.2	44.69	9.803 2963	2139.0	13.45	13.84	20 47.3
18	12 33 12.45	9.268	2 11 32.5	45.50	9.808 4016	2115.5	13.29	13.68	20 47.1
19	12 36 55.74	9.339	2 29 53.7	46.27	9.813 4507	2092.2	13.14	13.52	20 46.9
20	12 40 40.71	9.408	2 48 32.9	46.99	9.818 4443	2069.2	12.99	13.37	20 46.7
21	12 44 27.31	+ 9.475	- 3 7 29.0	-47.68	9.823 3829	+2046.4	12.84	13.22	20 46.6
22	12 48 15.51	9.541	3 26 41.0	48.32	9.828 2671	2023.9	12.70	13.07	20 46.5
23	12 52 5.27	9.605	3 46 8.0	48.93	9.833 0978	2001.7	12.55	12.92	20 46.4
24	12 55 56.56	9.669	4 5 49.1	49.49	9.837 8757	1979.9	12.42	12.78	20 46.3
25	12 59 49.35	9.730	4 25 43.3	50.02	9.842 6015	1958.3	12.28	12.64	20 46.3
26	13 3 43.61	+ 9.791	- 4 45 49.6	-50.50	9.847 2760	+1937.1	12.15	12.51	20 46.3
27	13 7 39.33	9.851	5 6 7.2	50.95	9.851 8999	1916.2	12.03	12.38	20 46.3
28	13 11 36.47	9.910	5 26 35.1	51.37	9.856 4738	1895.5	11.90	12.25	20 46.3
29	13 15 35.03	9.969	5 47 12.5	51.74	9.860 9986	1875.2	11.77	12.12	20 46.3
30	13 19 34.99	10.027	6 7 58.3	52.07	9.865 4748	1855.1	11.66	12.00	20 46.4
ec. 1	13 23 36.34	+10.085	- 6 28 51.8	-52.37	9.869 9032	+1835.3	11.53	11.87	20 46.5
2	13 27 39.07	10.143	6 49 51.9	52.63	9.874 2846	1815.8	11.42	11.75	20 46.6
3	13 31 43.18	10.200	7 10 57.9	52.86	9.878 6195	1796.7	11.31	11.64	20 46.8
4	13 35 48.66	10.257	7 32 8.8	53.04	9.882 9088	1777.8	11.19	11.52	20 47.0
5	13 39 55.52	10.315	7 53 23.7	53.19	9.887 1529	1759.0	11.09	11.41	20 47.2
6	13 44 3.76	+10.372	- 8 14 41.7	-53.30	9.891 3522	+1740.4	10.98	11.30	20 47.4
7	13 48 13.37	10.429	8 36 2.0	53.38	9.895 5072	1722.1	10.87	11.19	20 47.6
8	13 52 24.36	10.487	8 57 23.6	53.41	9.899 6186	1704.0	10.78	11.09	20 47.9
9	13 56 36.74	10.544	9 18 45.6	53.41	9.903 6866	1686.0	10.67	10.98	20 48.2
10	14 0 50.40	10.602	9 40 7.2	53.38	9.907 7115	1668.1	10.57	10.88	20 48.5
11	14 5 5.62	+10.659	-10 1 27.3	-53.30	9.911 6937	+1650.4	10.47	10.78	20 48.8
12	14 9 22.14	10.717	10 22 45.1	53.18	9.915 6335	1632.8	10.39	10.69	20 49.1
13	14 13 40.04	10.774	10 43 59.6	53.03	9.919 5314	1615.5	10.29	10.59	20 49.5
14	14 17 59.31	10.832	11 5 10.0	52.83	9.923 3878	1598.2	10.20	10.50	20 49.9
15	14 22 19.96	10.889	11 26 15.2	52.60	9.927 2031	1581.2	10.11	10.41	20 50.3
16	14 26 41.98	+10.946	-11 47 14.4	-52.33	9.930 9777	+1564.4	10.03	10.32	20 50.8
17	14 31 5.37	11.003	12 8 6.6	52.02	9.934 7123	1547.8	9.94	10.23	20 51.3
18	14 35 30.13	11.060	12 28 51.0	51.67	9.938 4072	1531.4	9.85	10.14	20 51.8
19	14 39 56.25	11.117	12 49 26.6	51.29	9.942 0631	1515.2	9.77	10.06	20 52.3
20	14 44 23.75	11.174	13 9 52.6	50.87	9.945 6805	1499.3	9.69	9.97	20 52.8
21	14 48 52.61	+11.231	-13 30 8.1	-50.41	9.949 2598	+1483.5	9.61	9.89	20 53.3
22	14 53 22.84	11.288	13 50 12.1	49.92	9.952 8017	1468.1	9.53	9.81	20 53.9
23	14 57 54.43	11.345	14 10 3.8	49.39	9.956 3066	1452.7	9.45	9.73	20 54.5
24	15 2 27.38	11.402	14 29 42.4	48.82	9.959 7750	1437.7	9.38	9.65	20 55.1
25	15 7 1.70	11.458	14 49 6.9	48.22	9.963 2077	1422.9	9.31	9.58	20 55.8
26	15 11 37.37	+11.515	-15 8 16.5	-47.58	9.966 6050	+1408.3	9.23	9.50	20 56.5
27	15 16 14.40	11.571	15 27 10.3	46.90	9.969 9677	1394.0	9.16	9.43	20 57.2
28	15 20 52.78	11.628	15 45 47.5	46.19	9.973 2962	1379.9	9.09	9.36	20 57.9
29	15 25 32.52	11.684	16 4 7.3	45.45	9.976 5912	1366.0	9.03	9.29	20 58.6
30	15 30 13.61	11.740	16 22 8.8	44.67	9.979 8531	1352.3	8.96	9.22	20 59.4
31	15 34 56.04	+11.796	-16 39 51.2	-43.86	9.983 0824	+1338.8	8.89	9.15	21 0.2
32	15 39 39.82	+11.852	-16 57 13.7	-43.01	9.986 2797	+1325.6	8.82	9.08	21 1.0

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		" ' "	" ' "	" "	" ' "	" "		
Jan.	1	301 52 43.8	1 34 50.9	+3 0.9	-2 26 22.8	-3 54.3	9.862 2580	+118
	3	305 2 26.2	1 34 51.6	2 59.2	2 33 57.8	3 40.6	9.862 2772	73
	5	308 12 10.2	1 34 52.4	2 55.2	2 41 4.7	3 26.2	9.862 2873	+ 28
	7	311 21 55.9	1 34 53.4	2 49.1	2 47 42.2	3 11.2	9.862 2884	- 17
	9	314 31 43.9	1 34 54.6	2 41.0	2 53 49.1	2 55.6	9.862 2804	63
	11	317 41 34.4	1 34 56.0	+2 30.9	-2 59 24.3	-2 39.5	9.862 2634	-108
	13	320 51 28.0	1 34 57.6	2 19.0	3 4 26.8	2 22.9	9.862 2374	153
	15	324 1 24.9	1 34 59.3	2 5.3	3 8 55.5	2 5.8	9.862 2024	197
	17	327 11 25.3	1 35 1.1	1 50.2	3 12 49.8	1 48.4	9.862 1586	241
	19	330 21 29.6	1 35 3.2	1 33.7	3 16 8.9	1 30.6	9.862 1062	284
	21	333 31 38.1	1 35 5.3	+1 16.0	-3 18 52.1	-1 12.6	9.862 0451	-326
	23	336 41 50.9	1 35 7.5	0 57.4	3 20 59.0	0 54.3	9.861 9758	367
	25	339 52 8.2	1 35 9.8	0 38.1	3 22 29.0	0 35.7	9.861 8983	407
	27	343 2 30.3	1 35 12.3	+0 18.3	3 23 21.9	-0 17.1	9.861 8129	446
	29	346 12 57.3	1 35 14.8	-0 1.7	3 23 37.4	+0 1.6	9.861 7198	484
	31	349 23 29.4	1 35 17.3	-0 21.7	-3 23 15.6	+0 20.2	9.861 6194	-520
Feb.	2	352 34 6.7	1 35 20.0	0 41.4	3 22 16.4	0 38.9	9.861 5118	555
	4	355 44 49.3	1 35 22.7	1 0.7	3 20 39.9	0 57.5	9.861 3974	588
	6	358 55 37.4	1 35 25.4	1 19.2	3 18 26.4	1 16.0	9.861 2767	619
	8	2 6 31.0	1 35 28.2	1 36.7	3 15 36.1	1 34.2	9.861 1498	649
	10	5 17 30.3	1 35 31.1	-1 53.1	-3 12 9.6	+1 52.2	9.861 0173	-676
	12	8 28 35.4	1 35 34.0	2 8.0	3 8 7.5	2 9.9	9.860 8794	702
	14	11 39 46.2	1 35 36.9	2 21.4	3 3 30.4	2 27.2	9.860 7367	725
	16	14 51 3.0	1 35 39.9	2 33.1	2 58 19.1	2 44.1	9.860 5896	746
	18	18 2 25.8	1 35 42.9	2 42.9	2 52 34.5	3 0.4	9.860 4384	765
	20	21 13 54.6	1 35 45.9	-2 50.7	-2 46 17.7	+3 16.3	9.860 2837	-781
	22	24 25 29.6	1 35 49.0	2 56.3	2 39 29.6	3 31.6	9.860 1260	796
	24	27 37 10.8	1 35 52.2	2 59.8	2 32 11.6	3 46.3	9.859 9656	808
	26	30 48 58.4	1 35 55.4	3 1.0	2 24 24.8	4 0.3	9.859 8031	817
	28	34 0 52.3	1 35 58.6	3 0.0	2 16 10.8	4 13.6	9.859 6391	823
Mar.	2	37 12 52.7	1 36 1.8	-2 56.8	-2 7 30.9	+4 26.2	9.859 4740	-827
	4	40 24 59.7	1 36 5.2	2 51.3	1 58 26.7	4 37.9	9.859 3083	829
	6	43 37 13.4	1 36 8.6	2 43.7	1 48 59.9	4 48.8	9.859 1426	828
	8	46 49 33.9	1 36 11.9	2 34.0	1 39 12.2	4 58.8	9.858 9773	824
	10	50 2 1.1	1 36 15.3	2 22.4	1 29 5.5	5 7.8	9.858 8131	818
	12	53 14 35.2	1 36 18.8	-2 9.0	-1 18 41.6	+5 16.0	9.858 6503	-809
	14	56 27 16.4	1 36 22.3	1 54.0	1 8 2.3	5 23.1	9.858 4896	797
	16	59 40 4.6	1 36 25.9	1 37.5	0 57 9.8	5 29.3	9.858 3315	783
	18	62 53 0.0	1 36 29.5	1 19.8	0 46 6.0	5 34.4	9.858 1764	767
	20	66 6 2.6	1 36 33.1	1 1.1	0 34 53.1	5 38.4	9.858 0248	748
	22	69 19 12.3	1 36 36.7	-0 41.6	-0 23 33.0	+5 41.4	9.857 8773	-727
	24	72 32 29.3	1 36 40.3	0 21.5	0 12 8.1	5 43.3	9.857 7342	703
	26	75 45 53.5	1 36 43.9	-0 1.2	-0 0 40.4	5 44.2	9.857 5961	677
	28	78 59 24.9	1 36 47.5	+0 19.2	+0 10 47.9	5 43.9	9.857 4635	649
	30	82 13 3.5	1 36 51.1	0 39.3	0 22 14.5	5 42.5	9.857 3367	619
Apr.	1	85 26 49.3	1 36 54.6	+0 59.0	+0 33 37.3	+5 40.1	9.857 2161	-587
	3	88 40 42.0	1 36 58.1	+1 17.8	+0 44 54.0	+5 36.5	9.857 1022	-552

VENUS, 1919.

159

FOR GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	° ' "	° ' "	' "	° ' "	' "		
pr. 1	85 26 49.3	1 36 54.6	+0 59.0	+0 33 37.3	+5 40.1	9.857 2161	-587
3	88 40 42.0	1 36 58.1	1 17.8	0 44 54.0	5 36.5	9.857 1022	552
5	91 54 41.7	1 37 1.5	1 35.8	0 56 2.5	5 31.8	9.856 9954	516
7	95 8 48.1	1 37 4.9	1 52.5	1 7 0.6	5 26.1	9.856 8959	479
9	98 23 1.1	1 37 8.1	2 7.8	1 17 46.2	5 19.3	9.856 8041	439
11	101 37 20.5	1 37 11.2	+2 21.4	+1 28 17.1	+5 11.5	9.856 7204	-398
13	104 51 45.9	1 37 14.2	2 33.3	1 38 31.4	5 2.6	9.856 6449	356
15	108 6 17.2	1 37 17.0	2 43.2	1 48 26.9	4 52.8	9.856 5779	313
17	111 20 53.8	1 37 19.6	2 51.0	1 58 1.8	4 42.6	9.856 5197	269
19	114 35 35.6	1 37 22.1	2 56.6	2 7 14.1	4 30.2	9.856 4705	223
21	117 50 22.0	1 37 24.3	+3 0.0	+2 16 2.1	+4 17.6	9.856 4304	-178
23	121 5 12.7	1 37 26.3	3 1.0	2 24 24.0	4 4.2	9.856 3995	131
25	124 20 7.0	1 37 28.0	2 59.7	2 32 18.2	3 49.9	9.856 3779	84
27	127 35 4.6	1 37 29.5	2 56.2	2 39 43.1	3 34.9	9.856 3658	-37
29	130 50 4.9	1 37 30.7	2 50.3	2 46 37.2	3 19.1	9.856 3631	+10
ay 1	134 5 7.2	1 37 31.6	+2 42.3	+2 52 59.1	+3 2.8	9.856 3699	+58
3	137 20 11.0	1 37 32.2	2 32.2	2 58 47.8	2 45.8	9.856 3862	105
5	140 35 15.7	1 37 32.4	2 20.1	3 4 1.9	2 28.2	9.856 4118	151
7	143 50 20.4	1 37 32.3	2 6.2	3 8 40.5	2 10.3	9.856 4467	198
9	147 5 24.7	1 37 31.9	1 50.7	3 12 42.7	1 51.8	9.856 4908	243
11	150 20 27.8	1 37 31.1	+1 33.8	+3 16 7.6	+1 33.1	9.856 5439	+288
13	153 35 29.0	1 37 30.0	1 15.7	3 18 54.8	1 14.0	9.856 6059	332
15	156 50 27.5	1 37 28.5	0 56.6	3 21 3.6	0 54.8	9.856 6765	374
17	160 5 22.8	1 37 26.7	0 36.8	3 22 33.7	0 35.3	9.856 7556	416
19	163 20 14.0	1 37 24.5	+0 16.5	3 23 24.8	+0 15.8	9.856 8428	456
21	166 35 0.6	1 37 22.0	-0 4.0	+3 23 36.8	-0 3.8	9.856 9378	+495
23	169 49 41.8	1 37 19.1	0 24.4	3 23 9.7	0 23.3	9.857 0405	532
25	173 4 16.9	1 37 16.0	0 44.5	3 22 3.7	0 42.7	9.857 1503	567
27	176 18 45.4	1 37 12.5	1 4.0	3 20 19.0	1 2.0	9.857 2670	600
29	179 33 6.6	1 37 8.7	1 22.7	3 17 56.0	1 21.0	9.857 3901	631
31	182 47 20.0	1 37 4.7	-1 40.3	+3 14 55.2	-1 30.7	9.857 5193	+661
une 2	186 1 25.1	1 37 0.4	1 56.6	3 11 17.4	1 58.1	9.857 6542	688
4	189 15 21.3	1 36 55.8	2 11.5	3 7 3.2	2 16.0	9.857 7943	713
6	192 29 8.1	1 36 51.0	2 24.6	3 2 13.6	2 33.5	9.857 9391	735
8	195 42 45.3	1 36 46.1	2 35.9	2 56 49.6	2 50.4	9.858 0882	755
10	198 56 12.4	1 36 41.0	-2 45.3	+2 50 52.3	-3 6.8	9.858 2411	+773
12	202 9 29.2	1 36 35.7	2 52.5	2 44 22.9	3 22.5	9.858 3974	789
14	205 22 35.3	1 36 30.4	2 57.6	2 37 22.6	3 37.6	9.858 5564	801
16	208 35 30.7	1 36 25.0	3 0.4	2 29 53.0	3 51.9	9.858 7178	812
18	211 48 15.2	1 36 19.5	3 1.0	2 21 55.5	4 5.5	9.858 8810	820
20	215 0 48.7	1 36 14.0	-2 59.2	+2 13 31.6	-4 18.2	9.859 0455	+825
22	218 13 11.2	1 36 8.5	2 55.3	2 4 43.1	4 30.2	9.859 2108	827
24	221 25 22.7	1 36 3.0	2 49.1	1 55 31.5	4 41.3	9.859 3763	827
26	224 37 23.3	1 35 57.6	2 40.9	1 45 58.8	4 51.4	9.859 5415	825
28	227 49 13.1	1 35 52.3	2 30.6	1 36 6.7	5 0.6	9.859 7060	820
30	231 0 52.4	1 35 47.1	-2 18.5	+1 25 57.2	-5 8.8	9.859 8692	+812
uly 2	234 12 21.4	1 35 42.0	-2 4.7	+1 15 32.1	-5 16.1	9.860 0306	+802

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		" ' "	" ' "	" "	" ' "	" "		
July	2	234 12 21.4	1 35 42.0	-2 4.7	+1 15 32.1	-5 16.1	9.860 0306	+802
	4	237 23 40.4	1 35 37.0	1 49.3	1 4 53.4	5 22.4	9.860 1897	789
	6	240 34 49.7	1 35 32.3	1 32.6	0 54 3.2	5 27.7	9.860 3460	774
	8	243 45 49.7	1 35 27.7	1 14.8	0 43 3.4	5 32.0	9.860 4991	756
	10	246 56 40.8	1 35 23.4	0 56.0	0 31 56.1	5 35.2	9.860 6484	737
	12	250 7 23.4	1 35 19.3	-0 36.6	+0 20 43.3	-5 37.4	9.860 7936	+715
	14	253 17 58.0	1 35 15.4	-0 16.8	+0 9 27.2	5 38.5	9.860 9342	691
	16	256 28 25.2	1 35 11.8	+0 3.3	-0 1 50.2	5 38.7	9.861 0697	664
	18	259 38 45.5	1 35 8.5	0 23.3	0 13 6.9	5 37.8	9.861 1998	636
	20	262 48 59.3	1 35 5.4	0 43.0	0 24 20.8	5 35.9	9.861 3240	606
	22	265 59 7.4	1 35 2.7	+1 2.1	-0 35 29.8	-5 33.0	9.861 4420	+574
	24	269 9 10.1	1 35 0.2	1 20.5	0 46 32.0	5 29.0	9.861 5535	541
	26	272 19 8.2	1 34 58.0	1 37.9	0 57 25.3	5 24.1	9.861 6581	505
	28	275 29 2.1	1 34 56.1	1 54.1	1 8 7.8	5 18.2	9.861 7555	468
	30	278 38 52.6	1 34 54.5	2 8.9	1 18 37.5	5 11.4	9.861 8454	430
Aug.	1	281 48 40.1	1 34 53.1	+2 22.2	-1 28 52.7	-5 3.6	9.861 9275	+391
	3	284 58 25.2	1 34 52.1	2 33.7	1 38 51.4	4 54.9	9.862 0016	350
	5	288 8 8.6	1 34 51.3	2 43.3	1 48 31.8	4 45.4	9.862 0676	309
	7	291 17 50.7	1 34 50.8	2 50.9	1 57 52.3	4 35.0	9.862 1251	266
	9	294 27 32.1	1 34 50.6	2 56.4	2 6 51.1	4 23.7	9.862 1741	223
	11	297 37 13.3	1 34 50.6	+2 59.8	-2 15 26.7	-4 11.7	9.862 2143	+179
	13	300 46 54.8	1 34 50.9	3 1.0	2 23 37.5	3 58.9	9.862 2457	135
	15	303 56 37.2	1 34 51.4	3 0.0	2 31 22.0	3 45.4	9.862 2682	90
	17	307 6 20.7	1 34 52.2	2 56.8	2 38 38.8	3 31.3	9.862 2816	+ 45
	19	310 16 6.0	1 34 53.2	2 51.5	2 45 26.7	3 16.5	9.862 2861	0
	21	313 25 53.4	1 34 54.3	+2 44.1	-2 51 44.5	-3 1.1	9.862 2815	- 46
	23	316 35 43.2	1 34 55.6	2 34.6	2 57 30.8	2 45.2	9.862 2679	91
	25	319 45 35.9	1 34 57.1	2 23.3	3 2 44.8	2 28.7	9.862 2453	135
	27	322 55 31.7	1 34 58.8	2 10.3	3 7 25.4	2 11.8	9.862 2139	179
	29	326 5 31.1	1 35 0.6	1 55.6	3 11 31.8	1 54.5	9.862 1736	223
	31	329 15 34.2	1 35 2.5	+1 39.6	-3 15 3.2	-1 36.8	9.862 1246	-267
Sept.	2	332 25 41.3	1 35 4.6	1 22.3	3 17 59.0	1 18.9	9.862 0670	309
	4	335 35 52.6	1 35 6.8	1 4.0	3 20 18.6	1 0.7	9.862 0011	350
	6	338 46 8.4	1 35 9.1	0 44.9	3 22 1.5	0 42.2	9.861 9270	390
	8	341 56 28.9	1 35 11.4	0 25.3	3 23 7.3	0 23.6	9.861 8450	430
	10	345 6 54.2	1 35 13.9	+0 5.3	-3 23 35.9	-0 5.0	9.861 7552	-468
	12	348 17 24.5	1 35 16.4	-0 14.7	3 23 27.2	+0 13.7	9.861 6580	504
	14	351 27 59.9	1 35 19.0	0 34.6	3 22 41.0	0 32.5	9.861 5537	539
	16	354 38 40.5	1 35 21.7	0 54.0	3 21 17.4	0 51.1	9.861 4424	573
	18	357 49 26.6	1 35 24.4	1 12.8	3 19 16.7	1 9.6	9.861 3247	604
	20	1 0 18.1	1 35 27.1	-1 30.7	-3 16 39.2	+1 27.9	9.861 2008	-634
	22	4 11 15.1	1 35 29.9	1 47.5	3 13 25.3	1 45.9	9.861 0711	663
	24	7 22 17.9	1 35 32.8	2 3.0	3 9 35.6	2 3.7	9.860 9359	689
	26	10 33 26.4	1 35 35.7	2 17.0	3 5 10.6	2 21.2	9.860 7958	712
	28	13 44 40.7	1 35 38.6	2 29.2	3 0 11.1	2 38.2	9.860 6511	734
	30	16 56 0.9	1 35 41.6	-2 39.7	-2 54 38.0	+2 54.8	9.860 5022	-754
Oct.	2	20 7 27.1	1 35 44.6	-2 48.2	-2 48 32.3	+3 10.9	9.860 3497	-771

FOR GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	° ' "	° ' "	' "	° ' "	' "		
2	20 7 27.1	1 35 44.6	-2 48.2	-2 48 32.3	+3 10.9	9.860 3497	-771
4	23 18 59.3	1 35 47.6	2 54.6	2 41 54.9	3 26.4	9.860 1939	796
6	26 30 37.7	1 35 50.8	2 58.8	2 34 47.2	3 41.3	9.860 0353	799
8	29 42 22.4	1 35 53.9	3 0.8	2 27 10.3	3 55.5	9.859 8745	809
10	32 54 13.3	1 35 57.1	3 0.6	2 19 5.6	4 9.0	9.859 7119	817
12	36 6 10.7	1 36 0.3	-2 58.1	-2 10 34.6	+4 21.9	9.859 5480	-822
14	39 18 14.5	1 36 3.6	2 53.4	2 1 38.7	4 33.9	9.859 3833	824
16	42 30 25.0	1 36 6.9	2 46.6	1 52 19.7	4 45.0	9.859 2184	824
18	45 42 42.1	1 36 10.2	2 37.6	1 42 39.1	4 55.4	9.859 0537	822
20	48 55 5.9	1 36 13.6	2 26.7	1 32 38.9	5 4.7	9.858 8898	817
22	52 7 36.7	1 36 17.1	-2 13.9	-1 22 20.8	+5 13.2	9.858 7272	-809
24	55 20 14.3	1 36 20.5	1 59.4	1 11 46.8	5 20.7	9.858 5663	799
26	58 32 58.9	1 36 24.1	1 43.4	1 0 58.7	5 27.2	9.858 4077	786
28	61 45 50.6	1 36 27.6	1 26.1	0 49 58.7	5 32.8	9.858 2520	771
30	64 58 49.4	1 36 31.2	1 7.7	0 38 48.8	5 37.1	9.858 0995	753
r. 1	68 11 55.4	1 36 34.8	-0 48.5	-0 27 31.0	+5 40.5	9.857 9506	-733
3	71 25 8.6	1 36 38.4	0 28.6	0 16 7.6	5 42.8	9.857 8064	711
5	74 38 29.1	1 36 42.1	-0 8.3	-0 4 40.7	5 44.0	9.857 6667	686
7	77 51 56.8	1 36 45.6	+0 12.1	+0 6 47.6	5 44.1	9.857 5322	659
9	81 5 31.6	1 36 49.2	0 32.3	0 18 14.9	5 43.1	9.857 4033	630
11	84 19 13.6	1 36 52.8	+0 52.1	+0 29 39.2	+5 41.0	9.857 2805	-599
13	87 33 2.7	1 36 56.3	1 11.3	0 40 58.2	5 37.8	9.857 1640	566
15	90 46 58.8	1 36 59.8	1 29.6	0 52 9.8	5 33.6	9.857 0544	530
17	94 1 1.7	1 37 3.1	1 46.8	1 3 11.7	5 28.2	9.856 9520	494
19	97 15 11.2	1 37 6.4	2 2.6	1 14 1.8	5 21.8	9.856 8571	455
21	100 29 27.2	1 37 9.5	+2 16.8	+1 24 38.1	+5 14.3	9.856 7701	-415
23	103 43 49.3	1 37 12.6	2 29.3	1 34 58.3	5 5.8	9.856 6911	374
25	106 58 17.5	1 37 15.5	2 39.9	1 45 0.6	4 56.2	9.856 6205	332
27	110 12 51.2	1 37 18.2	2 48.5	1 54 42.9	4 45.8	9.856 5585	288
29	113 27 30.2	1 37 20.3	2 54.9	2 4 3.3	4 34.4	9.856 5054	243
c. 1	116 42 14.1	1 37 23.1	+2 59.1	+2 12 59.9	+4 22.1	9.856 4612	-196
3	119 57 2.3	1 37 26.2	3 0.9	2 21 31.2	4 9.0	9.856 4262	152
5	123 11 54.6	1 37 27.0	3 0.5	2 29 35.2	3 55.0	9.856 4004	106
7	126 26 50.3	1 37 28.6	2 57.7	2 37 10.5	3 40.2	9.856 3840	59
9	129 41 48.9	1 37 29.9	2 52.6	2 44 15.5	3 24.8	9.856 3769	-12
11	132 56 49.8	1 37 31.0	+2 45.3	+2 50 48.9	+3 8.6	9.856 3793	+36
13	136 11 52.5	1 37 31.7	2 35.9	2 56 49.3	2 51.8	9.856 3911	82
15	139 26 56.3	1 37 32.1	2 24.5	3 2 15.6	2 34.5	9.856 4122	129
17	142 42 0.6	1 37 32.2	2 11.3	3 7 6.8	2 16.6	9.856 4427	176
19	145 57 4.7	1 37 31.9	1 56.3	3 11 21.8	1 58.4	9.856 4824	221
21	149 12 7.8	1 37 31.2	+1 39.9	+3 15 0.0	+1 39.7	9.856 5311	+266
23	152 27 9.4	1 37 30.3	1 22.2	3 18 0.5	1 20.7	9.856 5887	310
25	155 42 8.7	1 37 29.0	1 3.4	3 20 22.8	1 1.5	9.856 6550	353
27	158 57 5.1	1 37 27.3	0 43.8	3 22 6.5	0 42.1	9.856 7298	395
29	162 11 57.7	1 37 25.2	0 23.7	3 23 11.3	0 22.6	9.856 8128	428
31	165 26 45.9	1 37 22.9	+0 3.2	+3 23 37.0	+0 3.1	9.856 9039	+474
33	168 41 29.1	1 37 20.2	-0 17.2	+3 23 23.6	-0 16.4	9.857 0028	+512

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	" "	" "					h m
Jan. 1	20 49 8.35	+8.007	-19 0 7.8	+32.24	0.332 4354	+265.2	2.35	4.09	2 8.7
2	20 52 20.31	7.990	18 47 7.9	32.75	0.333 0707	264.2	2.35	4.09	2 8.0
3	20 55 31.85	7.972	18 33 55.9	33.25	0.333 7037	263.3	2.34	4.08	2 7.2
4	20 58 42.97	7.954	18 20 31.9	33.74	0.334 3343	262.2	2.34	4.07	2 6.5
5	21 1 53.64	7.936	18 6 56.3	34.23	0.334 9625	261.3	2.34	4.07	2 5.7
6	21 5 3.88	+7.917	-17 53 9.1	+34.70	0.335 5884	+260.3	2.33	4.06	2 4.9
7	21 8 13.67	7.899	17 39 10.7	35.17	0.336 2120	259.4	2.33	4.06	2 4.2
8	21 11 23.01	7.880	17 25 1.1	35.63	0.336 8333	258.4	2.32	4.05	2 3.4
9	21 14 31.89	7.860	17 10 40.6	36.08	0.337 4524	257.5	2.32	4.05	2 2.6
10	21 17 40.31	7.841	16 56 9.4	36.52	0.338 0693	256.6	2.32	4.04	2 1.8
11	21 20 48.28	+7.823	-16 41 27.8	+36.95	0.338 6842	+255.8	2.31	4.03	2 1.0
12	21 23 55.79	7.803	16 26 35.9	37.37	0.339 2972	255.0	2.31	4.03	2 0.1
13	21 27 2.84	7.784	16 11 33.9	37.79	0.339 9083	254.2	2.31	4.02	1 59.3
14	21 30 9.43	7.765	15 56 22.0	38.20	0.340 5176	253.5	2.31	4.02	1 58.5
15	21 33 15.57	7.746	15 41 0.4	38.60	0.341 1253	252.9	2.30	4.01	1 57.7
16	21 36 21.25	+7.727	-15 25 29.3	+38.99	0.341 7313	+252.2	2.30	4.01	1 56.8
17	21 39 26.48	7.709	15 9 48.9	39.37	0.342 3357	251.5	2.30	4.00	1 55.9
18	21 42 31.26	7.690	14 53 59.4	39.75	0.342 9385	250.8	2.30	4.00	1 55.1
19	21 45 35.59	7.671	14 38 0.9	40.12	0.343 5397	250.1	2.29	3.99	1 54.2
20	21 48 39.49	7.653	14 21 53.8	40.47	0.344 1392	249.5	2.28	3.98	1 53.3
21	21 51 42.95	+7.635	-14 5 38.2	+40.82	0.344 7371	+248.8	2.28	3.98	1 52.4
22	21 54 45.98	7.617	13 49 14.3	41.17	0.345 3334	248.1	2.28	3.97	1 51.5
23	21 57 48.58	7.600	13 32 42.3	41.50	0.345 9280	247.4	2.28	3.97	1 50.7
24	22 0 50.76	7.582	13 16 2.4	41.82	0.346 5209	246.7	2.27	3.96	1 49.8
25	22 3 52.51	7.564	12 59 14.9	42.14	0.347 1120	245.9	2.27	3.96	1 48.8
26	22 6 53.85	+7.547	-12 42 19.9	+42.45	0.347 7014	+245.2	2.27	3.95	1 47.9
27	22 9 54.77	7.530	12 25 17.6	42.74	0.348 2888	244.4	2.27	3.95	1 47.0
28	22 12 55.29	7.513	12 8 8.3	43.03	0.348 8743	243.5	2.26	3.94	1 46.1
29	22 15 55.40	7.496	11 50 52.2	43.31	0.349 4578	242.7	2.26	3.94	1 45.1
30	22 18 55.11	7.480	11 33 29.5	43.58	0.350 0393	241.9	2.26	3.93	1 44.2
31	22 21 54.43	+7.463	-11 16 0.4	+43.84	0.350 6187	+241.0	2.26	3.93	1 43.2
Feb. 1	22 24 53.35	7.447	10 58 25.2	44.09	0.351 1960	240.1	2.25	3.92	1 42.3
2	22 27 51.89	7.431	10 40 44.1	44.33	0.351 7713	239.3	2.24	3.91	1 41.3
3	22 30 50.04	7.415	10 22 57.3	44.57	0.352 3444	238.4	2.24	3.91	1 40.3
4	22 33 47.82	7.399	10 5 5.0	44.79	0.352 9154	237.5	2.24	3.90	1 39.3
5	22 36 45.21	+7.383	-9 47 7.4	+45.01	0.353 4842	+236.5	2.24	3.90	1 38.3
6	22 39 42.23	7.368	9 29 4.8	45.21	0.354 0508	235.6	2.23	3.89	1 37.3
7	22 42 38.88	7.353	9 10 57.3	45.41	0.354 6152	234.7	2.23	3.89	1 36.3
8	22 45 35.17	7.338	8 52 45.3	45.59	0.355 1776	233.9	2.23	3.88	1 35.3
9	22 48 31.11	7.323	8 34 28.9	45.77	0.355 7381	233.1	2.23	3.88	1 34.3
10	22 51 26.69	+7.309	-8 16 8.3	+45.94	0.356 2966	+232.3	2.22	3.87	1 33.3
11	22 54 21.93	7.295	7 57 43.7	46.11	0.356 8532	231.5	2.22	3.87	1 32.3
12	22 57 16.84	7.281	7 39 15.3	46.26	0.357 4080	230.8	2.22	3.86	1 31.3
13	23 0 11.42	7.267	7 20 43.3	46.41	0.357 9610	230.0	2.22	3.86	1 30.2
14	23 3 5.68	7.254	7 2 7.9	46.54	0.358 5122	229.3	2.21	3.85	1 29.2
15	23 5 59.64	+7.242	-6 43 29.3	+46.67	0.359 0617	+228.5	2.21	3.85	1 28.2
16	23 8 53.29	+7.230	-6 24 47.8	+46.79	0.359 6093	+227.8	2.20	3.84	1 27.2

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	h	m	s		°	'	"							h	m
16	23	8	53.29	+7.230	-6	24	47.8	+46.79	0.359 6093	+227.8	2.20	3.84	1 27.1
17	23	11	46.66	7.218	6	6	3.3	46.91	0.360 1551	227.0	2.20	3.84	1 26.1
18	23	14	39.74	7.206	5	47	16.3	47.01	0.360 6991	226.3	2.20	3.84	1 25.0
19	23	17	32.55	7.195	5	28	26.9	47.11	0.361 2412	225.5	2.20	3.83	1 23.9
20	23	20	25.10	7.184	5	9	35.2	47.20	0.361 7813	224.6	2.20	3.83	1 22.9
21	23	23	17.40	+7.174	-4	50	41.5	+47.28	0.362 3195	+223.8	2.19	3.82	1 21.8
22	23	26	9.45	7.164	4	31	45.9	47.35	0.362 8557	223.0	2.19	3.82	1 20.7
23	23	29	1.26	7.154	4	12	48.7	47.42	0.363 3898	222.1	2.19	3.81	1 19.7
24	23	31	52.85	7.145	3	53	49.9	47.47	0.363 9218	221.1	2.19	3.81	1 18.6
25	23	34	44.21	7.136	3	34	50.0	47.52	0.364 4514	220.2	2.18	3.80	1 17.5
26	23	37	35.37	+7.128	-3	15	49.0	+47.56	0.364 9788	+219.3	2.18	3.80	1 16.4
27	23	40	26.33	7.119	2	56	47.1	47.59	0.365 5038	218.3	2.18	3.79	1 15.3
28	23	43	17.09	7.111	2	37	44.6	47.62	0.366 0264	217.2	2.18	3.79	1 14.2
1	23	46	7.66	7.103	2	18	41.6	47.63	0.366 5463	216.1	2.17	3.78	1 13.1
2	23	48	58.05	7.096	1	59	38.4	47.64	0.367 0636	215.0	2.17	3.78	1 12.0
3	23	51	48.27	+7.089	-1	40	35.1	+47.64	0.367 5782	+213.9	2.16	3.77	1 10.9
4	23	54	38.32	7.082	1	21	31.9	47.63	0.368 0901	212.7	2.16	3.77	1 9.8
5	23	57	28.20	7.075	1	2	29.1	47.61	0.368 5993	211.6	2.16	3.77	1 8.7
6	0	0	17.93	7.069	0	43	26.8	47.58	0.369 1057	210.4	2.16	3.76	1 7.6
7	0	3	7.50	7.063	0	24	25.3	47.54	0.369 6094	209.3	2.16	3.76	1 6.5
8	0	5	56.94	+7.057	-0	5	24.7	+47.50	0.370 1103	+208.2	2.15	3.75	1 5.3
9	0	8	46.24	7.052	+0	13	34.8	47.45	0.370 6086	207.1	2.15	3.75	1 4.2
10	0	11	35.42	7.047	0	32	33.0	47.39	0.371 1042	206.0	2.15	3.74	1 3.1
11	0	14	24.48	7.042	0	51	29.7	47.33	0.371 5972	204.8	2.15	3.74	1 2.0
12	0	17	13.44	7.038	1	10	24.9	47.26	0.372 0875	203.7	2.15	3.74	1 0.8
13	0	20	2.29	+7.033	+1	29	18.2	+47.18	0.372 5752	+202.7	2.14	3.73	0 59.7
14	0	22	51.04	7.029	1	48	9.5	47.10	0.373 0603	201.6	2.14	3.73	0 58.6
15	0	25	39.71	7.026	2	6	58.7	47.00	0.373 5427	200.5	2.14	3.72	0 57.5
16	0	28	28.31	7.024	2	25	45.5	46.90	0.374 0226	199.4	2.14	3.72	0 56.3
17	0	31	16.85	7.021	2	44	29.9	46.79	0.374 4998	198.3	2.14	3.72	0 55.2
18	0	34	5.33	+7.019	+3	3	11.5	+46.68	0.374 9744	+197.2	2.13	3.71	0 54.1
19	0	36	53.77	7.017	3	21	50.3	46.56	0.375 4465	196.1	2.13	3.71	0 52.9
20	0	39	42.17	7.016	3	40	26.2	46.43	0.375 9158	195.0	2.12	3.70	0 51.8
21	0	42	30.54	7.015	3	58	58.9	46.29	0.376 3823	193.8	2.12	3.70	0 50.7
22	0	45	18.90	7.015	4	17	28.3	46.16	0.376 8458	192.5	2.12	3.70	0 49.5
23	0	48	7.24	+7.014	+4	35	54.3	+46.01	0.377 3063	+191.3	2.12	3.69	0 48.4
24	0	50	55.59	7.015	4	54	16.6	45.85	0.377 7638	190.0	2.12	3.69	0 47.2
25	0	53	43.94	7.015	5	12	35.1	45.69	0.378 2182	188.7	2.11	3.68	0 46.1
26	0	56	32.30	7.016	5	30	49.6	45.52	0.378 6693	187.3	2.11	3.68	0 45.0
27	0	59	20.69	7.017	5	49	0.1	45.35	0.379 1172	185.9	2.11	3.68	0 43.8
28	1	2	9.11	+7.018	+6	7	6.3	+45.17	0.379 5617	+184.5	2.11	3.67	0 42.7
29	1	4	57.56	7.020	6	25	8.0	44.97	0.380 0027	183.0	2.11	3.67	0 41.6
30	1	7	46.06	7.022	6	43	4.9	44.77	0.380 4401	181.5	2.11	3.67	0 40.4
31	1	10	34.61	7.024	7	0	57.0	44.57	0.380 8738	179.9	2.10	3.66	0 39.3
1	1	13	23.21	7.026	7	18	44.0	44.35	0.381 3038	178.4	2.10	3.66	0 38.2
2	1	16	11.87	+7.029	+7	36	25.9	+44.14	0.381 7300	+176.8	2.10	3.65	0 37.1
3	1	19	0.59	+7.031	+7	54	2.5	+43.91	0.382 1524	+175.2	2.10	3.65	0 35.5

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Apr. 1	1 13 23.21	+7.026	+ 7 18 44.0	+44.35	0.381 3038	+178.4	2.10	3.66	0 38.2
2	1 16 11.87	7.029	7 36 25.9	44.14	0.381 7300	176.8	2.10	3.65	0 37.1
3	1 19 0.59	7.031	7 54 2.5	43.91	0.382 1524	175.2	2.10	3.65	0 35.9
4	1 21 49.37	7.034	8 11 33.7	43.68	0.382 5709	173.6	2.10	3.65	0 34.8
5	1 24 38.22	7.037	8 28 59.2	43.44	0.382 9856	172.0	2.09	3.64	0 33.7
6	1 27 27.14	+7.040	+ 8 46 18.9	+43.20	0.383 3965	+170.4	2.09	3.64	0 32.5
7	1 30 16.15	7.044	9 3 32.7	42.95	0.383 8035	168.8	2.09	3.64	0 31.4
8	1 33 5.24	7.047	9 20 40.4	42.69	0.384 2066	167.2	2.08	3.63	0 30.3
9	1 35 54.42	7.051	9 37 41.8	42.43	0.384 6059	165.6	2.08	3.63	0 29.2
10	1 38 43.70	7.056	9 54 36.9	42.16	0.385 0015	164.0	2.08	3.63	0 28.0
11	1 41 33.09	+7.060	+10 11 25.4	+41.88	0.385 3932	+162.4	2.08	3.62	0 26.9
12	1 44 22.58	7.064	10 28 7.2	41.60	0.385 7812	160.9	2.08	3.62	0 25.8
13	1 47 12.19	7.070	10 44 42.2	41.32	0.386 1653	159.3	2.08	3.62	0 24.7
14	1 50 1.93	7.075	11 1 10.3	41.02	0.386 5457	157.7	2.07	3.61	0 23.6
15	1 52 51.79	7.080	11 17 31.2	40.72	0.386 9221	156.1	2.07	3.61	0 22.5
16	1 55 41.79	+7.087	+11 33 45.0	+40.42	0.387 2948	+154.5	2.07	3.61	0 21.4
17	1 58 31.94	7.092	11 49 51.3	40.11	0.387 6634	152.7	2.07	3.60	0 20.3
18	2 1 22.22	7.098	12 5 50.2	39.80	0.388 0279	151.0	2.07	3.60	0 19.2
19	2 4 12.66	7.105	12 21 41.5	39.48	0.388 3882	149.2	2.07	3.60	0 18.0
20	2 7 3.25	7.111	12 37 25.0	39.15	0.388 7441	147.4	2.07	3.60	0 16.9
21	2 9 54.01	+7.119	+12 53 0.7	+38.82	0.389 0958	+145.7	2.06	3.59	0 15.9
22	2 12 44.94	7.125	13 8 28.2	38.48	0.389 4433	143.9	2.06	3.59	0 14.8
23	2 15 36.03	7.133	13 23 47.6	38.14	0.389 7865	142.2	2.06	3.59	0 13.7
24	2 18 27.31	7.140	13 38 58.7	37.79	0.390 1258	140.4	2.05	3.58	0 12.6
25	2 21 18.76	7.147	13 54 1.3	37.43	0.390 4604	138.5	2.05	3.58	0 11.5
26	2 24 10.39	+7.155	+14 8 55.5	+37.08	0.390 7903	+136.4	2.05	3.58	0 10.4
27	2 27 2.20	7.163	14 23 40.9	36.71	0.391 1151	134.3	2.05	3.58	0 9.3
28	2 29 54.20	7.171	14 38 17.6	36.34	0.391 4348	132.1	2.05	3.57	0 8.3
29	2 32 46.39	7.178	14 52 45.3	35.97	0.391 7493	130.0	2.05	3.57	0 7.2
30	2 35 38.76	7.186	15 7 3.9	35.58	0.392 0588	127.9	2.05	3.57	0 6.1
May 1	2 38 31.31	+7.194	+15 21 13.3	+35.20	0.392 3631	+125.7	2.05	3.57	0 5.1
2	2 41 24.06	7.201	15 35 13.3	34.80	0.392 6623	123.5	2.04	3.56	0 4.0
3	2 44 16.98	7.209	15 49 3.8	34.41	0.392 9563	121.4	2.04	3.56	0 2.9
4	2 47 10.09	7.217	16 2 44.8	34.01	0.393 2452	119.3	2.04	3.56	0 1.9
5	2 50 3.37	7.224	16 16 16.1	33.60	0.393 5289	117.2	2.04	3.56	0 0.8
6	2 52 56.83	+7.231	+16 29 37.6	+33.19	0.393 8076	+115.1	2.04	3.55	23 58.7
7	2 55 50.48	7.239	16 42 49.1	32.77	0.394 0811	112.8	2.04	3.55	23 57.7
8	2 58 44.31	7.247	16 55 50.6	32.35	0.394 3492	110.6	2.04	3.55	23 56.6
9	3 1 38.33	7.255	17 8 41.9	31.92	0.394 6119	108.3	2.04	3.55	23 55.6
10	3 4 32.53	7.262	17 21 22.9	31.49	0.394 8690	106.0	2.03	3.54	23 54.5
11	3 7 26.92	+7.270	+17 33 53.6	+31.06	0.395 1207	+103.8	2.03	3.54	23 53.5
12	3 10 21.49	7.278	17 46 13.9	30.63	0.395 3673	101.7	2.03	3.54	23 52.5
13	3 13 16.26	7.286	17 58 23.6	30.19	0.395 6088	99.6	2.03	3.54	23 51.4
14	3 16 11.23	7.294	18 10 22.8	29.74	0.395 8452	97.4	2.03	3.54	23 50.4
15	3 19 6.38	7.302	18 22 11.1	29.29	0.396 0763	95.2	2.03	3.53	23 49.4
16	3 22 1.71	+7.309	+18 33 48.7	+28.84	0.396 3020	+ 92.9	2.03	3.53	23 48.4
17	3 24 57.21	+7.316	+18 45 15.2	+28.38	0.396 5223	+ 90.7	2.03	3.53	23 47.4

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension.		Var. per Hour.	Apparent Declination.		Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.		
		Noon.		Noon.	Noon.		Noon.	Noon.	Noon.	Noon.	Noon.			
Day	17	h	m	s	s	°	'	"	"		"	"	h	m
	17	3	24	57.21	+7.316	+18	45	15.2	+28.38	0.396 5223	+90.7	2.03	3.53	23 47.4
	18	3	27	52.88	7.323	18	56	30.7	27.91	0.396 7371	88.3	2.03	3.53	23 46.4
	19	3	30	48.74	7.331	19	7	35.0	27.45	0.396 9463	86.0	2.03	3.53	23 45.4
	20	3	33	44.78	7.339	19	18	28.2	26.98	0.397 1498	83.6	2.03	3.53	23 44.4
	21	3	36	41.01	7.347	19	29	10.0	26.51	0.397 3476	81.2	2.03	3.53	23 43.4
	22	3	39	37.43	+7.354	+19	39	40.5	+26.03	0.397 5397	+78.8	2.02	3.52	23 42.4
	23	3	42	34.02	7.362	19	49	59.5	25.55	0.397 7258	76.2	2.02	3.52	23 41.4
	24	3	45	30.79	7.369	20	0	7.0	25.07	0.397 9055	73.6	2.02	3.52	23 40.4
	25	3	48	27.73	7.376	20	10	2.9	24.59	0.398 0789	70.9	2.02	3.52	23 39.4
	26	3	51	24.83	7.383	20	19	47.1	24.10	0.398 2457	68.1	2.02	3.52	23 38.4
	27	3	54	22.10	+7.389	+20	29	19.5	+23.60	0.398 4060	+65.4	2.02	3.52	23 37.4
	28	3	57	19.51	7.395	20	38	40.1	23.11	0.398 5597	62.7	2.01	3.51	23 36.5
	29	4	0	17.07	7.402	20	47	48.7	22.61	0.398 7069	60.0	2.01	3.51	23 35.5
	30	4	3	14.78	7.407	20	56	45.3	22.11	0.398 8476	57.2	2.01	3.51	23 34.5
	31	4	6	12.61	7.412	21	5	29.9	21.60	0.398 9816	54.5	2.01	3.51	23 33.5
June	1	4	9	10.57	+7.417	+21	14	2.2	+21.09	0.399 1090	+51.7	2.01	3.51	23 32.5
	2	4	12	8.64	7.422	21	22	22.4	20.59	0.399 2297	48.9	2.01	3.51	23 31.5
	3	4	15	6.82	7.427	21	30	30.3	20.07	0.399 3436	46.1	2.01	3.51	23 30.6
	4	4	18	5.11	7.431	21	38	25.9	19.56	0.399 4508	43.3	2.01	3.51	23 29.6
	5	4	21	3.50	7.435	21	46	9.1	19.04	0.399 5513	40.5	2.01	3.51	23 28.6
	6	4	24	1.97	+7.438	+21	53	39.9	+18.53	0.399 6450	+37.6	2.01	3.51	23 27.7
	7	4	27	0.53	7.442	22	0	58.3	18.01	0.399 7320	34.8	2.01	3.51	23 26.7
	8	4	29	59.18	7.445	22	8	4.2	17.48	0.399 8122	32.0	2.01	3.50	23 25.7
	9	4	32	57.90	7.448	22	14	57.5	16.96	0.399 8856	29.2	2.01	3.50	23 24.8
	10	4	35	56.68	7.451	22	21	38.2	16.43	0.399 9523	26.4	2.01	3.50	23 23.8
	11	4	38	55.53	+7.453	+22	28	6.3	+15.91	0.400 0122	+23.5	2.01	3.50	23 22.8
	12	4	41	54.44	7.456	22	34	21.8	15.38	0.400 0652	20.6	2.01	3.50	23 21.9
	13	4	44	53.40	7.458	22	40	24.5	14.85	0.400 1113	17.8	2.01	3.50	23 20.9
	14	4	47	52.41	7.459	22	46	14.5	14.32	0.400 1505	14.9	2.01	3.50	23 20.0
	15	4	50	51.45	7.461	22	51	51.8	13.79	0.400 1827	11.9	2.01	3.50	23 19.0
	16	4	53	50.53	+7.462	+22	57	16.2	+13.25	0.400 2078	+ 8.9	2.01	3.50	23 18.1
	17	4	56	49.63	7.463	23	2	27.9	12.72	0.400 2256	5.9	2.01	3.50	23 17.1
	18	4	59	48.75	7.464	23	7	26.8	12.19	0.400 2362	+ 2.9	2.01	3.50	23 16.2
	19	5	2	47.89	7.464	23	12	12.9	11.65	0.400 2393	- 0.2	2.01	3.50	23 15.2
	20	5	5	47.03	7.464	23	16	46.1	11.11	0.400 2350	3.4	2.01	3.50	23 14.3
	21	5	8	46.17	+7.464	+23	21	6.4	+10.58	0.400 2230	- 6.6	2.01	3.50	23 13.3
	22	5	11	45.29	7.463	23	25	13.8	10.04	0.400 2034	9.8	2.01	3.50	23 12.4
	23	5	14	44.39	7.462	23	29	8.4	9.51	0.400 1761	13.0	2.01	3.50	23 11.4
	24	5	17	43.47	7.461	23	32	50.1	8.97	0.400 1409	16.3	2.01	3.50	23 10.4
	25	5	20	42.50	7.458	23	36	19.0	8.43	0.400 0976	19.7	2.01	3.50	23 9.5
	26	5	23	41.47	+7.456	+23	39	34.9	+ 7.90	0.400 0461	-23.2	2.01	3.50	23 8.5
	27	5	26	40.39	7.453	23	42	38.0	7.36	0.399 9863	26.6	2.01	3.50	23 7.5
	28	5	29	39.23	7.450	23	45	28.2	6.82	0.399 9183	30.1	2.01	3.50	23 6.6
	29	5	32	37.98	7.446	23	48	5.6	6.29	0.399 8420	33.5	2.01	3.50	23 5.6
	30	5	35	36.64	7.442	23	50	30.1	5.75	0.399 7574	37.0	2.01	3.50	23 4.8
July	1	5	38	35.19	+7.437	+23	52	41.8	+ 5.22	0.399 6645	-40.4	2.01	3.51	23 3.7
	2	5	41	33.63	+7.432	+23	54	40.7	+ 4.69	0.399 5633	-43.9	2.01	3.51	23 2.7

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- ax.	Transit, Meridian of Green- wich.
		Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
July	1	h m s 5 38 35.19	s +7.437	" ' " +23 52 41.8	" + 5.22	0.399 6645	- 40.4	" 2.01	" 3.51	h m 23 3.7
	2	5 41 33.63	7.432	23 54 40.7	4.69	0.399 5633	43.9	2.01	3.51	23 2.7
	3	5 44 31.93	7.426	23 56 26.8	4.16	0.399 4538	47.3	2.01	3.51	23 1.7
	4	5 47 30.10	7.421	23 58 0.2	3.63	0.399 3360	50.8	2.01	3.51	23 0.8
	5	5 50 28.12	7.414	23 59 20.9	3.10	0.399 2097	54.4	2.01	3.51	22 59.8
	6	5 53 25.99	+7.408	+24 0 28.9	+ 2.57	0.399 0750	- 57.9	2.01	3.51	22 58.8
	7	5 56 23.70	7.401	24 1 24.3	2.04	0.398 9320	61.4	2.01	3.51	22 57.8
	8	5 59 21.23	7.393	24 2 7.0	1.52	0.398 7805	64.9	2.01	3.51	22 56.9
	9	6 2 18.58	7.386	24 2 37.1	0.99	0.398 6206	68.4	2.01	3.51	22 55.9
	10	6 5 15.74	7.378	24 2 54.7	+ 0.47	0.398 4522	71.9	2.02	3.52	22 54.9
	11	6 8 12.72	+7.370	+24 2 59.8	- 0.05	0.398 2753	- 75.5	2.02	3.52	22 53.9
	12	6 11 9.49	7.362	24 2 52.4	0.57	0.398 0898	79.1	2.02	3.52	22 52.8
	13	6 14 6.07	7.353	24 2 32.5	1.09	0.397 8957	82.7	2.02	3.52	22 51.8
	14	6 17 2.43	7.344	24 2 0.3	1.60	0.397 6930	86.3	2.02	3.52	22 50.8
	15	6 19 58.57	7.335	24 1 15.7	2.11	0.397 4814	90.0	2.02	3.52	22 49.8
	16	6 22 54.49	+7.325	+24 0 18.9	- 2.62	0.397 2609	- 93.7	2.03	3.53	22 48.8
	17	6 25 50.17	7.315	23 59 9.9	3.13	0.397 0315	97.5	2.03	3.53	22 47.8
	18	6 28 45.60	7.304	23 57 48.7	3.63	0.396 7930	101.3	2.03	3.53	22 46.8
	19	6 31 40.78	7.294	23 56 15.5	4.14	0.396 5452	105.2	2.03	3.53	22 45.8
	20	6 34 35.69	7.282	23 54 30.2	4.64	0.396 2882	109.1	2.03	3.53	22 44.8
	21	6 37 30.33	+7.271	+23 52 33.0	- 5.13	0.396 0217	-113.0	2.03	3.54	22 43.7
	22	6 40 24.70	7.260	23 50 23.8	5.63	0.395 7456	117.1	2.03	3.54	22 42.7
	23	6 43 18.79	7.248	23 48 2.9	6.12	0.395 4598	121.1	2.03	3.54	22 41.6
	24	6 46 12.58	7.235	23 45 30.2	6.61	0.395 1643	125.2	2.03	3.54	22 40.6
	25	6 49 6.09	7.223	23 42 45.8	7.09	0.394 8589	129.3	2.03	3.54	22 39.5
	26	6 51 59.29	+7.210	+23 39 49.9	- 7.57	0.394 5436	-133.4	2.04	3.55	22 38.5
	27	6 54 52.17	7.196	23 36 42.4	8.05	0.394 2183	137.6	2.04	3.55	22 37.4
	28	6 57 44.71	7.182	23 33 23.4	8.53	0.393 8830	141.8	2.04	3.55	22 36.3
	29	7 0 36.91	7.168	23 29 53.1	9.00	0.393 5375	146.0	2.04	3.56	22 35.3
	30	7 3 28.76	7.153	23 26 11.6	9.46	0.393 1820	150.2	2.04	3.56	22 34.2
	Aug.	31	7 6 20.26	+7.138	+23 22 18.9	- 9.93	0.392 8164	-154.4	2.04	3.56	22 33.1
1		7 9 11.39	7.123	23 18 15.2	10.38	0.392 4407	158.7	2.05	3.57	22 32.0
2		7 12 2.16	7.108	23 14 0.6	10.83	0.392 0548	162.9	2.05	3.57	22 30.9
3		7 14 52.55	7.092	23 9 35.2	11.29	0.391 6588	167.1	2.05	3.57	22 29.8
4		7 17 42.56	7.076	23 4 58.9	11.74	0.391 2525	171.4	2.05	3.57	22 28.7
5		7 20 32.19	+7.060	+23 0 11.9	-12.18	0.390 8361	-175.6	2.05	3.58	22 27.5
6		7 23 21.43	7.044	22 55 14.3	12.62	0.390 4094	179.9	2.05	3.58	22 26.4
7		7 26 10.29	7.027	22 50 6.1	13.06	0.389 9724	184.2	2.05	3.58	22 25.3
8		7 28 58.74	7.010	22 44 47.5	13.49	0.389 5251	188.5	2.06	3.59	22 24.1
9		7 31 46.79	6.994	22 39 18.6	13.92	0.389 0674	192.8	2.06	3.59	22 23.0
10		7 34 34.45	+6.977	+22 33 39.4	-14.35	0.388 5994	-197.2	2.07	3.60	22 21.8
11		7 37 21.70	6.960	22 27 50.0	14.77	0.388 1208	201.6	2.07	3.60	22 20.6
12		7 40 8.54	6.943	22 21 50.6	15.18	0.387 6317	206.0	2.07	3.60	22 19.5
13		7 42 54.97	6.926	22 15 41.3	15.59	0.387 1320	210.4	2.07	3.61	22 18.3
14		7 45 40.99	6.909	22 9 22.1	16.00	0.386 6216	214.9	2.07	3.61	22 17.2
15	7 48 26.59	+6.892	+22 2 53.2	-16.40	0.386 1002	-219.5	2.08	3.62	22 16.0	
16	7 51 11.78	+6.874	+21 56 14.7	-16.80	0.385 5678	-224.1	2.08	3.62	22 14.8	

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- ax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	" ' "	"			"	"	h m
Aug. 16	7 51 11.78	+6.874	+21 56 14.7	-16.80	0.385 5678	-224.1	2.08	3.62	22 14.8
17	7 53 56.54	6.856	21 49 26.7	17.20	0.385 0243	228.8	2.08	3.63	22 13.6
18	7 56 40.88	6.839	21 42 29.2	17.59	0.384 4696	233.5	2.08	3.63	22 12.3
19	7 59 24.79	6.821	21 35 22.5	17.97	0.383 9034	238.3	2.09	3.64	22 11.1
20	8 2 8.27	6.803	21 28 6.5	18.36	0.383 3256	243.2	2.09	3.64	22 9.9
21	8 4 51.32	+6.785	+21 20 41.4	-18.73	0.382 7362	-248.0	2.10	3.65	22 8.7
22	8 7 33.93	6.766	21 13 7.4	19.10	0.382 1350	253.0	2.10	3.65	22 7.5
23	8 10 16.09	6.747	21 5 24.5	19.47	0.381 5220	257.9	2.10	3.66	22 6.2
24	8 12 57.80	6.729	20 57 32.9	19.83	0.380 8971	262.9	2.10	3.66	22 4.9
25	8 15 39.07	6.710	20 49 32.8	20.18	0.380 2601	267.9	2.11	3.67	22 3.7
26	8 18 19.88	+6.691	+20 41 24.1	-20.54	0.379 6111	-272.9	2.11	3.67	22 2.4
27	8 21 0.24	6.672	20 33 7.1	20.88	0.378 9500	278.0	2.11	3.68	22 1.1
28	8 23 40.13	6.652	20 24 41.9	21.22	0.378 2767	283.0	2.11	3.68	21 59.8
29	8 26 19.55	6.633	20 16 8.6	21.55	0.377 5914	288.1	2.12	3.69	21 58.5
30	8 28 58.51	6.614	20 7 27.3	21.88	0.376 8939	293.2	2.12	3.69	21 57.2
31	8 31 37.00	+6.594	+19 58 38.2	-22.21	0.376 1842	-298.2	2.12	3.70	21 55.9
Sept. 1	8 34 15.02	6.575	19 49 41.2	22.53	0.375 4623	303.3	2.13	3.71	21 54.6
2	8 36 52.58	6.555	19 40 36.6	22.85	0.374 7282	308.5	2.13	3.71	21 53.3
3	8 39 29.67	6.536	19 31 24.4	23.16	0.373 9817	313.6	2.14	3.72	21 52.0
4	8 42 6.30	6.516	19 22 4.8	23.47	0.373 2229	318.7	2.14	3.73	21 50.6
5	8 44 42.46	+6.497	+19 12 37.9	-23.77	0.372 4518	-323.9	2.14	3.73	21 49.3
6	8 47 18.16	6.478	19 3 3.8	24.07	0.371 6682	329.1	2.15	3.74	21 47.9
7	8 49 53.39	6.458	18 53 22.6	24.36	0.370 8721	334.3	2.15	3.75	21 46.6
8	8 52 28.16	6.439	18 43 34.5	24.65	0.370 0635	339.5	2.15	3.75	21 45.2
9	8 55 2.48	6.421	18 33 39.5	24.93	0.369 2423	344.8	2.16	3.76	21 43.9
10	8 57 36.35	+6.402	+18 23 37.7	-25.21	0.368 4084	-350.1	2.16	3.77	21 42.5
11	9 0 9.76	6.383	18 13 29.3	25.49	0.367 5617	355.5	2.16	3.77	21 41.1
12	9 2 42.73	6.364	18 3 14.3	25.76	0.366 7021	360.9	2.17	3.78	21 39.7
13	9 5 15.24	6.345	17 52 52.9	26.02	0.365 8293	366.4	2.18	3.79	21 38.3
14	9 7 47.30	6.327	17 42 25.2	26.28	0.364 9433	371.9	2.18	3.80	21 36.8
15	9 10 18.92	+6.308	+17 31 51.3	-26.54	0.364 0439	-377.6	2.19	3.81	21 35.4
16	9 12 50.09	6.290	17 21 11.3	26.79	0.363 1309	383.3	2.19	3.81	21 34.0
17	9 15 20.82	6.271	17 10 25.3	27.04	0.362 2042	389.0	2.19	3.82	21 32.6
18	9 17 51.10	6.252	16 59 33.6	27.27	0.361 2636	394.8	2.20	3.83	21 31.1
19	9 20 20.94	6.234	16 48 36.2	27.51	0.360 3090	400.7	2.20	3.84	21 29.7
20	9 22 50.34	+6.216	+16 37 33.2	-27.74	0.359 3403	-406.6	2.21	3.85	21 28.2
21	9 25 19.29	6.197	16 26 24.8	27.96	0.358 3575	412.5	2.22	3.86	21 26.8
22	9 27 47.80	6.179	16 15 11.1	28.18	0.357 3605	418.4	2.22	3.86	21 25.3
23	9 30 15.86	6.160	16 3 52.2	28.39	0.356 3492	424.4	2.22	3.87	21 23.8
24	9 32 43.47	6.141	15 52 28.3	28.60	0.355 3235	430.4	2.23	3.88	21 22.3
25	9 35 10.64	+6.123	+15 40 59.4	-28.80	0.354 2833	-436.4	2.23	3.89	21 20.8
26	9 37 37.37	6.105	15 29 25.8	29.00	0.353 2287	442.5	2.24	3.90	21 19.3
27	9 40 3.66	6.086	15 17 47.5	29.19	0.352 1595	448.5	2.24	3.91	21 17.8
28	9 42 29.51	6.068	15 6 4.6	29.38	0.351 0758	454.6	2.25	3.92	21 16.3
29	9 44 54.91	6.049	14 54 17.2	29.57	0.349 9774	460.7	2.26	3.93	21 14.8
30	9 47 19.88	+6.031	+14 42 25.5	-29.74	0.348 8643	-466.8	2.26	3.94	21 13.2
Oct. 1	9 49 44.42	+6.013	+14 30 29.6	-29.92	0.347 7365	-473.0	2.27	3.95	21 11.7

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.	
	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.							Noon.
Oct.		h	m	s	s	°	'	"	"				h	m
	1	9	49	44.42	+6.013	+14	30	29.6	-29.92	0.347 7365	-473.0	2.27	3.95	21 11.7
	2	9	52	8.52	5.995	14	18	29.5	30.09	0.346 5939	479.1	2.27	3.96	21 10.1
	3	9	54	32.20	5.978	14	6	25.5	30.25	0.345 4366	485.3	2.28	3.97	21 8.6
	4	9	56	55.45	5.960	13	54	17.5	30.41	0.344 2644	491.5	2.28	3.98	21 7.0
	5	9	59	18.28	5.943	13	42	5.7	30.57	0.343 0774	497.7	2.29	3.99	21 5.5
	6	10	1	40.70	+5.926	+13	29	50.3	-30.72	0.341 8754	-504.0	2.30	4.00	21 3.9
	7	10	4	2.71	5.909	13	17	31.2	30.87	0.340 6584	510.2	2.31	4.02	21 2.3
	8	10	6	24.31	5.892	13	5	8.7	31.01	0.339 4263	516.6	2.31	4.03	21 0.7
	9	10	8	45.51	5.875	12	52	42.8	31.15	0.338 1789	522.9	2.32	4.04	20 59.1
	10	10	11	6.31	5.858	12	40	13.6	31.28	0.336 9161	529.4	2.32	4.05	20 57.5
	11	10	13	26.72	+5.842	+12	27	41.2	-31.41	0.335 6377	-535.9	2.33	4.06	20 55.9
	12	10	15	46.74	5.826	12	15	5.8	31.54	0.334 3436	542.5	2.34	4.08	20 54.3
	13	10	18	6.37	5.810	12	2	27.4	31.66	0.333 0336	549.2	2.35	4.09	20 52.7
	14	10	20	25.62	5.794	11	49	46.1	31.76	0.331 7075	555.9	2.35	4.10	20 51.1
	15	10	22	44.48	5.778	11	37	2.2	31.88	0.330 3652	562.7	2.36	4.11	20 49.5
	16	10	25	2.96	+5.762	+11	24	15.7	-31.99	0.329 0065	-569.6	2.37	4.13	20 47.8
	17	10	27	21.06	5.746	11	11	26.8	32.09	0.327 6313	576.4	2.38	4.14	20 46.2
	18	10	29	38.78	5.731	10	58	35.5	32.18	0.326 2395	583.4	2.38	4.15	20 44.5
	19	10	31	56.13	5.715	10	45	42.0	32.28	0.324 8307	590.5	2.39	4.17	20 42.8
	20	10	34	13.10	5.699	10	32	46.3	32.36	0.323 4049	597.7	2.40	4.18	20 41.2
	21	10	36	29.70	+5.684	+10	19	48.6	-32.44	0.321 9619	-604.8	2.41	4.19	20 39.5
	22	10	38	45.91	5.668	10	6	49.1	32.52	0.320 5018	612.0	2.42	4.21	20 37.9
	23	10	41	1.75	5.652	9	53	47.8	32.59	0.319 0245	619.1	2.42	4.22	20 36.2
	24	10	43	17.21	5.636	9	40	44.9	32.65	0.317 5300	626.3	2.43	4.24	20 34.5
	25	10	45	32.30	5.621	9	27	40.5	32.71	0.316 0183	633.5	2.44	4.25	20 32.8
	26	10	47	47.02	+5.605	+ 9	14	34.7	-32.77	0.314 4892	-640.8	2.45	4.27	20 31.1
	27	10	50	1.36	5.590	9	1	27.6	32.82	0.312 9426	648.0	2.46	4.28	20 29.4
	28	10	52	15.33	5.575	8	48	19.3	32.87	0.311 3786	655.3	2.47	4.30	20 27.7
	29	10	54	28.94	5.559	8	35	9.9	32.91	0.309 7970	662.6	2.47	4.31	20 25.9
	30	10	56	42.18	5.544	8	21	59.5	32.95	0.308 1979	670.0	2.48	4.33	20 24.2
31	10	58	55.06	+5.529	+ 8	8	48.2	-32.99	0.306 5811	-677.4	2.49	4.34	20 22.5	
Nov.	1	11	1	7.58	5.514	7	55	36.2	33.02	0.304 9466	684.7	2.50	4.36	20 20.7
	2	11	3	19.74	5.500	7	42	23.5	33.04	0.303 2944	692.1	2.51	4.38	20 19.0
	3	11	5	31.56	5.485	7	29	10.2	33.07	0.301 6244	699.6	2.52	4.39	20 17.2
	4	11	7	43.02	5.470	7	15	56.4	33.08	0.299 9365	707.1	2.53	4.41	20 15.5
	5	11	9	54.13	+5.456	+ 7	2	42.2	-33.10	0.298 2305	-714.6	2.54	4.43	20 13.7
	6	11	12	4.90	5.442	6	49	27.6	33.11	0.296 5065	722.2	2.55	4.45	20 12.0
	7	11	14	15.34	5.428	6	36	12.8	33.12	0.294 7641	729.8	2.56	4.46	20 10.2
	8	11	16	25.44	5.414	6	22	57.9	33.12	0.293 0032	737.6	2.57	4.48	20 8.4
	9	11	18	35.21	5.400	6	9	43.0	33.12	0.291 2237	745.4	2.58	4.50	20 6.7
	10	11	20	44.65	+5.387	+ 5	56	28.2	-33.11	0.289 4254	-753.3	2.59	4.52	20 4.9
	11	11	22	53.77	5.373	5	43	13.6	33.11	0.287 6079	761.3	2.61	4.54	20 3.1
	12	11	25	2.56	5.359	5	29	59.2	33.09	0.285 7713	769.3	2.62	4.56	20 1.3
	13	11	27	11.02	5.346	5	16	45.3	33.07	0.283 9151	777.5	2.63	4.58	19 59.5
	14	11	29	19.15	5.332	5	3	31.8	33.05	0.282 0393	785.7	2.64	4.60	19 57.7
	15	11	31	26.95	+5.318	+ 4	50	19.0	-33.02	0.280 1437	-794.0	2.65	4.62	19 55.8
	16	11	33	34.42	+5.304	+ 4	37	7.0	-32.98	0.278 2281	-802.3	2.66	4.64	19 54.0

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Nov. 16	11 33 34.42	+5.304	+4 37 7.0	-32.98	0.278 2281	-802.3	2.66	4.64	19 54.0
17	11 35 41.55	5.290	4 23 55.9	32.94	0.276 2925	810.7	2.67	4.66	19 52.2
18	11 37 48.36	5.277	4 10 45.8	32.90	0.274 3366	819.2	2.69	4.68	19 50.4
19	11 39 54.83	5.268	3 57 36.7	32.85	0.272 3605	827.6	2.70	4.70	19 48.5
20	11 42 0.96	5.248	3 44 28.9	32.80	0.270 3639	836.2	2.71	4.72	19 46.7
21	11 44 6.74	+5.234	+3 31 22.4	-32.74	0.268 3469	-844.7	2.72	4.74	19 44.8
22	11 46 12.17	5.219	3 18 17.3	32.68	0.266 3092	853.3	2.74	4.77	19 43.0
23	11 48 17.26	5.205	3 5 13.7	32.62	0.264 2509	861.9	2.75	4.79	19 41.1
24	11 50 22.00	5.190	2 52 11.7	32.55	0.262 1719	870.6	2.76	4.81	19 39.3
25	11 52 26.40	5.176	2 39 11.5	32.47	0.260 0721	879.3	2.77	4.83	19 37.4
26	11 54 30.47	+5.162	+2 26 13.1	-32.39	0.257 9514	-888.0	2.79	4.86	19 35.5
27	11 56 34.19	5.148	2 13 16.6	32.31	0.255 8099	896.7	2.80	4.88	19 33.6
28	11 58 37.55	5.133	2 0 22.1	32.23	0.253 6474	905.4	2.82	4.91	19 31.7
29	12 0 40.56	5.118	1 47 29.8	32.13	0.251 4639	914.2	2.83	4.93	19 29.8
30	12 2 43.21	5.103	1 34 39.8	32.04	0.249 2593	923.0	2.85	4.96	19 27.9
Dec. 1	12 4 45.50	+5.088	+1 21 52.0	-31.94	0.247 0336	-931.8	2.86	4.98	19 26.0
2	12 6 47.45	5.074	1 9 6.6	31.84	0.244 7866	940.7	2.88	5.01	19 24.1
3	12 8 49.04	5.059	0 56 23.7	31.74	0.242 5182	949.6	2.89	5.03	19 22.2
4	12 10 50.28	5.044	0 43 43.3	31.63	0.240 2283	958.6	2.90	5.06	19 20.3
5	12 12 51.17	5.030	0 31 5.5	31.52	0.237 9168	967.6	2.92	5.09	19 18.4
6	12 14 51.71	+5.015	+0 18 30.4	-31.40	0.235 5835	-976.8	2.94	5.12	19 16.4
7	12 16 51.89	5.000	+0 5 58.2	31.28	0.233 2282	986.0	2.95	5.14	19 14.5
8	12 18 51.72	4.985	-0 6 31.1	31.16	0.230 8508	995.3	2.97	5.17	19 12.5
9	12 20 51.19	4.970	0 18 57.4	31.03	0.228 4509	1004.7	2.98	5.20	19 10.6
10	12 22 50.30	4.955	0 31 20.6	30.90	0.226 0283	1014.2	3.00	5.23	19 8.6
11	12 24 49.04	+4.940	-0 43 40.6	-30.77	0.223 5828	-1023.8	3.02	5.26	19 6.7
12	12 26 47.42	4.924	0 55 57.3	30.62	0.221 1142	1033.4	3.04	5.29	19 4.7
13	12 28 45.41	4.908	1 8 10.5	30.48	0.218 6223	1043.2	3.05	5.32	19 2.7
14	12 30 43.02	4.892	1 20 20.2	30.33	0.216 1068	1053.1	3.07	5.35	19 0.7
15	12 32 40.23	4.875	1 32 26.3	30.18	0.213 5676	1063.0	3.09	5.38	18 58.7
16	12 34 37.04	+4.859	-1 44 28.7	-30.02	0.211 0045	-1072.9	3.11	5.41	18 56.7
17	12 36 33.45	4.842	1 56 27.2	29.85	0.208 4175	1082.9	3.13	5.45	18 54.7
18	12 38 29.43	4.824	2 8 21.7	29.69	0.205 8065	1092.9	3.15	5.48	18 52.7
19	12 40 24.99	4.806	2 20 12.1	29.51	0.203 1715	1102.9	3.16	5.51	18 50.7
20	12 42 20.11	4.788	2 31 58.3	29.34	0.200 5124	1113.0	3.19	5.55	18 48.7
21	12 44 14.79	+4.769	-2 43 40.2	-29.15	0.197 8290	-1123.1	3.20	5.58	18 46.6
22	12 46 9.02	4.750	2 55 17.7	28.97	0.195 1213	1133.3	3.23	5.62	18 44.6
23	12 48 2.79	4.731	3 6 50.8	28.78	0.192 3892	1143.5	3.24	5.65	18 42.5
24	12 49 56.09	4.711	3 18 19.3	28.59	0.189 6326	1153.7	3.27	5.69	18 40.4
25	12 51 48.91	4.691	3 29 43.1	28.39	0.186 8516	1163.9	3.28	5.72	18 38.4
26	12 53 41.25	+4.671	-3 41 2.2	-28.20	0.184 0460	-1174.1	3.31	5.76	18 36.3
27	12 55 33.10	4.650	3 52 16.5	27.99	0.181 2159	1184.3	3.33	5.80	18 34.2
28	12 57 24.44	4.629	4 3 25.9	27.79	0.178 3612	1194.6	3.35	5.84	18 32.2
29	12 59 15.27	4.607	4 14 30.3	27.58	0.175 4818	1204.9	3.37	5.87	18 30.1
30	13 1 5.59	4.586	4 25 29.6	27.37	0.172 5778	1215.2	3.39	5.91	18 28.0
31	13 2 55.38	+4.563	-4 36 23.8	-27.15	0.169 6490	-1225.5	3.42	5.95	18 25.8
32	13 4 44.63	...	-4 47 12.7	...	0.166 6954	...	3.44	5.99	18 23.7

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		° ' "	' "	"	° ' "	"		
Jan.	1	330 1 58.6	38 4.9	-20.3	-1 48 56.0	+14.2	0.140 4578	- 318
	3	331 18 9.0	38 5.5	22.5	1 48 26.0	15.8	0.140 4032	228
	5	332 34 20.4	38 5.8	24.7	1 47 52.8	17.4	0.140 3667	137
	7	333 50 32.2	38 6.0	26.8	1 47 16.5	19.0	0.140 3484	- 46
	9	335 6 44.2	38 6.0	28.8	1 46 36.9	20.6	0.140 3483	+ 45
	11	336 22 55.9	38 5.7	-30.8	-1 45 54.3	+22.1	0.140 3664	+ 136
	13	337 39 7.0	38 5.3	32.7	1 45 8.5	23.7	0.140 4027	227
	15	338 55 17.0	38 4.7	34.5	1 44 19.7	25.2	0.140 4571	317
	17	340 11 25.7	38 3.9	36.3	1 43 27.8	26.7	0.140 5296	406
	19	341 27 32.6	38 2.9	38.1	1 42 32.8	28.3	0.140 6202	498
	21	342 43 37.3	38 1.8	-39.7	-1 41 34.8	+29.7	0.140 7288	+ 588
	23	343 59 39.5	38 0.4	41.3	1 40 34.0	31.2	0.140 8553	677
	25	345 15 38.8	37 58.3	42.7	1 39 30.2	32.6	0.140 9996	766
	27	346 31 34.7	37 57.1	44.1	1 38 23.6	34.0	0.141 1617	855
	29	347 47 27.0	37 55.2	45.5	1 37 14.1	35.4	0.141 3414	942
	31	349 3 15.2	37 53.1	-46.7	-1 36 1.9	+36.8	0.141 5386	+1029
Feb.	2	350 18 59.1	37 50.8	47.8	1 34 46.9	38.2	0.141 7531	1116
	4	351 34 38.1	37 48.3	48.8	1 33 29.2	39.5	0.141 9848	1201
	6	352 50 12.1	37 45.6	49.8	1 32 9.0	40.8	0.142 2336	1286
	8	354 5 40.5	37 42.8	50.6	1 30 46.1	42.1	0.142 4993	1370
	10	355 21 3.2	37 39.9	-51.4	-1 29 20.7	+43.3	0.142 7817	+1453
	12	356 36 19.8	37 36.7	52.0	1 27 52.9	44.5	0.143 0806	1535
	14	357 51 29.8	37 33.3	52.6	1 26 22.7	45.7	0.143 3958	1617
	16	359 6 33.0	37 29.8	53.0	1 24 50.1	46.9	0.143 7272	1697
	18	0 21 29.1	37 26.2	53.4	1 23 15.3	48.0	0.144 0744	1775
	20	1 36 17.8	37 22.4	-53.6	-1 21 38.3	+49.1	0.144 4373	+1853
	22	2 50 58.7	37 18.5	53.7	1 19 59.1	50.1	0.144 8155	1929
	24	4 5 31.6	37 14.3	53.8	1 18 17.8	51.2	0.145 2090	2005
Mar.	26	5 19 56.0	37 10.1	53.7	1 16 34.5	52.2	0.145 6174	2079
	28	6 34 11.9	37 5.7	53.6	1 14 49.2	53.1	0.146 0404	2151
	2	7 48 18.8	37 1.2	-53.3	-1 13 2.1	+54.0	0.146 4778	+2223
	4	9 2 16.6	36 56.5	52.9	1 11 13.2	54.9	0.146 9294	2293
	6	10 16 4.8	36 51.7	52.5	1 9 22.5	55.8	0.147 3947	2361
	8	11 29 43.4	36 46.8	51.9	1 7 30.2	56.6	0.147 8736	2428
	10	12 43 12.0	36 41.8	51.3	1 5 36.2	57.4	0.148 3658	2493
	12	13 56 30.4	36 36.6	-50.5	-1 3 40.8	+58.1	0.148 8708	+2557
	14	15 9 38.3	36 31.3	49.7	1 1 43.9	58.8	0.149 3886	2620
	16	16 22 35.6	36 25.9	48.8	0 59 45.6	59.5	0.149 9186	2681
	18	17 35 22.0	36 20.4	47.8	0 57 45.9	60.2	0.150 4607	2740
	20	18 47 57.3	36 14.9	46.7	0 55 45.0	60.7	0.151 0144	2797
	22	20 0 21.4	36 9.2	-45.5	-0 53 43.0	+61.3	0.151 5795	+2853
	24	21 12 33.9	36 3.4	44.3	0 51 39.8	61.9	0.152 1556	2908
	26	22 24 34.8	35 57.5	43.0	0 49 35.6	62.4	0.152 7425	2961
	28	23 36 23.8	35 51.5	41.6	0 47 30.4	62.8	0.153 3397	3011
Apr.	30	24 48 0.8	35 45.5	40.1	0 45 24.4	63.2	0.153 9469	3061
	1	25 59 25.7	35 39.4	-38.6	-0 43 17.5	+63.6	0.154 5639	+3109
	3	27 10 38.3	35 33.2	-37.0	-0 41 9.9	+64.0	0.155 1902	+3155

FOR GREENWICH MEAN NOON.

Date.	Helio-centric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Helio-centric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	" ' "	" "	"	" ' "	"		
r. 1	25 59 25.7	35 39.4	-38.6	-0 43 17.5	+63.6	0.154 5639	+3109
3	27 10 38.3	35 33.2	87.0	0 41 9.9	64.0	0.155 1902	3155
5	28 21 38.4	35 26.9	85.4	0 39 1.7	64.3	0.155 8256	3199
7	29 32 25.9	35 20.6	83.7	0 36 52.8	64.6	0.156 4696	3241
9	30 43 0.7	35 14.2	82.0	0 34 43.3	64.9	0.157 1220	3282
11	31 53 22.6	35 7.7	-30.2	-0 32 33.4	+65.1	0.157 7824	+3322
13	33 3 31.6	35 1.3	28.3	0 30 23.0	65.3	0.158 4505	3359
15	34 13 27.6	34 54.7	26.4	0 28 12.3	65.4	0.159 1259	3395
17	35 23 10.4	34 48.1	24.5	0 26 1.3	65.6	0.159 8083	3429
19	36 32 39.9	34 41.5	22.6	0 23 50.0	65.7	0.160 4974	3461
21	37 41 56.2	34 34.8	-20.6	-0 21 38.6	+65.7	0.161 1927	+3492
23	38 50 59.1	34 28.1	18.6	0 19 27.1	65.8	0.161 8940	3521
25	39 59 48.6	34 21.4	16.5	0 17 15.6	65.8	0.162 6010	3548
27	41 8 24.6	34 14.6	14.5	0 15 4.0	65.8	0.163 3132	3574
29	42 16 47.0	34 7.8	12.4	0 12 52.6	65.7	0.164 0304	3598
y 1	43 24 55.8	34 1.0	-10.3	-0 10 41.3	+65.6	0.164 7522	+3620
3	44 32 51.0	33 54.2	8.2	0 8 30.2	65.5	0.165 4784	3641
5	45 40 32.6	33 47.4	6.1	0 6 19.2	65.4	0.166 2086	3660
7	46 48 0.4	33 40.5	4.0	0 4 8.6	65.2	0.166 9424	3678
9	47 55 14.6	33 33.7	-1.9	-0 1 58.4	65.0	0.167 6796	3694
11	49 2 15.1	33 26.8	+0.2	+0 0 11.5	+64.8	0.168 4198	+3708
13	50 9 1.9	33 20.0	2.3	0 2 20.9	64.6	0.169 1627	3721
15	51 15 35.0	33 13.1	4.4	0 4 29.8	64.3	0.169 9080	3732
17	52 21 54.4	33 6.3	6.4	0 6 38.2	64.1	0.170 6554	3742
19	53 28 0.1	32 59.5	8.5	0 8 46.0	63.8	0.171 4047	3750
21	54 33 52.2	32 52.6	+10.5	+0 10 53.2	+63.4	0.172 1554	+3757
23	55 39 30.6	32 45.8	12.5	0 12 59.6	63.1	0.172 9074	3763
25	56 44 55.4	32 39.0	14.5	0 15 5.4	62.7	0.173 6603	3766
27	57 50 6.7	32 32.2	16.4	0 17 10.4	62.3	0.174 4138	3769
29	58 55 4.4	32 25.5	18.4	0 19 14.6	61.9	0.175 1677	3770
31	59 59 48.7	32 18.8	+20.3	+0 21 17.9	+61.4	0.175 9217	+3770
le 2	61 4 19.5	32 12.0	22.2	0 23 20.4	61.0	0.176 6755	3768
4	62 8 36.9	32 5.4	23.9	0 25 22.0	60.6	0.177 4288	3765
6	63 12 41.0	31 58.7	25.7	0 27 22.6	60.1	0.178 1813	3760
8	64 16 31.9	31 52.1	27.4	0 29 22.2	59.6	0.178 9329	3755
10	65 20 9.6	31 45.5	+29.1	+0 31 20.8	+59.1	0.179 6832	+3748
12	66 23 34.1	31 39.0	30.8	0 33 18.4	58.5	0.180 4321	3740
14	67 26 45.7	31 32.5	32.4	0 35 14.9	57.9	0.181 1792	3731
16	68 29 44.3	31 26.1	33.9	0 37 10.2	57.4	0.181 9243	3720
18	69 32 30.0	31 19.6	35.4	0 39 4.5	56.9	0.182 6672	3708
20	70 35 2.9	31 13.3	+36.9	+0 40 57.6	+56.2	0.183 4076	+3695
22	71 37 23.1	31 6.9	38.3	0 42 49.4	55.6	0.184 1453	3681
24	72 39 30.7	31 0.7	39.6	0 44 40.1	55.0	0.184 8801	3666
26	73 41 25.8	30 54.5	40.9	0 46 29.4	54.4	0.185 6118	3650
28	74 43 8.5	30 48.3	42.1	0 48 17.6	53.8	0.186 3402	3633
30	75 44 38.9	30 42.1	+43.3	+0 50 4.4	+53.1	0.187 0649	+3615
ly 2	76 45 57.0	30 36.0	+44.4	+0 51 50.0	+52.5	0.187 7860	+3598

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		° ' "	' "	"	° ' "	"		
July	2	76 45 57.0	30 36.0	+44.4	+0 51 50.0	+52.5	0.187 7860	+3596
	4	77 47 3.1	30 30.0	45.5	0 53 34.2	51.7	0.188 5030	3575
	6	78 47 57.2	30 24.1	46.5	0 55 17.0	51.1	0.189 2159	3554
	8	79 48 39.4	30 18.2	47.4	0 56 58.5	50.4	0.189 9244	3531
	10	80 49 9.9	30 12.3	48.2	0 58 38.6	49.7	0.190 6233	3506
	12	81 49 28.7	30 6.5	+49.0	+1 0 17.2	+49.0	0.191 3275	+3484
	14	82 49 36.0	30 0.8	49.8	1 1 54.5	48.3	0.192 0218	3459
	16	83 49 31.8	29 55.1	50.5	1 3 30.3	47.5	0.192 7110	3433
	18	84 49 16.4	29 49.5	51.1	1 5 4.6	46.8	0.193 3949	3406
	20	85 48 49.8	29 43.9	51.6	1 6 37.6	46.1	0.194 0734	3378
	22	86 48 12.1	29 38.4	+52.1	+1 8 9.0	+45.4	0.194 7462	+3350
	24	87 47 23.6	29 33.0	52.5	1 9 38.9	44.6	0.195 4133	3321
	26	88 46 24.3	29 27.7	52.9	1 11 7.3	43.8	0.196 0745	3291
	28	89 45 14.3	29 22.4	53.2	1 12 34.2	43.1	0.196 7296	3260
	30	90 43 53.8	29 17.2	53.4	1 13 59.6	42.3	0.197 3785	3229
Aug.	1	91 42 23.0	29 12.0	+53.6	+1 15 23.4	+41.5	0.198 0211	+3197
	3	92 40 41.9	29 6.9	53.7	1 16 45.6	40.8	0.198 6571	3168
	5	93 38 50.7	29 1.9	53.8	1 18 6.4	40.0	0.199 2864	3139
	7	94 36 49.5	28 56.9	53.8	1 19 25.5	39.2	0.199 9090	3096
	9	95 34 38.5	28 52.1	53.7	1 20 43.1	38.4	0.200 5247	3061
	11	96 32 17.8	28 47.2	+53.6	+1 21 59.1	+37.6	0.201 1333	+3025
	13	97 29 47.5	28 42.5	53.4	1 23 13.5	36.8	0.201 7347	2999
	15	98 27 7.8	28 37.8	53.1	1 24 26.3	36.0	0.202 3289	2952
	17	99 24 18.8	28 33.2	52.8	1 25 37.5	35.2	0.202 9156	2915
	19	100 21 20.7	28 28.7	52.5	1 26 47.2	34.4	0.203 4948	2877
	21	101 18 13.6	28 24.2	+52.0	+1 27 55.2	+33.6	0.204 0664	+2839
	23	102 14 57.6	28 19.8	51.5	1 29 1.5	32.7	0.204 6303	2800
	25	103 11 32.9	28 15.5	51.0	1 30 6.2	32.0	0.205 1863	2760
	27	104 7 59.7	28 11.3	50.4	1 31 9.4	31.2	0.205 7343	2720
	29	105 4 18.1	28 7.1	49.8	1 32 10.8	30.4	0.206 2744	2680
Sept.	31	106 0 28.2	28 3.0	+49.1	+1 33 10.7	+29.6	0.206 8062	+2639
	2	106 56 30.1	27 59.0	48.3	1 34 9.0	28.7	0.207 3298	2597
	4	107 52 24.1	27 55.0	47.5	1 35 5.6	27.9	0.207 8451	2556
	6	108 48 10.2	27 51.1	46.7	1 36 0.6	27.1	0.208 3520	2513
	8	109 43 48.7	27 47.3	45.8	1 36 54.0	26.3	0.208 8503	2470
	10	110 39 19.6	27 43.6	+44.9	+1 37 45.7	+25.5	0.209 3400	+2427
	12	111 34 43.1	27 39.9	43.9	1 38 35.8	24.6	0.209 8212	2384
	14	112 29 59.4	27 36.4	42.9	1 39 24.2	23.8	0.210 2935	2340
	16	113 25 8.6	27 32.9	41.8	1 40 11.0	23.0	0.210 7571	2296
	18	114 20 10.9	27 29.4	40.7	1 40 56.2	22.1	0.211 2117	2251
	20	115 15 6.4	27 26.1	+39.6	+1 41 39.6	+21.3	0.211 6574	+2206
	22	116 9 55.2	27 22.8	38.4	1 42 21.5	20.5	0.212 0941	2161
	24	117 4 37.6	27 19.6	37.2	1 43 1.8	19.7	0.212 5217	2115
	26	117 59 13.6	27 16.4	35.9	1 43 40.3	18.9	0.212 9401	2069
	28	118 53 43.4	27 13.4	34.6	1 44 17.3	18.1	0.213 3492	2023
Oct.	30	119 48 7.1	27 10.4	+33.3	+1 44 52.6	+17.2	0.213 7491	+1976
	2	120 42 24.9	27 7.5	+32.0	+1 45 26.2	+16.4	0.214 1396	+1929

FOR GREENWICH MEAN NOON.

Date.	Helio-centric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Helio-centric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	° ' "	' "	"	° ' "	"		
t. 2	120 42 24.9	27 7.5	+32.0	+1 45 26.2	+16.4	0.214 1396	+1929
4	121 36 37.0	27 4.6	30.6	1 45 58.3	15.6	0.214 5208	1882
6	122 30 43.5	27 1.9	29.2	1 46 28.7	14.8	0.214 8924	1834
8	123 24 44.5	26 59.2	27.7	1 46 57.5	14.0	0.215 2546	1787
10	124 18 40.2	26 56.6	26.3	1 47 24.6	13.1	0.215 6072	1739
12	125 12 30.8	26 54.0	+24.8	+1 47 50.1	+12.4	0.215 9502	+1691
14	126 6 16.4	26 51.6	23.3	1 48 14.1	11.6	0.216 2836	1643
16	126 59 57.2	26 49.2	21.8	1 48 36.4	10.7	0.216 6072	1594
18	127 53 33.2	26 46.9	20.2	1 48 57.0	9.9	0.216 9211	1545
20	128 47 4.7	26 44.6	18.7	1 49 16.1	9.1	0.217 2252	1496
22	129 40 31.8	26 42.5	+17.1	+1 49 33.5	+ 8.3	0.217 5196	+1447
24	130 33 54.6	26 40.4	15.5	1 49 49.4	7.5	0.217 8040	1397
26	131 27 13.3	26 38.3	13.9	1 50 3.6	6.7	0.218 0785	1348
28	132 20 28.0	26 36.4	12.3	1 50 16.2	5.9	0.218 3431	1298
30	133 13 39.0	26 34.6	10.7	1 50 27.2	5.1	0.218 5978	1248
v. 1	134 6 46.3	26 32.8	+ 9.0	+1 50 36.6	+ 4.3	0.218 8424	+1198
3	134 59 50.1	26 31.0	7.4	1 50 44.5	3.6	0.219 0771	1148
5	135 52 50.5	26 29.4	5.7	1 50 50.8	2.8	0.219 3017	1098
7	136 45 47.7	26 27.8	4.1	1 50 55.5	1.9	0.219 5162	1047
9	137 38 41.9	26 26.4	2.4	1 50 58.6	1.1	0.219 7206	996
11	138 31 33.2	26 24.9	+ 0.8	+1 51 0.1	+ 0.4	0.219 9148	+ 946
13	139 24 21.7	26 23.6	- 0.9	1 51 0.1	- 0.4	0.220 0989	895
15	140 17 7.6	26 22.3	2.5	1 50 58.4	1.2	0.220 2728	844
17	141 9 51.0	26 21.1	4.2	1 50 55.3	2.0	0.220 4365	793
19	142 2 32.1	26 20.0	5.8	1 50 50.5	2.8	0.220 5900	742
21	142 55 11.0	26 19.0	- 7.4	+1 50 44.2	- 3.6	0.220 7332	+ 690
23	143 47 48.0	26 18.0	9.1	1 50 36.3	4.3	0.220 8662	639
25	144 40 23.0	26 17.1	10.7	1 50 26.9	5.1	0.220 9889	588
27	145 32 56.4	26 16.3	12.3	1 50 16.0	5.9	0.221 1013	537
29	146 25 28.1	26 15.5	13.9	1 50 3.5	6.6	0.221 2035	485
c. 1	147 17 58.4	26 14.8	-15.5	+1 49 49.6	- 7.4	0.221 2952	+ 433
3	148 10 27.5	26 14.2	17.0	1 49 34.0	8.2	0.221 3767	382
5	149 2 55.4	26 13.7	18.6	1 49 17.0	8.9	0.221 4479	330
7	149 55 22.4	26 13.3	20.1	1 48 58.4	9.7	0.221 5087	278
9	150 47 48.5	26 12.9	21.6	1 48 38.2	10.4	0.221 5591	226
11	151 40 14.0	26 12.6	-23.1	+1 48 16.7	-11.1	0.221 5992	+ 175
13	152 32 38.9	26 12.4	24.6	1 47 53.6	12.0	0.221 6290	123
15	153 25 3.5	26 12.2	26.0	1 47 28.9	12.7	0.221 6484	71
17	154 17 27.8	26 12.1	27.5	1 47 2.8	13.4	0.221 6574	+ 19
19	155 9 52.0	26 12.1	28.9	1 46 35.2	14.2	0.221 6560	- 33
21	156 2 16.3	26 12.2	-30.2	+1 46 6.1	-14.9	0.221 6442	- 85
23	156 54 40.8	26 12.3	31.6	1 45 35.5	15.6	0.221 6221	136
25	157 47 5.7	26 12.6	32.9	1 45 3.5	16.4	0.221 5897	188
27	158 39 31.1	26 12.9	34.2	1 44 30.0	17.1	0.221 5468	240
29	159 31 57.2	26 13.2	35.4	1 43 55.0	17.9	0.221 4936	292
31	160 24 24.1	26 13.7	-36.6	+1 43 18.5	-18.6	0.221 4300	- 344
33	161 16 51.9	26 14.2	-37.8	+1 42 40.6	-19.3	0.221 3561	- 396

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Jan. 1	6 47 17.82	-1.466	+23 2 6.1	+2.01	0.622 8830	+ 5.9	22.43	2.10	12 4.7
2	6 46 42.64	1.466	23 2 54.1	1.99	0.622 9137	19.7	22.43	2.10	12 0.1
3	6 46 7.46	1.465	23 3 41.6	1.97	0.622 9775	33.5	22.42	2.10	11 55.6
4	6 45 32.32	1.463	23 4 28.5	1.94	0.623 0746	47.3	22.42	2.10	11 51.1
5	6 44 57.24	1.460	23 5 14.8	1.91	0.623 2047	61.1	22.41	2.10	11 46.6
6	6 44 22.25	-1.455	+23 6 0.4	+1.89	0.623 3678	+ 74.8	22.40	2.09	11 42.1
7	6 43 47.39	1.450	23 6 45.5	1.87	0.623 5636	88.4	22.39	2.09	11 37.6
8	6 43 12.67	1.443	23 7 30.0	1.84	0.623 7920	101.9	22.38	2.09	11 33.1
9	6 42 38.12	1.436	23 8 13.8	1.81	0.624 0528	115.4	22.37	2.09	11 28.6
10	6 42 3.77	1.427	23 8 56.9	1.78	0.624 3458	128.7	22.35	2.09	11 24.1
11	6 41 29.65	-1.417	+23 9 39.2	+1.75	0.624 6707	+142.0	22.34	2.09	11 19.6
12	6 40 55.78	1.406	23 10 20.8	1.72	0.625 0274	155.2	22.32	2.09	11 15.1
13	6 40 22.19	1.393	23 11 1.7	1.69	0.625 4156	168.3	22.30	2.08	11 10.6
14	6 39 48.90	1.381	23 11 41.9	1.66	0.625 8350	181.2	22.28	2.08	11 6.1
15	6 39 15.93	1.367	23 12 21.2	1.62	0.626 2853	194.0	22.25	2.08	11 1.7
16	6 38 43.31	-1.352	+23 12 59.7	+1.59	0.626 7662	+206.7	22.23	2.08	10 57.2
17	6 38 11.06	1.336	23 13 37.5	1.56	0.627 2773	219.2	22.20	2.08	10 52.7
18	6 37 39.20	1.319	23 14 14.4	1.52	0.627 8184	231.6	22.17	2.07	10 48.3
19	6 37 7.75	1.301	23 14 50.6	1.49	0.628 3891	243.9	22.15	2.07	10 43.8
20	6 36 36.74	1.283	23 15 25.9	1.45	0.628 9891	256.0	22.12	2.07	10 39.4
21	6 36 6.19	-1.263	+23 16 0.4	+1.42	0.629 6180	+268.0	22.08	2.06	10 34.9
22	6 35 36.12	1.243	23 16 34.1	1.39	0.630 2754	279.8	22.05	2.06	10 30.5
23	6 35 6.55	1.221	23 17 7.0	1.35	0.630 9610	291.5	22.01	2.06	10 26.1
24	6 34 37.50	1.199	23 17 39.1	1.32	0.631 6743	302.9	21.98	2.05	10 21.7
25	6 34 9.00	1.176	23 18 10.3	1.28	0.632 4149	314.2	21.94	2.05	10 17.3
26	6 33 41.06	-1.152	+23 18 40.7	+1.25	0.633 1824	+325.3	21.90	2.05	10 12.9
27	6 33 13.70	1.128	23 19 10.3	1.22	0.633 9763	336.2	21.86	2.04	10 8.5
28	6 32 46.94	1.102	23 19 39.1	1.18	0.634 7961	346.9	21.82	2.04	10 4.1
29	6 32 20.81	1.076	23 20 7.1	1.15	0.635 6412	357.4	21.78	2.04	9 59.8
30	6 31 55.32	1.048	23 20 34.3	1.11	0.636 5113	367.7	21.74	2.03	9 55.4
31	6 31 30.49	-1.021	+23 21 0.6	+1.08	0.637 4058	+377.7	21.69	2.03	9 51.1
Feb. 1	6 31 6.33	0.992	23 21 26.1	1.05	0.638 3241	387.5	21.64	2.02	9 46.8
2	6 30 42.86	0.963	23 21 50.8	1.02	0.639 2657	397.1	21.60	2.02	9 42.5
3	6 30 20.10	0.933	23 22 14.8	0.98	0.640 2299	406.4	21.55	2.02	9 38.2
4	6 29 58.07	0.903	23 22 37.9	0.95	0.641 2161	415.4	21.50	2.01	9 33.9
5	6 29 36.77	-0.872	+23 23 0.3	+0.92	0.642 2237	+424.2	21.45	2.01	9 29.6
6	6 29 16.22	0.840	23 23 21.9	0.89	0.643 2522	432.8	21.40	2.00	9 25.3
7	6 28 56.43	0.809	23 23 42.8	0.85	0.644 3008	441.0	21.35	2.00	9 21.1
8	6 28 37.40	0.777	23 24 2.9	0.82	0.645 3690	449.1	21.30	1.99	9 16.8
9	6 28 19.16	0.744	23 24 22.3	0.79	0.646 4561	456.8	21.24	1.99	9 12.6
10	6 28 1.70	-0.711	+23 24 41.0	+0.76	0.647 5616	+464.4	21.19	1.98	9 8.4
11	6 27 45.04	0.677	23 24 58.9	0.73	0.648 6848	471.6	21.13	1.98	9 4.2
12	6 27 29.19	0.644	23 25 16.2	0.71	0.649 8251	478.6	21.08	1.97	9 0.0
13	6 27 14.14	0.610	23 25 32.8	0.68	0.650 9821	485.5	21.02	1.97	8 55.8
14	6 26 59.91	0.576	23 25 48.7	0.65	0.652 1551	492.0	20.97	1.96	8 51.6
15	6 26 46.51	-0.541	+23 26 4.0	+0.62	0.653 3435	+498.3	20.91	1.96	8 47.5
16	6 26 33.94	-0.506	+23 26 18.6	+0.60	0.654 5467	+504.4	20.85	1.95	8 43.4

JUPITER, 1919.

175

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Paralax.	Transit, Meridian of Greenwich.		
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.			
	h	m	s	s	°	'	"	"			"	"	h	m	
b.	16	6	26	33.94	-0.506	+23	26	18.6	+0.60	0.654 5467	+504.4	20.85	1.95	8	43.4
	17	6	26	22.20	0.472	23	26	32.6	0.57	0.655 7643	510.2	20.79	1.94	8	39.2
	18	6	26	11.30	0.437	23	26	45.9	0.54	0.656 9956	515.8	20.73	1.94	8	35.1
	19	6	26	1.24	0.401	23	26	58.7	0.52	0.658 2400	521.2	20.67	1.93	8	31.0
	20	6	25	52.04	0.366	23	27	10.8	0.49	0.659 4970	526.3	20.61	1.93	8	26.9
	21	6	25	43.68	-0.330	+23	27	22.3	+0.47	0.660 7661	+531.2	20.55	1.92	8	22.9
	22	6	25	36.18	0.295	23	27	33.3	0.44	0.662 0467	535.9	20.49	1.92	8	18.9
	23	6	25	29.54	0.259	23	27	43.6	0.42	0.663 3383	540.3	20.43	1.91	8	14.8
	24	6	25	23.76	0.223	23	27	53.3	0.39	0.664 6402	544.6	20.37	1.90	8	10.8
	25	6	25	18.84	0.187	23	28	2.4	0.37	0.665 9521	548.6	20.31	1.90	8	6.8
	26	6	25	14.79	-0.151	+23	28	11.0	+0.34	0.667 2733	+552.4	20.25	1.89	8	2.8
	27	6	25	11.61	0.114	23	28	18.9	0.32	0.668 6033	555.9	20.19	1.89	7	58.8
ir.	28	6	25	9.30	0.078	23	28	26.2	0.29	0.669 9414	559.2	20.12	1.88	7	54.8
	1	6	25	7.86	0.042	23	28	33.0	0.27	0.671 2872	562.2	20.06	1.88	7	50.9
	2	6	25	7.28	-0.006	23	28	39.2	0.25	0.672 6400	565.1	20.00	1.87	7	46.9
	3	6	25	7.57	+0.030	+23	28	44.8	+0.22	0.673 9994	+567.7	19.94	1.86	7	43.0
	4	6	25	8.73	0.066	23	28	49.8	0.20	0.675 3648	570.1	19.88	1.86	7	39.1
	5	6	25	10.76	0.103	23	28	54.3	0.18	0.676 7357	572.2	19.81	1.85	7	35.2
	6	6	25	13.65	0.138	23	28	58.2	0.15	0.678 1114	574.2	19.75	1.85	7	31.3
	7	6	25	17.39	0.174	23	29	1.5	0.12	0.679 4915	575.9	19.69	1.84	7	27.5
	8	6	25	22.00	+0.210	+23	29	4.2	+0.10	0.680 8754	+577.3	19.62	1.83	7	23.6
	9	6	25	27.46	0.245	23	29	6.4	0.08	0.682 2626	578.6	19.56	1.83	7	19.8
	10	6	25	33.76	0.280	23	29	8.0	0.05	0.683 6527	579.7	19.50	1.82	7	16.0
	11	6	25	40.90	0.315	23	29	9.0	+0.03	0.685 0451	580.6	19.44	1.82	7	12.2
	12	6	25	48.88	0.350	23	29	9.4	0.00	0.686 4395	581.4	19.38	1.81	7	8.4
	13	6	25	57.69	+0.384	+23	29	9.2	-0.02	0.687 8355	+581.9	19.31	1.81	7	4.6
	14	6	26	7.33	0.419	23	29	8.5	0.04	0.689 2325	582.3	19.25	1.80	7	0.8
	15	6	26	17.78	0.452	23	29	7.2	0.07	0.690 6303	582.5	19.19	1.79	6	57.0
	16	6	26	29.04	0.486	23	29	5.3	0.09	0.692 0283	582.5	19.13	1.79	6	53.3
	17	6	26	41.11	0.520	23	29	2.8	0.12	0.693 4263	582.4	19.07	1.78	6	49.6
	18	6	26	53.98	+0.553	+23	28	59.7	-0.14	0.694 8238	+582.2	19.00	1.78	6	45.9
	19	6	27	7.65	0.586	23	28	56.0	0.17	0.696 2205	581.7	18.94	1.77	6	42.2
	20	6	27	22.10	0.619	23	28	51.6	0.20	0.697 6159	581.1	18.88	1.77	6	38.5
	21	6	27	37.34	0.651	23	28	46.6	0.22	0.699 0098	580.4	18.82	1.76	6	34.8
	22	6	27	53.35	0.683	23	28	41.0	0.25	0.700 4018	579.6	18.76	1.75	6	31.2
	23	6	28	10.13	+0.715	+23	28	34.7	-0.28	0.701 7916	+578.5	18.70	1.75	6	27.5
pr.	24	6	28	27.68	0.747	23	28	27.7	0.30	0.703 1787	577.4	18.64	1.74	6	23.9
	25	6	28	45.99	0.779	23	28	20.1	0.33	0.704 5630	576.1	18.58	1.74	6	20.2
	26	6	29	5.05	0.810	23	28	11.8	0.36	0.705 9440	574.7	18.52	1.73	6	16.6
	27	6	29	24.86	0.841	23	28	2.7	0.39	0.707 3214	573.1	18.47	1.73	6	13.0
	28	6	29	45.40	+0.871	+23	27	53.0	-0.42	0.708 6949	+571.4	18.41	1.72	6	9.4
	29	6	30	6.68	0.902	23	27	42.5	0.45	0.710 0642	569.6	18.35	1.72	6	5.8
	30	6	30	28.69	0.932	23	27	31.3	0.48	0.711 4288	567.6	18.29	1.71	6	2.3
	31	6	30	51.41	0.962	23	27	19.3	0.52	0.712 7885	565.5	18.23	1.70	5	58.7
	1	6	31	14.85	0.992	23	27	6.5	0.55	0.714 1430	563.2	18.18	1.70	5	55.2
	2	6	31	39.00	+1.021	+23	26	53.0	-0.58	0.715 4919	+560.9	18.12	1.69	5	51.7
	3	6	32	3.84	+1.049	+23	26	38.7	-0.61	0.716 8349	+558.3	18.07	1.69	5	48.2

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.	
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.		
	h	m	s	s	°	'	"	"			"	"	h	m
Apr.	1	6	31	14.85	+0.992	+23	27	6.5	-0.55	0.714 1430	+563.2	18.18	1.70	5 55.2
	2	6	31	39.00	1.021	23	26	53.0	0.58	0.715 4919	560.9	18.12	1.69	5 51.7
	3	6	32	3.84	1.049	23	26	38.7	0.61	0.716 8349	558.3	18.07	1.69	5 48.2
	4	6	32	29.37	1.078	23	26	23.5	0.65	0.718 1717	555.7	18.01	1.68	5 44.6
	5	6	32	55.57	1.106	23	26	7.6	0.68	0.719 5020	552.9	17.95	1.68	5 41.1
	6	6	33	22.45	+1.134	+23	25	50.8	-0.72	0.720 8255	+550.0	17.90	1.67	5 37.7
	7	6	33	49.98	1.161	23	25	33.2	0.75	0.722 1421	547.1	17.85	1.67	5 34.2
	8	6	34	18.17	1.188	23	25	14.7	0.79	0.723 4514	544.0	17.80	1.66	5 30.7
	9	6	34	46.99	1.214	23	24	55.4	0.82	0.724 7533	540.9	17.74	1.66	5 27.3
	10	6	35	16.45	1.240	23	24	35.2	0.86	0.726 0476	537.7	17.69	1.65	5 23.8
	11	6	35	46.53	+1.266	+23	24	14.0	-0.90	0.727 3340	+534.3	17.63	1.65	5 20.4
	12	6	36	17.23	1.292	23	23	52.0	0.94	0.728 6124	531.0	17.58	1.64	5 17.0
	13	6	36	48.53	1.317	23	23	29.0	0.98	0.729 8825	527.5	17.53	1.64	5 13.6
	14	6	37	20.43	1.342	23	23	5.1	1.01	0.731 1442	523.9	17.48	1.63	5 10.2
	15	6	37	52.92	1.366	23	22	40.3	1.05	0.732 3972	520.3	17.43	1.63	5 6.8
	16	6	38	25.99	+1.390	+23	22	14.5	-1.10	0.733 6415	+516.6	17.38	1.62	5 3.4
	17	6	38	59.64	1.414	23	21	47.7	1.14	0.734 8769	512.9	17.33	1.62	5 0.0
	18	6	39	33.85	1.437	23	21	19.9	1.18	0.736 1032	509.1	17.28	1.61	4 56.7
	19	6	40	8.63	1.461	23	20	51.1	1.22	0.737 3203	505.2	17.23	1.61	4 53.3
	20	6	40	43.95	1.483	23	20	21.3	1.26	0.738 5280	501.2	17.19	1.61	4 50.0
	21	6	41	19.81	+1.505	+23	19	50.5	-1.31	0.739 7262	+497.2	17.14	1.60	4 46.6
	22	6	41	56.21	1.528	23	19	18.6	1.35	0.740 9147	493.2	17.09	1.60	4 43.3
	23	6	42	33.14	1.550	23	18	45.6	1.40	0.742 0933	489.0	17.04	1.59	4 40.0
	24	6	43	10.59	1.571	23	18	11.4	1.45	0.743 2619	484.8	17.00	1.59	4 36.7
	25	6	43	48.55	1.592	23	17	36.2	1.49	0.744 4203	480.5	16.95	1.58	4 33.4
	26	6	44	27.02	+1.614	+23	16	59.8	-1.54	0.745 5684	+476.2	16.91	1.58	4 30.1
	27	6	45	6.00	1.634	23	16	22.3	1.58	0.746 7060	471.8	16.86	1.58	4 26.8
	28	6	45	45.46	1.654	23	15	43.7	1.63	0.747 8329	467.3	16.82	1.57	4 23.5
	29	6	46	25.41	1.674	23	15	3.9	1.68	0.748 9490	462.8	16.78	1.57	4 20.3
	30	6	47	5.83	1.694	23	14	22.9	1.73	0.750 0542	458.2	16.73	1.56	4 17.0
May	1	6	47	46.72	+1.713	+23	13	40.7	-1.78	0.751 1483	+453.5	16.69	1.56	4 13.8
	2	6	48	28.06	1.732	23	12	57.3	1.83	0.752 2311	448.8	16.65	1.56	4 10.5
	3	6	49	9.86	1.751	23	12	12.7	1.88	0.753 3025	444.0	16.61	1.55	4 7.3
	4	6	49	52.10	1.769	23	11	26.9	1.93	0.754 3623	439.2	16.57	1.55	4 4.0
	5	6	50	34.78	1.787	23	10	39.9	1.98	0.755 4105	434.3	16.53	1.55	4 0.8
	6	6	51	17.88	+1.804	+23	9	51.7	-2.04	0.756 4470	+429.4	16.49	1.54	3 57.6
	7	6	52	1.39	1.821	23	9	2.2	2.09	0.757 4716	424.5	16.45	1.54	3 54.4
	8	6	52	45.31	1.838	23	8	11.5	2.14	0.758 4844	419.5	16.41	1.53	3 51.2
	9	6	53	29.63	1.855	23	7	19.4	2.20	0.759 4853	414.5	16.38	1.53	3 48.0
	10	6	54	14.34	1.871	23	6	26.1	2.25	0.760 4741	409.5	16.34	1.53	3 44.8
	11	6	54	59.43	+1.887	+23	5	31.5	-2.30	0.761 4509	+404.5	16.30	1.52	3 41.6
	12	6	55	44.89	1.902	23	4	35.6	2.36	0.762 4156	399.4	16.27	1.52	3 38.4
	13	6	56	30.73	1.917	23	3	38.4	2.41	0.763 3682	394.4	16.23	1.52	3 35.3
	14	6	57	16.92	1.933	23	2	39.9	2.47	0.764 3086	389.3	16.19	1.51	3 32.1
	15	6	58	3.47	1.947	23	1	40.0	2.52	0.765 2366	384.1	16.16	1.51	3 28.9
	16	6	58	50.37	+1.961	+23	0	38.8	-2.58	0.766 1523	+378.9	16.13	1.51	3 25.8
	17	6	59	37.61	+1.975	+22	59	36.2	-2.64	0.767 0555	+373.8	16.09	1.50	3 22.6

JUPITER, 1919.

GREENWICH MEAN TIME.

177

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	h	m	s		°	'	"							h	m
17	6	59	37.61	+1.975	+22	59	36.2	-2.64	0.767 0555	+373.8	16.09	1.50	3 22.6
18	7	0	25.19	1.989	22	58	32.2	2.69	0.767 9464	368.6	16.06	1.50	3 19.5
19	7	1	13.09	2.002	22	57	26.9	2.75	0.768 8247	363.4	16.03	1.50	3 16.4
20	7	2	1.31	2.016	22	56	20.2	2.81	0.769 6905	358.1	15.99	1.50	3 13.2
21	7	2	49.85	2.029	22	55	12.1	2.87	0.770 5437	352.8	15.96	1.49	3 10.1
22	7	3	38.70	+2.042	+22	54	2.6	-2.92	0.771 3841	+347.5	15.93	1.49	3 7.0
23	7	4	27.85	2.054	22	52	51.7	2.98	0.772 2118	342.2	15.90	1.49	3 3.9
24	7	5	17.30	2.066	22	51	39.4	3.04	0.773 0267	336.8	15.87	1.48	3 0.8
25	7	6	7.04	2.079	22	50	25.6	3.10	0.773 8286	331.4	15.84	1.48	2 57.7
26	7	6	57.07	2.090	22	49	10.5	3.16	0.774 6176	326.0	15.81	1.48	2 54.6
27	7	7	47.38	+2.102	+22	47	53.9	-3.22	0.775 3934	+320.5	15.79	1.48	2 51.5
28	7	8	37.96	2.113	22	46	35.9	3.28	0.776 1562	315.1	15.76	1.47	2 48.4
29	7	9	28.81	2.124	22	45	16.4	3.34	0.776 9057	309.5	15.73	1.47	2 45.3
30	7	10	19.91	2.134	22	43	55.5	3.40	0.777 6420	304.0	15.70	1.47	2 42.2
31	7	11	11.25	2.144	22	42	33.1	3.46	0.778 3649	298.4	15.68	1.47	2 39.1
e 1	7	12	2.84	+2.155	+22	41	9.3	-3.52	0.779 0745	+292.9	15.65	1.46	2 36.0
2	7	12	54.67	2.164	22	39	44.0	3.58	0.779 7706	287.3	15.63	1.46	2 33.0
3	7	13	46.72	2.173	22	38	17.3	3.64	0.780 4534	281.7	15.60	1.46	2 29.9
4	7	14	38.99	2.183	22	36	49.2	3.70	0.781 1226	276.0	15.58	1.46	2 26.8
5	7	15	31.48	2.191	22	35	19.6	3.76	0.781 7784	270.5	15.56	1.45	2 23.8
6	7	16	24.17	+2.200	+22	33	48.6	-3.82	0.782 4208	+264.8	15.53	1.45	2 20.7
7	7	17	17.06	2.208	22	32	16.1	3.88	0.783 0496	259.2	15.51	1.45	2 17.7
8	7	18	10.15	2.216	22	30	42.2	3.94	0.783 6649	253.6	15.49	1.45	2 14.6
9	7	19	3.43	2.224	22	29	6.8	4.00	0.784 2667	247.9	15.47	1.45	2 11.6
10	7	19	56.88	2.231	22	27	30.0	4.06	0.784 8549	242.3	15.45	1.44	2 8.5
11	7	20	50.52	+2.238	+22	25	51.8	-4.12	0.785 4296	+236.6	15.43	1.44	2 5.5
12	7	21	44.32	2.245	22	24	12.1	4.19	0.785 9908	231.0	15.41	1.44	2 2.4
13	7	22	38.29	2.252	22	22	30.9	4.25	0.786 5386	225.4	15.39	1.44	1 59.4
14	7	23	32.42	2.259	22	20	48.3	4.30	0.787 0728	219.8	15.37	1.44	1 56.4
15	7	24	26.71	2.265	22	19	4.3	4.36	0.787 5935	214.1	15.35	1.44	1 53.3
16	7	25	21.14	+2.271	+22	17	18.8	-4.43	0.788 1005	+208.4	15.33	1.43	1 50.3
17	7	26	15.72	2.277	22	15	31.8	4.49	0.788 5940	202.8	15.31	1.43	1 47.3
18	7	27	10.44	2.283	22	13	43.4	4.55	0.789 0738	197.1	15.30	1.43	1 44.3
19	7	28	5.30	2.288	22	11	53.6	4.61	0.789 5399	191.3	15.28	1.43	1 41.2
20	7	29	0.28	2.294	22	10	2.3	4.67	0.789 9923	185.7	15.26	1.43	1 38.2
21	7	29	55.40	+2.299	+22	8	9.5	-4.73	0.790 4311	+180.0	15.25	1.43	1 35.2
22	7	30	50.63	2.304	22	6	15.3	4.79	0.790 8561	174.2	15.23	1.42	1 32.2
23	7	31	45.98	2.308	22	4	19.7	4.85	0.791 2673	168.5	15.22	1.42	1 29.2
24	7	32	41.43	2.313	22	2	22.7	4.90	0.791 6647	162.7	15.21	1.42	1 26.2
25	7	33	36.99	2.317	22	0	24.3	4.96	0.792 0482	156.9	15.19	1.42	1 23.1
26	7	34	32.65	+2.321	+21	58	24.5	-5.02	0.792 4179	+151.1	15.18	1.42	1 20.1
27	7	35	28.40	2.325	21	56	23.2	5.08	0.792 7736	145.3	15.17	1.42	1 17.1
28	7	36	24.23	2.328	21	54	20.6	5.14	0.793 1153	139.4	15.16	1.42	1 14.1
29	7	37	20.14	2.331	21	52	16.6	5.20	0.793 4429	133.6	15.14	1.42	1 11.1
30	7	38	16.13	2.334	21	50	11.2	5.25	0.793 7565	127.8	15.13	1.41	1 8.1
y 1	7	39	12.18	+2.337	+21	48	4.5	-5.31	0.794 0562	+121.9	15.12	1.41	1 5.1
2	7	40	8.29	+2.339	+21	45	56.4	-5.36	0.794 3418	+116.1	15.11	1.41	1 2.3

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
	h	m	s	s	°	'	"	"		"	"	"	h m
July	1	7 39	12.18	+2.337	+21 48	4.5		-5.31	0.794 0562	+121.9	15.12	1.41	1 5.1
	2	7 40	8.29	2.339	21 45	56.4		5.36	0.794 3418	116.1	15.11	1.41	1 2.1
	3	7 41	4.46	2.341	21 43	47.0		5.42	0.794 6135	110.3	15.10	1.41	0 59.1
	4	7 42	0.67	2.343	21 41	36.3		5.48	0.794 8712	104.5	15.09	1.41	0 56.1
	5	7 42	56.93	2.345	21 39	24.2		5.53	0.795 1150	98.6	15.09	1.41	0 53.1
	6	7 43	53.23	+2.346	+21 37	10.9		-5.58	0.795 3447	+ 92.8	15.08	1.41	0 50.1
	7	7 44	49.56	2.348	21 34	56.3		5.64	0.795 5605	87.0	15.07	1.41	0 47.1
	8	7 45	45.92	2.349	21 32	40.4		5.69	0.795 7623	81.2	15.06	1.41	0 44.1
	9	7 46	42.31	2.350	21 30	23.2		5.74	0.795 9502	75.4	15.06	1.41	0 41.1
	10	7 47	38.71	2.350	21 28	4.8		5.79	0.796 1241	69.6	15.05	1.41	0 38.1
	11	7 48	35.13	+2.351	+21 25	45.1		-5.85	0.796 2842	+ 63.8	15.05	1.41	0 35.1
	12	7 49	31.56	2.351	21 23	24.2		5.90	0.796 4303	58.0	15.04	1.41	0 32.1
	13	7 50	27.99	2.351	21 21	2.0		5.95	0.796 5626	52.2	15.04	1.41	0 29.1
	14	7 51	24.42	2.351	21 18	38.7		6.00	0.796 6810	46.4	15.03	1.41	0 26.1
	15	7 52	20.85	2.351	21 16	14.1		6.05	0.796 7855	40.6	15.03	1.41	0 23.1
	16	7 53	17.28	+2.351	+21 13	48.3		-6.10	0.796 8761	+ 34.9	15.02	1.40	0 20.2
	17	7 54	13.69	2.350	21 11	21.4		6.15	0.796 9528	29.0	15.02	1.40	0 17.2
	18	7 55	10.09	2.350	21 8	53.3		6.19	0.797 0155	23.2	15.02	1.40	0 14.2
	19	7 56	6.47	2.349	21 6	24.1		6.24	0.797 0643	17.4	15.02	1.40	0 11.2
	20	7 57	2.82	2.347	21 3	53.7		6.29	0.797 0991	11.6	15.02	1.40	0 8.2
	21	7 57	59.14	+2.346	+21 1	22.2		-6.34	0.797 1198	+ 5.7	15.02	1.40	0 5.2
	22	7 58	55.43	2.345	20 58	49.6		6.38	0.797 1264	- 0.3	15.02	1.40	0 2.2
	23	7 59	51.68	2.343	20 56	15.9		6.43	0.797 1190	6.0	15.02	1.40	23 56.1
	24	8 0	47.89	2.341	20 53	41.2		6.47	0.797 0974	11.9	15.02	1.40	23 53.1
	25	8 1	44.05	2.339	20 51	5.5		6.51	0.797 0617	17.8	15.02	1.40	23 50.1
	26	8 2	40.15	+2.336	+20 48	28.7		-6.55	0.797 0119	- 23.7	15.02	1.40	23 47.1
	27	8 3	36.19	2.334	20 45	50.9		6.60	0.796 9480	29.6	15.02	1.40	23 44.1
	28	8 4	32.16	2.331	20 43	12.1		6.63	0.796 8699	35.5	15.02	1.40	23 41.1
	29	8 5	28.06	2.328	20 40	32.5		6.67	0.796 7777	41.3	15.03	1.41	23 38.1
	30	8 6	23.88	2.324	20 37	51.9		6.71	0.796 6714	47.3	15.03	1.41	23 35.1
	31	8 7	19.62	+2.320	+20 35	10.4		-6.75	0.796 5509	- 53.1	15.04	1.41	23 32.1
Aug.	1	8 8	15.26	2.317	20 32	28.0		6.78	0.796 4164	59.0	15.04	1.41	23 29.1
	2	8 9	10.82	2.313	20 29	44.8		6.82	0.796 2678	64.8	15.05	1.41	23 26.1
	3	8 10	6.27	2.308	20 27	0.7		6.85	0.796 1052	70.7	15.05	1.41	23 23.1
	4	8 11	1.62	2.304	20 24	15.8		6.88	0.795 9285	76.5	15.06	1.41	23 20.1
	5	8 11	56.86	+2.299	+20 21	30.2		-6.92	0.795 7379	- 82.3	15.06	1.41	23 17.1
	6	8 12	51.99	2.295	20 18	43.7		6.95	0.795 5334	88.1	15.07	1.41	23 14.0
	7	8 13	47.00	2.290	20 15	56.5		6.98	0.795 3149	93.9	15.08	1.41	23 11.0
	8	8 14	41.89	2.284	20 13	8.6		7.01	0.795 0825	99.7	15.09	1.41	23 8.0
	9	8 15	36.65	2.279	20 10	20.0		7.04	0.794 8362	105.5	15.10	1.41	23 4.9
	10	8 16	31.29	+2.274	+20 7	30.7		-7.07	0.794 5760	-111.3	15.10	1.41	23 1.9
	11	8 17	25.78	2.268	20 4	40.7		7.10	0.794 3020	117.1	15.11	1.41	22 58.9
	12	8 18	20.14	2.262	20 1	50.1		7.12	0.794 0141	122.9	15.12	1.41	22 55.9
	13	8 19	14.36	2.256	19 58	58.9		7.15	0.793 7122	128.7	15.13	1.42	22 52.8
	14	8 20	8.43	2.250	19 56	7.1		7.17	0.793 3965	134.4	15.15	1.42	22 49.8
	15	8 21	2.35	+2.243	+19 53	14.7		-7.19	0.793 0670	-140.2	15.16	1.42	22 46.8
	16	8 21	56.11	+2.237	+19 50	21.8		-7.21	0.792 7236	-146.0	15.17	1.42	22 43.7

JUPITER, 1919.

179

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	" ' "	"			"	"	h m
Aug. 16	8 21 56.11	+2.237	+19 50 21.8	-7.21	0.792 7236	-146.0	15.17	1.42	22 43.7
17	8 22 49.72	2.230	19 47 28.4	7.24	0.792 3664	151.7	15.18	1.42	22 40.7
18	8 23 43.16	2.223	19 44 34.5	7.25	0.791 9952	157.6	15.19	1.42	22 37.6
19	8 24 36.42	2.216	19 41 40.2	7.27	0.791 6101	163.4	15.21	1.42	22 34.6
20	8 25 29.52	2.209	19 38 45.4	7.29	0.791 2110	169.2	15.22	1.42	22 31.5
21	8 26 22.44	+2.201	+19 35 50.3	-7.31	0.790 7979	-175.0	15.24	1.42	22 28.5
22	8 27 15.17	2.193	19 32 54.8	7.32	0.790 3709	180.8	15.25	1.43	22 25.4
23	8 28 7.70	2.185	19 29 59.0	7.33	0.789 9299	186.6	15.27	1.43	22 22.3
24	8 29 0.04	2.177	19 27 2.9	7.34	0.789 4750	192.4	15.28	1.43	22 19.3
25	8 29 52.18	2.168	19 24 6.5	7.35	0.789 0062	198.2	15.30	1.43	22 16.2
26	8 30 44.10	+2.159	+19 21 10.0	-7.36	0.788 5236	-204.0	15.32	1.43	22 13.2
27	8 31 35.81	2.150	19 18 13.2	7.37	0.788 0271	209.8	15.33	1.43	22 10.1
28	8 32 27.30	2.140	19 15 16.3	7.37	0.787 5168	215.5	15.35	1.44	22 7.0
29	8 33 18.55	2.131	19 12 19.3	7.37	0.786 9927	221.3	15.37	1.44	22 3.9
30	8 34 9.58	2.121	19 9 22.3	7.38	0.786 4548	227.0	15.39	1.44	22 0.8
31	8 35 0.37	+2.111	+19 6 25.2	-7.38	0.785 9033	-232.6	15.41	1.44	21 57.7
Sept. 1	8 35 50.92	2.101	19 3 28.1	7.38	0.785 3382	238.3	15.43	1.44	21 54.6
2	8 36 41.23	2.091	19 0 31.0	7.38	0.784 7595	243.9	15.45	1.44	21 51.5
3	8 37 31.28	2.080	18 57 34.0	7.38	0.784 1673	249.5	15.47	1.45	21 48.4
4	8 38 21.07	2.069	18 54 37.0	7.37	0.783 5617	255.1	15.49	1.45	21 45.3
5	8 39 10.60	+2.058	+18 51 40.2	-7.36	0.782 9427	-260.7	15.51	1.45	21 42.2
6	8 39 59.86	2.047	18 48 43.5	7.36	0.782 3102	266.3	15.54	1.45	21 39.1
7	8 40 48.84	2.035	18 45 47.1	7.35	0.781 6644	271.9	15.56	1.45	21 35.9
8	8 41 37.55	2.024	18 42 50.8	7.34	0.781 0053	277.4	15.58	1.46	21 32.8
9	8 42 25.99	2.012	18 39 54.8	7.33	0.780 3329	282.9	15.61	1.46	21 29.7
10	8 43 14.14	+2.000	+18 36 59.0	-7.32	0.779 6472	-288.4	15.63	1.46	21 26.5
11	8 44 2.00	1.988	18 34 3.6	7.30	0.778 9484	293.9	15.66	1.46	21 23.4
12	8 44 49.56	1.976	18 31 8.6	7.28	0.778 2363	299.4	15.68	1.47	21 20.2
13	8 45 36.83	1.963	18 28 14.0	7.27	0.777 5111	304.9	15.71	1.47	21 17.1
14	8 46 23.79	1.950	18 25 19.8	7.25	0.776 7728	310.4	15.74	1.47	21 13.9
15	8 47 10.43	+1.937	+18 22 26.1	-7.23	0.776 0214	-315.9	15.76	1.47	21 10.8
16	8 47 56.75	1.924	18 19 32.9	7.20	0.775 2568	321.3	15.79	1.48	21 7.6
17	8 48 42.76	1.910	18 16 40.3	7.18	0.774 4792	326.7	15.82	1.48	21 4.4
18	8 49 28.43	1.896	18 13 48.3	7.15	0.773 6885	332.2	15.85	1.48	21 1.3
19	8 50 13.77	1.882	18 10 56.9	7.13	0.772 8847	337.6	15.88	1.48	20 58.1
20	8 50 58.77	+1.868	+18 8 6.3	-7.09	0.772 0681	-342.9	15.91	1.49	20 54.9
21	8 51 43.42	1.853	18 5 16.4	7.06	0.771 2386	348.3	15.94	1.49	20 51.7
22	8 52 27.71	1.838	18 2 27.3	7.03	0.770 3963	353.6	15.97	1.49	20 48.5
23	8 53 11.63	1.823	17 59 39.1	6.99	0.769 5412	358.9	16.00	1.50	20 45.3
24	8 53 55.19	1.807	17 56 51.7	6.96	0.768 6736	364.1	16.03	1.50	20 42.0
25	8 54 38.37	+1.792	+17 54 5.2	-6.91	0.767 7934	-369.3	16.07	1.50	20 38.8
26	8 55 21.18	1.775	17 51 19.8	6.87	0.766 9008	374.5	16.10	1.51	20 35.6
27	8 56 3.59	1.759	17 48 35.3	6.83	0.765 9958	379.6	16.13	1.51	20 32.4
28	8 56 45.61	1.743	17 45 51.9	6.79	0.765 0786	384.7	16.17	1.51	20 29.1
29	8 57 27.23	1.726	17 43 9.6	6.74	0.764 1492	389.8	16.20	1.51	20 25.9
30	8 58 8.44	+1.709	+17 40 28.5	-6.69	0.763 2078	-394.8	16.24	1.52	20 22.8
Oct. 1	8 58 49.24	+1.691	+17 37 48.5	-6.64	0.762 2544	-399.7	16.27	1.52	20 19.9

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.	
	Noon.				Noon.									
	h	m	s	s	"	'	"	"			"	"	h	m
Oct.	1	8 58	49.24	+1.691	+17 37	48.5		-6.64	0.762 2544	-399.7	16.27	1.52	20 19.3	
	2	8 59	29.62	1.674	17 35	9.8		6.59	0.761 2892	404.6	16.31	1.52	20 16.1	
	3	9 0	9.58	1.656	17 32	32.3		6.53	0.760 3124	409.4	16.34	1.53	20 12.8	
	4	9 0	49.11	1.638	17 29	56.2		6.48	0.759 3239	414.3	16.38	1.53	20 9.6	
	5	9 1	28.20	1.619	17 27	21.4		6.42	0.758 3240	419.0	16.42	1.54	20 6.3	
	6	9 2	6.84	+1.601	+17 24	48.0		-6.36	0.757 3128	-423.7	16.46	1.54	20 3.0	
	7	9 2	45.04	1.583	17 22	16.1		6.30	0.756 2904	428.3	16.50	1.54	19 59.7	
	8	9 3	22.80	1.564	17 19	45.7		6.24	0.755 2568	433.0	16.54	1.55	19 56.4	
	9	9 4	0.09	1.544	17 17	16.8		6.17	0.754 2122	437.5	16.58	1.55	19 53.0	
	10	9 4	36.91	1.525	17 14	49.5		6.10	0.753 1567	442.0	16.62	1.55	19 49.7	
	11	9 5	13.27	+1.505	+17 12	23.8		-6.04	0.752 0904	-446.5	16.66	1.56	19 46.3	
	12	9 5	49.16	1.485	17 9	59.8		5.96	0.751 0134	451.0	16.70	1.56	19 43.0	
	13	9 6	24.56	1.465	17 7	37.6		5.89	0.749 9258	455.4	16.74	1.57	19 39.6	
	14	9 6	59.47	1.444	17 5	17.1		5.82	0.748 8277	459.7	16.78	1.57	19 36.3	
	15	9 7	33.89	1.424	17 2	58.4		5.74	0.747 7192	464.0	16.83	1.57	19 33.0	
	16	9 8	7.80	+1.402	+17 0	41.7		-5.66	0.746 6004	-468.3	16.87	1.58	19 29.6	
	17	9 8	41.20	1.381	16 58	26.8		5.58	0.745 4716	472.4	16.91	1.58	19 26.2	
	18	9 9	14.07	1.359	16 56	13.9		5.50	0.744 3328	476.6	16.96	1.59	19 22.8	
	19	9 9	46.42	1.337	16 54	3.0		5.41	0.743 1842	480.6	17.00	1.59	19 19.4	
	20	9 10	18.24	1.315	16 51	54.2		5.32	0.742 0261	484.5	17.05	1.59	19 16.0	
	21	9 10	49.52	+1.292	+16 49	47.6		-5.23	0.740 8585	-488.4	17.09	1.60	19 12.5	
	22	9 11	20.24	1.269	16 47	43.2		5.14	0.739 6819	492.2	17.14	1.60	19 9.1	
	23	9 11	50.41	1.245	16 45	41.0		5.04	0.738 4963	495.8	17.19	1.61	19 5.7	
	24	9 12	20.01	1.222	16 43	41.2		4.95	0.737 3019	499.5	17.23	1.61	19 2.2	
	25	9 12	49.05	1.198	16 41	43.6		4.85	0.736 0989	503.0	17.28	1.62	18 58.7	
	26	9 13	17.50	+1.173	+16 39	48.5		-4.75	0.734 8877	-506.4	17.33	1.62	18 55.3	
	27	9 13	45.37	1.149	16 37	55.8		4.65	0.733 6684	509.7	17.38	1.62	18 51.8	
	28	9 14	12.65	1.124	16 36	5.5		4.54	0.732 4413	512.9	17.43	1.63	18 48.3	
	29	9 14	39.34	1.099	16 34	17.7		4.44	0.731 2065	516.0	17.48	1.63	18 44.8	
	30	9 15	5.42	1.074	16 32	32.5		4.33	0.729 9645	519.0	17.53	1.64	18 41.3	
Nov.	31	9 15	30.89	+1.049	+16 30	49.9		-4.22	0.728 7154	-521.9	17.58	1.64	18 37.8	
	1	9 15	55.75	1.023	16 29	9.9		4.11	0.727 4594	524.7	17.63	1.65	18 34.3	
	2	9 16	19.98	0.997	16 27	32.6		4.00	0.726 1970	527.4	17.68	1.65	18 30.7	
	3	9 16	43.59	0.971	16 25	58.1		3.88	0.724 9282	529.9	17.73	1.66	18 27.2	
	4	9 17	6.57	0.944	16 24	26.3		3.77	0.723 6535	532.3	17.78	1.66	18 23.6	
	5	9 17	28.91	+0.917	+16 22	57.3		-3.65	0.722 3730	-534.7	17.84	1.67	18 20.1	
	6	9 17	50.60	0.890	16 21	31.2		3.53	0.721 0871	536.9	17.89	1.67	18 16.5	
	7	9 18	11.64	0.863	16 20	8.0		3.41	0.719 7960	539.0	17.94	1.68	18 12.9	
	8	9 18	32.03	0.836	16 18	47.7		3.29	0.718 4999	541.0	18.00	1.68	18 9.3	
	9	9 18	51.76	0.808	16 17	30.3		3.16	0.717 1991	543.0	18.05	1.69	18 5.7	
	10	9 19	10.82	+0.780	+16 16	16.0		-3.03	0.715 8938	-544.8	18.10	1.69	18 2.1	
	11	9 19	29.21	0.752	16 15	4.7		2.90	0.714 5844	546.4	18.16	1.70	17 58.5	
	12	9 19	46.91	0.723	16 13	56.5		2.78	0.713 2711	548.0	18.21	1.70	17 54.8	
	13	9 20	3.93	0.695	16 12	51.5		2.64	0.711 9543	549.4	18.27	1.71	17 51.1	
	14	9 20	20.25	0.665	16 11	49.7		2.51	0.710 6343	550.6	18.32	1.71	17 47.5	
15	9 20	35.87	+0.636	+16 10	51.1		-2.37	0.709 3114	-551.8	18.38	1.72	17 43.8		
16	9 20	50.78	+0.606	+16 9	55.8		-2.24	0.707 9860	-552.7	18.44	1.72	17 40.1		

JUPITER, 1919.

181

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
iv. 16	9 20 50.78	+0.606	+16 9 55.8	-2.24	0.707 9860	-552.7	18.44	1.72	17 40.1
17	9 21 4.98	0.577	16 9 3.8	2.10	0.706 6586	553.5	18.49	1.73	17 36.4
18	9 21 18.46	0.546	16 8 15.2	1.95	0.705 3294	554.1	18.55	1.73	17 32.6
19	9 21 31.20	0.516	16 7 30.0	1.81	0.703 9990	554.5	18.61	1.74	17 28.9
20	9 21 43.22	0.485	16 6 48.2	1.67	0.702 6677	554.8	18.66	1.74	17 25.2
21	9 21 54.50	+0.455	+16 6 9.8	-1.53	0.701 3359	-554.9	18.72	1.75	17 21.4
22	9 22 5.04	0.424	16 5 34.8	1.38	0.700 0041	554.9	18.78	1.76	17 17.6
23	9 22 14.83	0.392	16 5 3.4	1.23	0.698 6727	554.6	18.84	1.76	17 13.9
24	9 22 23.87	0.361	16 4 35.5	1.09	0.697 3421	554.2	18.89	1.77	17 10.1
25	9 22 32.16	0.330	16 4 11.1	0.94	0.696 0128	553.5	18.95	1.77	17 6.3
26	9 22 39.69	+0.298	+16 3 50.3	-0.79	0.694 6853	-552.7	19.01	1.78	17 2.5
27	9 22 46.46	0.266	16 3 33.0	0.65	0.693 3600	551.7	19.07	1.78	16 58.6
28	9 22 52.47	0.234	16 3 19.3	0.50	0.692 0374	550.4	19.13	1.79	16 54.8
29	9 22 57.70	0.202	16 3 9.2	0.34	0.690 7180	549.0	19.19	1.79	16 51.0
30	9 23 2.17	0.170	16 3 2.8	0.19	0.689 4022	547.4	19.24	1.80	16 47.1
sc. 1	9 23 5.87	+0.138	+16 3 0.0	-0.04	0.688 0907	-545.5	19.30	1.80	16 43.2
2	9 23 8.80	0.106	16 3 0.8	+0.11	0.686 7838	543.5	19.36	1.81	16 39.3
3	9 23 10.95	0.074	16 3 5.3	0.26	0.685 4819	541.3	19.42	1.82	16 35.4
4	9 23 12.33	0.041	16 3 13.4	0.41	0.684 1856	538.9	19.48	1.82	16 31.5
5	9 23 12.93	+0.009	16 3 25.1	0.56	0.682 8953	536.3	19.53	1.83	16 27.6
6	9 23 12.76	-0.023	+16 3 40.5	+0.72	0.681 6116	-533.4	19.59	1.83	16 23.6
7	9 23 11.81	0.056	16 3 59.5	0.87	0.680 3349	530.4	19.65	1.84	16 19.7
8	9 23 10.09	0.088	16 4 22.2	1.02	0.679 0656	527.3	19.71	1.84	16 15.7
9	9 23 7.58	0.121	16 4 48.5	1.17	0.677 8042	523.9	19.76	1.85	16 11.7
10	9 23 4.30	0.153	16 5 18.4	1.32	0.676 5512	520.2	19.82	1.85	16 7.7
11	9 23 0.23	-0.186	+16 5 52.0	+1.47	0.675 3073	-516.3	19.88	1.86	16 3.7
12	9 22 55.39	0.218	16 6 29.2	1.63	0.674 0729	512.2	19.93	1.86	15 59.7
13	9 22 49.77	0.250	16 7 10.1	1.78	0.672 8487	507.9	19.99	1.87	15 55.7
14	9 22 43.37	0.283	16 7 54.6	1.93	0.671 6351	503.4	20.05	1.87	15 51.6
15	9 22 36.19	0.315	16 8 42.7	2.08	0.670 4328	498.5	20.10	1.88	15 47.6
16	9 22 28.23	-0.348	+16 9 34.4	+2.23	0.669 2424	-493.5	20.16	1.88	15 43.5
17	9 22 19.50	0.380	16 10 29.6	2.37	0.668 0643	488.2	20.21	1.89	15 39.4
18	9 22 10.00	0.412	16 11 28.3	2.52	0.666 8992	482.6	20.27	1.89	15 35.3
19	9 21 59.73	0.444	16 12 30.6	2.67	0.665 7478	476.8	20.32	1.90	15 31.2
20	9 21 48.70	0.475	16 13 36.3	2.81	0.664 6106	470.8	20.37	1.90	15 27.1
21	9 21 36.91	-0.507	+16 14 45.4	+2.95	0.663 4883	-464.4	20.43	1.91	15 22.9
22	9 21 24.37	0.538	16 15 57.9	3.09	0.662 3815	457.9	20.48	1.91	15 18.8
23	9 21 11.09	0.569	16 17 13.7	3.23	0.661 2907	451.1	20.53	1.92	15 14.6
24	9 20 57.07	0.599	16 18 32.8	3.37	0.660 2166	444.0	20.58	1.92	15 10.5
25	9 20 42.32	0.630	16 19 55.2	3.50	0.659 1598	436.6	20.63	1.93	15 6.3
26	9 20 26.84	-0.660	+16 21 20.7	+3.63	0.658 1209	-429.1	20.68	1.93	15 2.1
27	9 20 10.66	0.689	16 22 49.3	3.76	0.657 1003	421.3	20.73	1.94	14 57.9
28	9 19 53.77	0.718	16 24 21.0	3.88	0.656 0987	413.3	20.78	1.94	14 53.6
29	9 19 36.19	0.747	16 25 55.7	4.01	0.655 1166	405.1	20.82	1.95	14 49.4
30	9 19 17.93	0.775	16 27 33.3	4.13	0.654 1546	396.6	20.87	1.95	14 45.2
31	9 18 59.00	-0.803	+16 29 13.8	+4.25	0.653 2131	-387.9	20.92	1.96	14 40.9
32	9 18 39.41	-0.830	+16 30 57.1	+4.36	0.652 2928	-379.0	20.96	1.96	14 36.7

FOR GREENWICH MEAN NOON.

Date.		Helio-centric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Helio-centric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		" " "	" "	" "	" " "	" "		
Jan.	3	100 52 20.2	5 1.42	+ 1.2	+0 1 45.0	+6.89	0.714 3646	+303.4
	7	101 12 25.6	5 1.26	1.5	0 2 12.6	6.89	0.714 4859	303.2
	11	101 32 30.3	5 1.09	1.8	0 2 40.1	6.88	0.714 6072	303.2
	15	101 52 34.3	5 0.91	2.1	0 3 7.6	6.86	0.714 7285	303.2
	19	102 12 37.6	5 0.75	2.4	0 3 35.0	6.86	0.714 8498	303.2
	23	102 32 40.3	5 0.59	+ 2.7	+0 4 2.5	+6.86	0.714 9711	+303.1
	27	102 52 42.3	5 0.43	3.0	0 4 29.9	6.85	0.715 0923	303.0
	31	103 12 43.7	5 0.25	3.3	0 4 57.3	6.84	0.715 2135	303.0
Feb.	4	103 32 44.3	5 0.09	3.7	0 5 24.6	6.83	0.715 3347	302.9
	8	103 52 44.4	4 59.93	4.0	0 5 51.9	6.82	0.715 4558	302.7
	12	104 12 43.7	4 59.75	+ 4.3	+0 6 19.2	+6.82	0.715 5769	+302.7
	16	104 32 42.4	4 59.59	4.6	0 6 46.5	6.82	0.715 6980	302.7
	20	104 52 40.4	4 59.41	4.9	0 7 13.8	6.81	0.715 8191	302.5
	24	105 12 37.7	4 59.25	5.2	0 7 41.0	6.80	0.715 9400	302.4
	28	105 32 34.4	4 59.09	5.5	0 8 8.2	6.80	0.716 0610	302.3
Mar.	4	105 52 30.4	4 58.91	+ 5.8	+0 8 35.4	+6.79	0.716 1818	+302.0
	8	106 12 25.7	4 58.75	6.1	0 9 2.5	6.78	0.716 3026	301.9
	12	106 32 20.4	4 58.60	6.4	0 9 29.6	6.76	0.716 4233	301.8
	16	106 52 14.5	4 58.44	6.7	0 9 56.6	6.75	0.716 5440	301.5
	20	107 12 7.9	4 58.26	7.0	0 10 23.6	6.75	0.716 6645	301.2
	24	107 32 0.6	4 58.10	+ 7.3	+0 10 50.6	+6.75	0.716 7850	+301.1
	28	107 51 52.7	4 57.94	7.6	0 11 17.6	6.74	0.716 9054	300.9
Apr.	1	108 11 44.1	4 57.76	7.9	0 11 44.5	6.72	0.717 0257	300.6
	5	108 31 34.8	4 57.60	8.2	0 12 11.4	6.71	0.717 1459	300.4
	9	108 51 24.9	4 57.44	8.5	0 12 38.2	6.71	0.717 2660	300.1
	13	109 11 14.3	4 57.26	+ 8.8	+0 13 5.1	+6.70	0.717 3860	+299.7
	17	109 31 3.0	4 57.11	9.1	0 13 31.8	6.69	0.717 5058	299.5
	21	109 50 51.2	4 56.95	9.4	0 13 58.5	6.68	0.717 6256	299.4
	25	110 10 38.6	4 56.79	9.7	0 14 25.2	6.66	0.717 7453	299.0
	29	110 30 25.5	4 56.64	10.0	0 14 51.8	6.65	0.717 8648	298.6
May	3	110 50 11.7	4 56.46	+10.2	+0 15 18.4	+6.64	0.717 9842	+298.4
	7	111 9 57.2	4 56.29	10.5	0 15 44.9	6.63	0.718 1035	298.1
	11	111 29 42.0	4 56.12	10.8	0 16 11.4	6.62	0.718 2227	297.9
	15	111 49 26.2	4 55.98	11.1	0 16 37.9	6.61	0.718 3418	297.5
	19	112 9 9.8	4 55.81	11.4	0 17 4.3	6.60	0.718 4607	297.1
	23	112 28 52.7	4 55.64	+11.6	+0 17 30.7	+6.59	0.718 5795	+296.8
	27	112 48 34.9	4 55.47	11.9	0 17 57.0	6.56	0.718 6981	296.4
	31	113 8 16.5	4 55.32	12.2	0 18 23.2	6.55	0.718 8166	296.0
June	4	113 27 57.5	4 55.18	12.5	0 18 49.4	6.54	0.718 9349	295.6
	8	113 47 37.9	4 55.01	12.7	0 19 15.5	6.53	0.719 0531	295.2
	12	114 7 17.6	4 54.85	+13.0	+0 19 41.6	+6.52	0.719 1711	+294.9
	16	114 26 56.7	4 54.69	13.3	0 20 7.7	6.51	0.719 2890	294.5
	20	114 46 35.1	4 54.52	13.5	0 20 33.7	6.49	0.719 4067	294.0
	24	115 6 12.9	4 54.38	13.8	0 20 59.6	6.48	0.719 5242	293.6
	28	115 25 50.1	4 54.21	14.1	0 21 25.5	6.46	0.719 6416	293.3
July	2	115 45 26.6	4 54.05	+14.3	+0 21 51.3	+6.45	0.719 7588	+292.8
	6	116 5 2.5	4 53.90	+14.6	+0 22 17.1	+6.44	0.719 8758	+292.2

JUPITER, 1919.

183

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		° ' "	' "	"	° ' "	"		
uly	2	115 45 26.6	4 54.05	+14.3	+0 21 51.3	+6.45	0.719 7588	+292.8
	6	116 5 2.5	4 53.90	14.6	0 22 17.1	6.44	0.719 8758	292.2
	10	116 24 37.8	4 53.74	14.8	0 22 42.8	6.42	0.719 9926	291.7
	14	116 44 12.4	4 53.59	15.1	0 23 8.5	6.40	0.720 1092	291.4
	18	117 3 46.5	4 53.44	15.4	0 23 34.0	6.39	0.720 2257	291.0
	22	117 23 19.9	4 53.26	+15.6	+0 23 59.6	+6.38	0.720 3420	+290.5
	26	117 42 52.6	4 53.11	15.8	0 24 25.0	6.36	0.720 4581	289.9
	30	118 2 24.8	4 52.96	16.1	0 24 50.5	6.35	0.720 5739	289.4
ug.	3	118 21 56.3	4 52.78	16.3	0 25 15.8	6.34	0.720 6896	289.0
	7	118 41 27.1	4 52.64	16.6	0 25 41.2	6.32	0.720 8051	288.5
	11	119 0 57.4	4 52.50	+16.8	+0 26 6.4	+6.30	0.720 9204	+287.9
	15	119 20 27.1	4 52.34	17.0	0 26 31.6	6.29	0.721 0354	287.4
	19	119 39 56.1	4 52.19	17.3	0 26 56.7	6.26	0.721 1503	286.9
	23	119 59 24.6	4 52.04	17.5	0 27 21.7	6.24	0.721 2649	286.3
	27	120 18 52.4	4 51.87	17.7	0 27 46.6	6.23	0.721 3793	285.8
	31	120 38 19.6	4 51.72	+18.0	+0 28 11.5	+6.22	0.721 4935	+285.1
pt.	4	120 57 46.2	4 51.58	18.2	0 28 36.4	6.21	0.721 6074	284.5
	8	121 17 12.2	4 51.41	18.4	0 29 1.2	6.19	0.721 7211	284.0
	12	121 36 37.5	4 51.26	18.6	0 29 25.9	6.16	0.721 8346	283.5
	16	121 56 2.3	4 51.15	18.8	0 29 50.5	6.15	0.721 9479	282.9
	20	122 15 26.5	4 50.98	+19.1	+0 30 15.1	+6.14	0.722 0609	+282.1
	24	122 34 50.1	4 50.82	19.3	0 30 39.6	6.11	0.722 1736	281.5
	28	122 54 13.1	4 50.68	19.5	0 31 4.0	6.10	0.722 2861	281.0
ct.	2	123 13 35.5	4 50.52	19.7	0 31 28.4	6.08	0.722 3984	280.4
	6	123 32 57.3	4 50.38	19.9	0 31 52.6	6.05	0.722 5104	279.6
	10	123 52 18.5	4 50.22	+20.1	+0 32 16.8	+6.05	0.722 6221	+279.0
	14	124 11 39.1	4 50.09	20.3	0 32 41.0	6.02	0.722 7336	278.4
	18	124 30 59.2	4 49.94	20.5	0 33 5.0	6.00	0.722 8448	277.8
	22	124 50 18.6	4 49.79	20.7	0 33 29.0	6.00	0.722 9558	277.0
	26	125 9 37.5	4 49.64	20.9	0 33 53.0	5.98	0.723 0664	276.2
	30	125 28 55.7	4 49.49	+21.1	+0 34 16.8	+5.95	0.723 1768	+275.6
ov.	3	125 48 13.4	4 49.35	21.3	0 34 40.6	5.94	0.723 2869	275.0
	7	126 7 30.5	4 49.20	21.4	0 35 4.3	5.90	0.723 3968	274.2
	11	126 26 47.0	4 49.06	21.6	0 35 27.8	5.88	0.723 5063	273.5
	15	126 46 3.0	4 48.93	21.8	0 35 51.3	5.87	0.723 6156	272.9
	19	127 5 18.4	4 48.78	+22.0	+0 36 14.8	+5.85	0.723 7246	+272.1
	23	127 24 33.2	4 48.62	22.1	0 36 38.1	5.83	0.723 8333	271.2
	27	127 43 47.4	4 48.47	22.3	0 37 1.4	5.81	0.723 9416	270.5
ec.	1	128 3 1.0	4 48.34	22.5	0 37 24.6	5.80	0.724 0497	269.9
	5	128 22 14.1	4 48.20	22.6	0 37 47.8	5.78	0.724 1575	269.1
	9	128 41 26.6	4 48.06	+22.8	+0 38 10.8	+5.74	0.724 2650	+268.2
	13	129 0 38.5	4 47.91	23.0	0 38 33.7	5.72	0.724 3721	267.5
	17	129 19 49.9	4 47.78	23.1	0 38 56.6	5.71	0.724 4790	266.8
	21	129 39 0.7	4 47.64	23.3	0 39 19.4	5.68	0.724 5855	265.9
	25	129 58 11.0	4 47.50	23.4	0 39 42.0	5.65	0.724 6917	265.1
	29	130 17 20.7	4 47.36	+23.6	+0 40 4.6	+5.65	0.724 7976	+264.2
	33	130 36 29.9	4 47.23	+23.7	+0 40 27.2	+5.63	0.724 9031	+263.4

SATURN, 1919.

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.	
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h	m	s	s	°	'	"	"			"	"	h m	
Jan.	1	10	1	47.96	-0.379	+13	31	13.0	+2.59	0.930 0273	-200.3	9.10	1.03	15 18.8
	2	10	1	38.69	0.394	13	32	16.1	2.67	0.929 4077	256.1	9.11	1.04	15 14.7
	3	10	1	29.03	0.410	13	33	21.2	2.75	0.928 7980	261.9	9.13	1.04	15 10.6
	4	10	1	19.00	0.426	13	34	28.1	2.83	0.928 1986	247.6	9.14	1.04	15 6.5
	5	10	1	8.59	0.441	13	35	36.9	2.90	0.927 6098	243.1	9.15	1.04	15 2.4
	6	10	0	57.83	-0.456	+13	36	47.5	+2.98	0.927 0317	-238.6	9.17	1.04	14 58.3
	7	10	0	46.71	0.471	13	37	59.9	3.05	0.926 4648	233.9	9.18	1.04	14 54.2
	8	10	0	35.23	0.485	13	39	14.0	3.12	0.925 9091	229.2	9.19	1.04	14 50.1
	9	10	0	23.41	0.500	13	40	29.7	3.19	0.925 3649	224.3	9.20	1.05	14 46.0
	10	10	0	11.25	0.514	13	41	47.1	3.26	0.924 8325	219.3	9.21	1.05	14 41.8
	11	9	59	58.76	-0.527	+13	43	6.1	+3.33	0.924 3122	-214.2	9.22	1.05	14 37.7
	12	9	59	45.95	0.541	13	44	26.7	3.39	0.923 8042	209.1	9.23	1.05	14 33.5
	13	9	59	32.81	0.554	13	45	48.8	3.45	0.923 3087	203.8	9.24	1.05	14 29.4
	14	9	59	19.37	0.566	13	47	12.4	3.51	0.922 8259	198.5	9.25	1.05	14 25.2
	15	9	59	5.62	0.579	13	48	37.4	3.57	0.922 3559	193.1	9.26	1.05	14 21.1
	16	9	58	51.57	-0.591	+13	50	3.8	+3.63	0.921 8990	-187.6	9.27	1.05	14 16.9
	17	9	58	37.24	0.603	13	51	31.5	3.68	0.921 4555	182.0	9.28	1.05	14 12.7
	18	9	58	22.62	0.615	13	53	0.6	3.74	0.921 0255	176.3	9.29	1.06	14 8.5
	19	9	58	7.72	0.627	13	54	30.8	3.79	0.920 6092	170.6	9.30	1.06	14 4.4
	20	9	57	52.55	0.638	13	56	2.3	3.84	0.920 2068	164.7	9.31	1.06	14 0.2
	21	9	57	37.12	-0.648	+13	57	35.0	+3.89	0.919 8186	-158.8	9.32	1.06	13 56.0
	22	9	57	21.44	0.658	13	59	8.8	3.93	0.919 4447	152.8	9.33	1.06	13 51.8
	23	9	57	5.52	0.668	14	0	43.5	3.97	0.919 0854	146.7	9.33	1.06	13 47.6
	24	9	56	49.37	0.678	14	2	19.3	4.01	0.918 7408	140.5	9.34	1.06	13 43.4
	25	9	56	32.99	0.687	14	3	56.0	4.05	0.918 4111	134.2	9.35	1.06	13 39.2
	26	9	56	16.38	-0.696	+14	5	33.6	+4.08	0.918 0965	-127.9	9.35	1.06	13 35.0
	27	9	55	59.57	0.705	14	7	12.0	4.12	0.917 7972	121.5	9.36	1.06	13 30.7
	28	9	55	42.56	0.713	14	8	51.3	4.15	0.917 5132	115.1	9.37	1.06	13 26.5
	29	9	55	25.35	0.721	14	10	31.3	4.18	0.917 2449	108.6	9.37	1.07	13 22.3
	30	9	55	7.96	0.728	14	12	12.0	4.21	0.916 9922	102.0	9.38	1.07	13 18.1
	31	9	54	50.41	-0.735	+14	13	53.2	+4.23	0.916 7555	-95.3	9.38	1.07	13 13.9
Feb.	1	9	54	32.70	0.741	14	15	35.0	4.25	0.916 5348	88.6	9.39	1.07	13 9.6
	2	9	54	14.84	0.747	14	17	17.3	4.27	0.916 3303	81.8	9.39	1.07	13 5.4
	3	9	53	56.84	0.753	14	19	0.0	4.29	0.916 1420	75.1	9.40	1.07	13 1.2
	4	9	53	38.72	0.758	14	20	43.0	4.30	0.915 9700	68.3	9.40	1.07	12 57.0
	5	9	53	20.48	-0.762	+14	22	26.3	+4.31	0.915 8143	-61.4	9.40	1.07	12 52.7
	6	9	53	2.13	0.767	14	24	9.9	4.32	0.915 6751	54.6	9.41	1.07	12 48.5
	7	9	52	43.69	0.770	14	25	53.7	4.33	0.915 5523	47.7	9.41	1.07	12 44.3
	8	9	52	25.17	0.773	14	27	37.5	4.33	0.915 4462	40.8	9.41	1.07	12 40.0
	9	9	52	6.57	0.776	14	29	21.5	4.33	0.915 3566	33.9	9.41	1.07	12 35.8
	10	9	51	47.92	-0.778	+14	31	5.4	+4.33	0.915 2837	-26.9	9.42	1.07	12 31.5
	11	9	51	29.21	0.781	14	32	49.3	4.33	0.915 2274	20.0	9.42	1.07	12 27.3
	12	9	51	10.46	0.782	14	34	33.0	4.32	0.915 1877	13.1	9.42	1.07	12 23.0
	13	9	50	51.68	0.783	14	36	16.6	4.31	0.915 1646	-6.2	9.42	1.07	12 18.8
	14	9	50	32.88	0.784	14	37	59.9	4.30	0.915 1581	+0.8	9.42	1.07	12 14.6
	15	9	50	14.07	-0.784	+14	39	43.0	+4.29	0.915 1683	+7.7	9.42	1.07	12 10.3
	16	9	49	55.26	-0.784	+14	41	25.8	+4.28	0.915 1950	+14.6	9.42	1.07	12 6.1

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.	
	Hours.	Minutes.	Seconds.		Hours.	Minutes.	Seconds.							
	h	m	s	s	°	'	"	"			"	"	h	m
p.	16	9 49	55.28	-0.784	+14 41	25.8		+4.28	0.915 1950	+ 14.6	9.42	1.07	12 6.1	
	17	9 49	36.46	0.783	14 43	8.2		4.26	0.915 2383	21.5	9.42	1.07	12 1.8	
	18	9 49	17.68	0.782	14 44	50.3		4.24	0.915 2982	28.4	9.42	1.07	11 57.6	
	19	9 48	58.93	0.780	14 46	31.8		4.22	0.915 3745	35.2	9.41	1.07	11 53.3	
	20	9 48	40.23	0.778	14 48	12.7		4.19	0.915 4674	42.2	9.41	1.07	11 49.1	
	21	9 48	21.58	-0.776	+14 49	53.1		+4.17	0.915 5768	+ 49.0	9.41	1.07	11 44.9	
	22	9 48	2.98	0.773	14 51	32.9		4.14	0.915 7026	55.8	9.41	1.07	11 40.6	
	23	9 47	44.46	0.770	14 53	11.9		4.11	0.915 8448	62.7	9.40	1.07	11 36.4	
	24	9 47	26.03	0.766	14 54	50.1		4.08	0.916 0033	69.4	9.40	1.07	11 32.1	
	25	9 47	7.69	0.762	14 56	27.5		4.04	0.916 1780	76.2	9.40	1.07	11 27.9	
r.	26	9 46	49.45	-0.758	+14 58	4.1		+4.01	0.916 3689	+ 82.9	9.39	1.07	11 23.7	
	27	9 46	31.33	0.752	14 59	39.8		3.97	0.916 5759	89.6	9.39	1.07	11 19.4	
	28	9 46	13.34	0.747	15 1	14.5		3.92	0.916 7989	96.2	9.38	1.07	11 15.2	
	1	9 45	55.48	0.741	15 2	48.2		3.88	0.917 0377	102.8	9.38	1.07	11 11.0	
	2	9 45	37.77	0.735	15 4	20.9		3.84	0.917 2922	109.3	9.37	1.07	11 6.8	
	3	9 45	20.22	-0.728	+15 5	52.5		+3.79	0.917 5623	+115.8	9.37	1.06	11 2.5	
	4	9 45	2.84	0.720	15 7	22.8		3.74	0.917 8479	122.2	9.36	1.06	10 58.3	
	5	9 44	45.64	0.713	15 8	51.9		3.69	0.918 1488	128.5	9.35	1.06	10 54.1	
	6	9 44	28.63	0.705	15 10	19.7		3.63	0.918 4648	134.8	9.35	1.06	10 49.9	
	7	9 44	11.82	0.696	15 11	46.3		3.58	0.918 7957	141.0	9.34	1.06	10 45.7	
	8	9 43	55.21	-0.688	+15 13	11.5		+3.52	0.919 1414	+147.1	9.33	1.06	10 41.5	
	9	9 43	38.82	0.678	15 14	35.3		3.46	0.919 5016	153.1	9.32	1.06	10 37.3	
	10	9 43	22.66	0.669	15 15	57.8		3.41	0.919 8760	159.0	9.32	1.06	10 33.1	
	11	9 43	6.73	0.659	15 17	18.8		3.34	0.920 2646	164.8	9.31	1.06	10 28.9	
	12	9 42	51.04	0.649	15 18	38.3		3.28	0.920 6671	170.6	9.30	1.06	10 24.7	
	13	9 42	35.60	-0.638	+15 19	56.3		+3.22	0.921 0834	+176.3	9.29	1.06	10 20.5	
	14	9 42	20.42	0.627	15 21	12.7		3.15	0.921 5132	181.9	9.28	1.05	10 16.3	
	15	9 42	5.51	0.616	15 22	27.6		3.09	0.921 9563	187.3	9.27	1.05	10 12.2	
	16	9 41	50.87	0.604	15 23	40.8		3.02	0.922 4124	192.8	9.26	1.05	10 8.0	
	17	9 41	36.50	0.593	15 24	52.4		2.95	0.922 8815	198.1	9.25	1.05	10 3.8	
	18	9 41	22.43	-0.580	+15 26	2.3		+2.88	0.923 3632	+203.3	9.24	1.05	9 59.6	
	19	9 41	8.64	0.568	15 27	10.5		2.80	0.923 8574	208.5	9.23	1.05	9 55.5	
	20	9 40	55.16	0.555	15 28	16.9		2.73	0.924 3638	213.5	9.22	1.05	9 51.3	
	21	9 40	41.98	0.543	15 29	21.6		2.66	0.924 8822	218.5	9.21	1.05	9 47.2	
	22	9 40	29.12	0.529	15 30	24.6		2.59	0.925 4124	223.4	9.20	1.05	9 43.1	
	23	9 40	16.58	-0.516	+15 31	25.7		+2.51	0.925 9542	+228.1	9.19	1.04	9 38.9	
	24	9 40	4.37	0.502	15 32	25.0		2.43	0.926 5073	232.8	9.18	1.04	9 34.8	
	25	9 39	52.49	0.488	15 33	22.4		2.35	0.927 0716	237.4	9.16	1.04	9 30.6	
	26	9 39	40.95	0.474	15 34	17.9		2.28	0.927 6467	241.9	9.15	1.04	9 26.5	
	27	9 39	29.75	0.459	15 35	11.6		2.20	0.928 2325	246.3	9.14	1.04	9 22.4	
	28	9 39	18.91	-0.444	+15 36	3.3		+2.11	0.928 8287	+250.5	9.13	1.04	9 18.3	
	29	9 39	8.42	0.429	15 36	53.0		2.03	0.929 4349	254.7	9.11	1.04	9 14.2	
	30	9 38	58.30	0.414	15 37	40.8		1.95	0.930 0510	258.7	9.10	1.03	9 10.1	
	31	9 38	48.54	0.399	15 38	26.6		1.87	0.930 6767	262.6	9.09	1.03	9 6.0	
	1	9 38	39.15	0.383	15 39	10.4		1.78	0.931 3116	266.4	9.07	1.03	9 1.9	
	2	9 38	30.14	-0.368	+15 39	52.1		+1.70	0.931 9555	+270.1	9.06	1.03	8 57.8	
	3	9 38	21.51	-0.352	+15 40	31.8		+1.61	0.932 6082	+273.7	9.05	1.03	8 53.8	

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Paralax.	Transit, Meridian of Greenwich.																																			
	h	m	s		°	'	"							h	m																																	
Apr.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	May	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	9 38 39.15	9 38 30.14	9 38 21.51	9 38 13.27	9 38 5.43	9 37 57.97	9 37 50.92	9 37 44.26	9 37 38.01	9 37 32.16	9 37 26.72	9 37 21.68	9 37 17.05	9 37 12.83	9 37 9.02	9 37 5.63	9 37 2.65	9 37 0.09	9 36 57.94	9 36 56.21	9 36 54.90	9 36 54.01	9 36 53.54	9 36 53.50	9 36 53.87	9 36 54.66	9 36 55.88	9 36 57.51	9 36 59.57	9 37 2.05	9 37 4.96	9 37 8.28	9 37 12.02	9 37 16.18	9 37 20.75	9 37 25.74	9 37 31.13	9 37 36.94	9 37 43.15	9 37 49.77	9 37 56.78	9 38 4.20	9 38 12.01	9 38 20.22	9 38 28.81	9 38 37.80	9 38 47.17	
	-0.383	0.368	0.352	0.335	0.319	-0.302	0.286	0.269	0.252	0.235	-0.218	0.201	0.184	0.167	0.150	-0.133	0.115	0.098	0.081	0.063	-0.046	0.028	-0.011	+0.007	0.024	+0.042	0.059	0.077	0.095	0.112	+0.130	0.147	0.165	0.182	0.199	+0.216	0.233	0.250	0.267	0.284	+0.301	0.317	0.334	0.350	0.366	+0.383	+0.399	
	+15 39 10.4	15 39 52.1	15 40 31.8	15 41 9.5	15 41 45.0	+15 42 18.5	15 42 50.0	15 43 19.3	15 43 46.6	15 44 11.8	+15 44 34.8	15 44 55.8	15 45 14.6	15 45 31.3	15 45 45.9	+15 45 58.4	15 46 8.8	15 46 17.1	15 46 23.3	15 46 27.3	+15 46 29.3	15 46 29.1	15 46 26.8	15 46 22.4	15 46 15.9	+15 46 7.2	15 45 56.4	15 45 43.4	15 45 28.4	15 45 11.3	+15 44 52.1	+15 44 30.8	15 44 7.5	15 43 42.0	15 43 14.5	+15 42 44.9	15 42 13.3	15 41 39.7	15 41 4.0	15 40 26.4	+15 39 46.8	15 39 5.2	15 38 21.6	15 37 36.1	15 36 48.6	+15 35 59.2	+15 35 7.9	
	+1.78	1.70	1.61	1.52	1.43	+1.35	1.27	1.18	1.09	1.00	+0.92	0.83	0.74	0.65	0.56	+0.48	0.39	0.30	0.21	0.12	+0.04	-0.05	0.14	0.23	0.32	-0.41	0.50	0.58	0.67	0.76	-0.84	0.93	1.02	1.11	1.19	-1.28	1.36	1.44	1.53	1.61	-1.69	1.78	1.85	1.94	2.02	-2.10	-2.18	
	0.931 3116	0.931 9555	0.932 6082	0.933 2693	0.933 9386	0.934 6159	0.935 3007	0.935 9929	0.936 6920	0.937 3978	0.938 1101	0.938 8286	0.939 5531	0.940 2833	0.941 0189	0.941 7598	0.942 5056	0.943 2561	0.944 0111	0.944 7702	0.945 5332	0.946 2999	0.947 0701	0.947 8435	0.948 6199	0.949 3991	0.950 1808	0.950 9648	0.951 7506	0.952 5382	0.953 3272	0.954 1173	0.954 9084	0.955 7002	0.956 4924	0.957 2848	0.958 0772	0.958 8693	0.959 6610	0.960 4521	0.961 2422	0.962 0313	0.962 8191	0.963 6055	0.964 3902	0.965 1731	0.965 9541	
	+266.4	270.1	273.7	277.2	280.6	+283.8	286.9	289.9	292.7	295.5	+296.1	300.6	303.1	305.4	307.6	+309.7	311.7	313.7	315.5	317.1	+318.7	320.2	321.6	322.9	324.1	+325.2	326.2	327.1	327.8	328.5	+329.0	329.4	329.8	330.0	330.1	+330.2	330.1	330.0	329.8	329.4	+329.0	328.5	328.0	327.3	326.6	+325.8	+325.0	
	9.07	9.06	9.05	9.03	9.02	9.01	8.99	8.98	8.96	8.95	8.93	8.92	8.90	8.89	8.87	8.86	8.84	8.83	8.81	8.80	8.78	8.77	8.75	8.74	8.72	8.70	8.69	8.67	8.66	8.64	8.63	8.61	8.59	8.58	8.56	8.55	8.53	8.52	8.50	8.49	8.47	8.46	8.44	8.42	8.41	8.40	8.38	
	1.03	1.03	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97	0.96	0.96	0.96	0.96	0.96	0.95	0.95				
	9 1.9	8 57.8	8 53.8	8 49.7	8 45.7	8 41.6	8 37.6	8 33.5	8 29.5	8 25.5	8 21.4	8 17.4	8 13.4	8 9.4	8 5.4	8 1.4	7 57.5	7 53.5	7 49.5	7 45.6	7 41.6	7 37.7	7 33.7	7 29.8	7 25.9	7 21.9	7 18.0	7 14.2	7 10.3	7 6.4	7 2.5	6 58.6	6 54.7	6 50.9	6 47.0	6 43.2	6 39.3	6 35.5	6 31.7	6 27.9	6 24.0	6 20.2	6 16.4	6 12.6	6 8.8	6 5.1	6 1.3	

SATURN, 1919.

187

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
17	9 38 47.17	+0.399	+15 35 7.9	-2.18	0.965 9541	+325.0	8.38	0.95	6 1.3
18	9 38 56.93	0.414	15 34 14.6	2.26	0.966 7328	324.0	8.36	0.95	5 57.5
19	9 39 7.06	0.430	15 33 19.5	2.34	0.967 5092	323.0	8.35	0.95	5 53.8
20	9 39 17.58	0.446	15 32 22.5	2.41	0.968 2831	321.9	8.33	0.95	5 50.0
21	9 39 28.47	0.462	15 31 23.6	2.49	0.969 0542	320.7	8.32	0.95	5 46.2
22	9 39 39.74	+0.477	+15 30 22.8	-2.57	0.969 8225	+319.5	8.30	0.94	5 42.5
23	9 39 51.37	0.492	15 29 20.2	2.65	0.970 5877	318.2	8.29	0.94	5 38.8
24	9 40 3.38	0.508	15 28 15.7	2.72	0.971 3498	316.8	8.28	0.94	5 35.0
25	9 40 15.75	0.523	15 27 9.4	2.80	0.972 1084	315.4	8.26	0.94	5 31.3
26	9 40 28.49	0.538	15 26 1.2	2.88	0.972 8635	313.8	8.25	0.94	5 27.6
27	9 40 41.58	+0.553	+15 24 51.3	-2.95	0.973 6147	+312.2	8.23	0.94	5 23.9
28	9 40 55.03	0.568	15 23 39.6	3.02	0.974 3620	310.5	8.22	0.93	5 20.2
29	9 41 8.84	0.583	15 22 26.1	3.10	0.975 1052	308.8	8.20	0.93	5 16.5
30	9 41 22.99	0.597	15 21 10.8	3.17	0.975 8441	307.0	8.19	0.93	5 12.8
31	9 41 37.49	0.612	15 19 53.8	3.25	0.976 5785	305.0	8.18	0.93	5 9.1
e 1	9 41 52.34	+0.626	+15 18 35.0	-3.32	0.977 3082	+303.0	8.16	0.93	5 5.4
2	9 42 7.52	0.640	15 17 14.6	3.39	0.978 0331	301.0	8.15	0.93	5 1.7
3	9 42 23.04	0.653	15 15 52.4	3.46	0.978 7531	298.9	8.13	0.92	4 58.1
4	9 42 38.88	0.667	15 14 28.5	3.53	0.979 4680	296.8	8.12	0.92	4 54.4
5	9 42 55.05	0.681	15 13 3.0	3.60	0.980 1777	294.6	8.11	0.92	4 50.7
6	9 43 11.55	+0.694	+15 11 35.9	-3.67	0.980 8819	+292.3	8.10	0.92	4 47.1
7	9 43 28.36	0.707	15 10 7.1	3.73	0.981 5807	290.0	8.08	0.92	4 43.4
8	9 43 45.48	0.720	15 8 36.8	3.80	0.982 2739	287.6	8.07	0.92	4 39.8
9	9 44 2.92	0.733	15 7 4.8	3.86	0.982 9613	285.2	8.06	0.92	4 36.1
10	9 44 20.66	0.745	15 5 31.3	3.93	0.983 6428	282.7	8.05	0.91	4 32.5
11	9 44 38.70	+0.758	+15 3 56.2	-4.00	0.984 3183	+280.2	8.03	0.91	4 28.9
12	9 44 57.03	0.770	15 2 19.5	4.06	0.984 9877	277.6	8.02	0.91	4 25.2
13	9 45 15.66	0.783	15 0 41.4	4.12	0.985 6509	275.0	8.01	0.91	4 21.6
14	9 45 34.59	0.795	14 59 1.7	4.18	0.986 3079	272.4	8.00	0.91	4 18.0
15	9 45 53.80	0.806	14 57 20.6	4.24	0.986 9585	269.7	7.98	0.91	4 14.4
16	9 46 13.28	+0.818	+14 55 38.0	-4.31	0.987 6025	+267.0	7.97	0.91	4 10.8
17	9 46 33.05	0.829	14 53 53.9	4.37	0.988 2399	264.2	7.96	0.90	4 7.2
18	9 46 53.09	0.841	14 52 8.3	4.43	0.988 8706	261.4	7.95	0.90	4 3.6
19	9 47 13.40	0.852	14 50 21.3	4.49	0.989 4945	258.5	7.94	0.90	4 0.0
20	9 47 33.98	0.863	14 48 32.9	4.54	0.990 1115	255.6	7.93	0.90	3 56.4
21	9 47 54.83	+0.874	+14 46 43.1	-4.61	0.990 7215	+252.7	7.91	0.90	3 52.8
22	9 48 15.94	0.885	14 44 51.8	4.67	0.991 3245	249.7	7.90	0.90	3 49.2
23	9 48 37.30	0.895	14 42 59.2	4.72	0.991 9201	246.6	7.89	0.90	3 45.6
24	9 48 58.91	0.906	14 41 5.3	4.78	0.992 5084	243.6	7.88	0.90	3 42.1
25	9 49 20.78	0.916	14 39 10.0	4.83	0.993 0892	240.4	7.87	0.89	3 38.5
26	9 49 42.89	+0.926	+14 37 13.4	-4.89	0.993 6624	+237.2	7.86	0.89	3 34.9
27	9 50 5.24	0.936	14 35 15.5	4.94	0.994 2279	234.0	7.85	0.89	3 31.4
28	9 50 27.82	0.946	14 33 16.3	4.99	0.994 7856	230.7	7.84	0.89	3 27.8
29	9 50 50.64	0.956	14 31 15.8	5.05	0.995 3354	227.4	7.83	0.89	3 24.3
30	9 51 13.69	0.965	14 29 14.0	5.10	0.995 8772	224.1	7.82	0.89	3 20.7
y 1	9 51 36.97	+0.974	+14 27 11.1	-5.15	0.996 4109	+220.7	7.81	0.89	3 17.2
2	9 52 0.46	+0.983	+14 25 6.9	-5.20	0.996 9365	+217.3	7.80	0.89	3 13.6

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.	
	h	m	s	s	°	'	"	"			"	"	h m
July	1	9 51	36.97	+0.974	+14 27	11.1		-5.15	0.996 4109	+220.7	7.81	0.89	3 17.2
	2	9 52	0.46	0.983	14 25	6.9		5.20	0.996 9365	217.3	7.80	0.89	3 13.6
	3	9 52	24.16	0.992	14 23	1.6		5.25	0.997 4539	213.9	7.79	0.89	3 10.1
	4	9 52	48.07	1.000	14 20	55.1		5.29	0.997 9630	210.4	7.78	0.88	3 6.6
	5	9 53	12.18	1.009	14 18	47.5		5.34	0.998 4637	206.9	7.77	0.88	3 3.0
	6	9 53	36.49	+1.017	+14 16	38.8		-5.39	0.998 9560	+203.4	7.76	0.88	2 59.5
	7	9 54	1.00	1.025	14 14	29.0		5.43	0.999 4398	199.8	7.76	0.88	2 56.0
	8	9 54	25.69	1.033	14 12	18.1		5.48	0.999 9150	196.2	7.75	0.88	2 52.5
	9	9 54	50.58	1.041	14 10	6.1		5.53	1.000 3816	192.6	7.74	0.88	2 48.9
	10	9 55	15.65	1.048	14 7	52.9		5.57	1.000 8396	189.0	7.73	0.88	2 45.4
	11	9 55	40.90	+1.056	+14 5	38.9		-5.61	1.001 2889	+185.4	7.72	0.88	2 41.9
	12	9 56	6.33	1.063	14 3	23.8		5.65	1.001 7294	181.7	7.72	0.88	2 38.4
	13	9 56	31.93	1.070	14 1	7.7		5.69	1.002 1611	178.0	7.71	0.88	2 34.9
	14	9 56	57.70	1.077	13 58	50.5		5.73	1.002 5840	174.3	7.70	0.88	2 31.4
	15	9 57	23.63	1.084	13 56	32.6		5.77	1.002 9979	170.6	7.69	0.87	2 27.9
	16	9 57	49.72	+1.090	+13 54	13.6		-5.81	1.003 4029	+166.9	7.69	0.87	2 24.4
	17	9 58	15.96	1.097	13 51	53.7		5.85	1.003 7989	163.1	7.68	0.87	2 20.9
	18	9 58	42.36	1.103	13 49	32.8		5.89	1.004 1858	159.3	7.67	0.87	2 17.4
	19	9 59	8.91	1.109	13 47	11.1		5.93	1.004 5636	155.5	7.67	0.87	2 13.9
	20	9 59	35.61	1.115	13 44	48.4		5.96	1.004 9322	151.7	7.66	0.87	2 10.4
	21	10 0	2.44	+1.121	+13 42	24.9		-6.00	1.005 2916	+147.8	7.65	0.87	2 6.9
	22	10 0	29.41	1.127	13 40	0.6		6.03	1.005 6416	143.9	7.65	0.87	2 3.4
	23	10 0	56.52	1.132	13 37	35.5		6.06	1.005 9822	140.0	7.64	0.87	2 0.0
	24	10 1	23.76	1.138	13 35	9.6		6.10	1.006 3134	136.0	7.64	0.87	1 56.5
	25	10 1	51.12	1.143	13 32	42.9		6.13	1.006 6350	132.0	7.63	0.87	1 53.0
	26	10 2	18.60	+1.148	+13 30	15.4		-6.16	1.006 9471	+128.0	7.62	0.87	1 49.5
	27	10 2	46.20	1.153	13 27	47.2		6.19	1.007 2495	124.0	7.62	0.87	1 46.0
	28	10 3	13.92	1.157	13 25	18.4		6.22	1.007 5422	119.9	7.61	0.87	1 42.6
	29	10 3	41.74	1.161	13 22	48.8		6.25	1.007 8252	115.9	7.61	0.86	1 39.1
	30	10 4	9.66	1.166	13 20	18.5		6.28	1.008 0985	111.9	7.60	0.86	1 35.6
	31	10 4	37.69	+1.170	+13 17	47.6		-6.30	1.008 3621	+107.8	7.60	0.86	1 32.2
Aug.	1	10 5	5.81	1.174	13 15	16.2		6.32	1.008 6158	103.7	7.60	0.86	1 28.7
	2	10 5	34.02	1.177	13 12	44.1		6.35	1.008 8598	99.6	7.59	0.86	1 25.2
	3	10 6	2.31	1.180	13 10	11.4		6.38	1.009 0939	95.5	7.59	0.86	1 21.8
	4	10 6	30.68	1.184	13 7	38.1		6.40	1.009 3181	91.4	7.58	0.86	1 18.3
	5	10 6	59.13	+1.187	+13 5	4.3		-6.42	1.009 5324	+87.2	7.58	0.86	1 14.9
	6	10 7	27.66	1.190	13 2	30.0		6.44	1.009 7368	83.1	7.58	0.86	1 11.4
	7	10 7	56.26	1.193	12 59	55.3		6.46	1.009 9313	79.0	7.57	0.86	1 7.9
	8	10 8	24.93	1.196	12 57	20.1		6.48	1.010 1158	74.8	7.57	0.86	1 4.5
	9	10 8	53.65	1.198	12 54	44.4		6.50	1.010 2903	70.6	7.57	0.86	1 1.0
	10	10 9	22.44	+1.200	+12 52	8.3		-6.51	1.010 4548	+66.5	7.56	0.86	0 57.6
	11	10 9	51.27	1.202	12 49	31.8		6.53	1.010 6093	62.3	7.56	0.86	0 54.1
	12	10 10	20.16	1.205	12 46	54.9		6.55	1.010 7538	58.1	7.56	0.86	0 50.7
	13	10 10	49.09	1.207	12 44	17.6		6.56	1.010 8884	54.0	7.55	0.86	0 47.2
	14	10 11	18.07	1.208	12 41	40.0		6.57	1.011 0129	49.8	7.55	0.86	0 43.8
	15	10 11	47.08	+1.210	+12 39	2.1		-6.59	1.011 1274	+45.6	7.55	0.86	0 40.3
	16	10 12	16.13	+1.211	+12 36	23.8		-6.60	1.011 2318	+41.4	7.55	0.86	0 36.9

SATURN, 1919.

189

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Aug. 16	10 12 16.13	+1.211	+12 36 23.8	-6.60	1.011 2318	+ 41.4	7.55	0.86	0 36.9
17	10 12 45.22	1.213	12 33 45.2	6.61	1.011 3261	37.2	7.55	0.86	0 33.4
18	10 13 14.34	1.214	12 31 6.4	6.62	1.011 4103	33.0	7.55	0.86	0 30.0
19	10 13 43.48	1.215	12 28 27.3	6.63	1.011 4843	28.7	7.54	0.86	0 26.5
20	10 14 12.65	1.216	12 25 48.0	6.64	1.011 5480	24.4	7.54	0.86	0 23.1
21	10 14 41.83	+1.216	+12 23 8.5	-6.65	1.011 6015	+ 20.2	7.54	0.86	0 19.6
22	10 15 11.03	1.217	12 20 28.8	6.66	1.011 6447	15.9	7.54	0.86	0 16.2
23	10 15 40.23	1.217	12 17 49.0	6.66	1.011 6776	11.6	7.54	0.86	0 12.7
24	10 16 9.44	1.217	12 15 9.1	6.66	1.011 7003	7.3	7.54	0.86	0 9.3
25	10 16 38.65	1.217	12 12 29.1	6.67	1.011 7126	+ 3.0	7.54	0.86	0 5.8
26	10 17 7.86	+1.217	+12 9 49.0	-6.67	1.011 7146	- 1.3	7.54	0.86	0 2.4
27	10 17 37.05	1.216	12 7 8.9	6.67	1.011 7063	5.6	7.54	0.86	23 58.9
28	10 18 6.23	1.216	12 4 28.7	6.67	1.011 6877	9.9	7.54	0.86	23 55.5
29	10 18 35.40	1.215	12 1 48.6	6.67	1.011 6587	14.2	7.54	0.86	23 52.0
30	10 19 4.54	1.214	11 59 8.5	6.67	1.011 6194	18.5	7.54	0.86	23 48.6
Sept. 1	10 19 33.66	+1.213	+11 56 28.5	-6.67	1.011 5697	- 22.8	7.54	0.86	23 45.1
2	10 20 2.75	1.212	11 53 48.5	6.66	1.011 5098	27.1	7.54	0.86	23 41.7
3	10 20 31.81	1.210	11 51 8.7	6.66	1.011 4396	31.4	7.55	0.86	23 38.2
4	10 21 0.82	1.208	11 48 28.9	6.65	1.011 3592	35.6	7.55	0.86	23 34.8
5	10 21 29.79	1.206	11 45 49.4	6.64	1.011 2685	39.9	7.55	0.86	23 31.3
6	10 21 58.72	+1.204	+11 43 10.0	-6.64	1.011 1676	- 44.2	7.55	0.86	23 27.9
7	10 22 27.59	1.202	11 40 30.8	6.63	1.011 0565	48.4	7.55	0.86	23 24.4
8	10 22 56.41	1.200	11 37 51.9	6.62	1.010 9353	52.6	7.55	0.86	23 21.0
9	10 23 25.18	1.197	11 35 13.2	6.61	1.010 8038	56.9	7.56	0.86	23 17.5
10	10 23 53.88	1.195	11 32 34.8	6.60	1.010 6622	61.1	7.56	0.86	23 14.1
11	10 24 22.53	+1.192	+11 29 56.6	-6.58	1.010 5104	- 65.4	7.56	0.86	23 10.6
12	10 24 51.10	1.189	11 27 18.8	6.57	1.010 3485	69.6	7.57	0.86	23 7.1
13	10 25 19.60	1.186	11 24 41.4	6.56	1.010 1765	73.8	7.57	0.86	23 3.7
14	10 25 48.02	1.183	11 22 4.3	6.54	1.009 9944	78.0	7.57	0.86	23 0.2
15	10 26 16.37	1.179	11 19 27.6	6.52	1.009 8021	82.2	7.57	0.86	22 56.7
16	10 26 44.63	+1.176	+11 16 51.3	-6.50	1.009 5998	- 86.4	7.58	0.86	22 53.3
17	10 27 12.81	1.172	11 14 15.5	6.48	1.009 3873	90.7	7.58	0.86	22 49.8
18	10 27 40.90	1.169	11 11 40.1	6.46	1.009 1647	94.8	7.58	0.86	22 46.4
19	10 28 8.90	1.164	11 9 5.2	6.44	1.008 9321	99.0	7.59	0.86	22 42.9
20	10 28 36.79	1.160	11 6 30.8	6.42	1.008 6894	103.2	7.59	0.86	22 39.4
21	10 29 4.58	+1.156	+11 3 57.0	-6.40	1.008 4366	-107.4	7.60	0.86	22 36.0
22	10 29 32.26	1.151	11 1 23.8	6.37	1.008 1738	111.6	7.60	0.86	22 32.5
23	10 29 59.83	1.146	10 58 51.2	6.35	1.007 9010	115.8	7.61	0.86	22 29.0
24	10 30 27.28	1.141	10 56 19.2	6.32	1.007 6182	119.9	7.61	0.87	22 25.5
25	10 30 54.60	1.136	10 53 48.0	6.29	1.007 3255	124.0	7.62	0.87	22 22.1
26	10 31 21.80	+1.131	+10 51 17.4	-6.26	1.007 0228	-128.2	7.62	0.87	22 18.6
27	10 31 48.87	1.125	10 48 47.6	6.23	1.006 7103	132.3	7.63	0.87	22 15.1
28	10 32 15.81	1.119	10 46 18.5	6.20	1.006 3879	136.4	7.63	0.87	22 11.6
29	10 32 42.60	1.113	10 43 50.2	6.16	1.006 0557	140.4	7.64	0.87	22 8.1
30	10 33 9.25	1.108	10 41 22.7	6.13	1.005 7138	144.5	7.65	0.87	22 4.6
Oct. 1	10 33 35.76	+1.101	+10 38 56.1	-6.09	1.005 3622	-148.5	7.65	0.87	22 1.1
2	10 34 2.11	+1.095	+10 36 30.3	-6.05	1.005 0011	-152.5	7.66	0.87	21 57.6

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi- diam- eter.	Hor. Paral- lax.	Tran- s. Mer- id. Gr- w.
		Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
Oct.	1	h m s 10 34 2.11	s +1.095	° ' " +10 36 30.3	" -6.05	1.005 0011	-152.5	" 7.66	" 0.87	h 21
	2	10 34 28.31	1.088	10 34 5.5	6.01	1.004 6304	156.4	7.67	0.87	21
	3	10 34 54.34	1.081	10 31 41.6	5.98	1.004 2502	160.4	7.67	0.87	21
	4	10 35 20.21	1.074	10 29 18.6	5.94	1.003 8607	164.3	7.68	0.87	21
	5	10 35 45.91	1.067	10 26 56.6	5.90	1.003 4618	168.2	7.68	0.87	21
	6	10 36 11.44	+1.060	+10 24 35.6	-5.85	1.003 0536	-172.0	7.69	0.87	21
	7	10 36 36.79	1.053	10 22 15.6	5.81	1.002 6361	175.9	7.70	0.88	21
	8	10 37 1.97	1.045	10 19 56.7	5.77	1.002 2095	179.7	7.71	0.88	21
	9	10 37 26.96	1.037	10 17 38.8	5.72	1.001 7737	183.5	7.71	0.88	21
	10	10 37 51.76	1.030	10 15 22.1	5.67	1.001 3289	187.2	7.72	0.88	21
	11	10 38 16.38	+1.022	+10 13 6.5	-5.63	1.000 8750	-191.0	7.73	0.88	21
	12	10 38 40.80	1.013	10 10 52.0	5.58	1.000 4121	194.7	7.74	0.88	21
	13	10 39 5.02	1.005	10 8 38.7	5.53	0.999 9404	198.4	7.75	0.88	21
	14	10 39 29.03	0.996	10 6 26.7	5.47	0.999 4598	202.1	7.76	0.88	21
	15	10 39 52.84	0.988	10 4 15.9	5.43	0.998 9704	205.7	7.76	0.88	21
	16	10 40 16.44	+0.979	+10 2 6.3	-5.37	0.998 4723	-209.4	7.77	0.88	21
	17	10 40 39.83	0.970	9 59 58.1	5.31	0.997 9655	213.0	7.78	0.88	20
	18	10 41 2.99	0.960	9 57 51.2	5.26	0.997 4501	216.5	7.79	0.89	20
	19	10 41 25.93	0.951	9 55 45.7	5.20	0.996 9261	220.1	7.80	0.89	20
	20	10 41 48.64	0.941	9 53 41.5	5.14	0.996 3936	223.6	7.81	0.89	20
	21	10 42 11.11	+0.931	+ 9 51 38.8	-5.08	0.995 8527	-227.1	7.82	0.89	20
	22	10 42 33.35	0.921	9 49 37.6	5.02	0.995 3036	230.5	7.83	0.89	20
	23	10 42 55.34	0.911	9 47 37.9	4.96	0.994 7463	233.9	7.84	0.89	20
	24	10 43 17.09	0.901	9 45 39.7	4.89	0.994 1810	237.2	7.85	0.89	20
	25	10 43 38.58	0.890	9 43 43.0	4.83	0.993 6077	240.5	7.86	0.89	20
	26	10 43 59.82	+0.880	+ 9 41 47.9	-4.76	0.993 0266	-243.8	7.87	0.89	20
	27	10 44 20.80	0.869	9 39 54.4	4.70	0.992 4377	247.0	7.88	0.90	20
	28	10 44 41.51	0.857	9 38 2.5	4.63	0.991 8412	250.1	7.89	0.90	20
	29	10 45 1.95	0.846	9 36 12.3	4.56	0.991 2372	253.2	7.91	0.90	20
	30	10 45 22.11	0.834	9 34 23.8	4.49	0.990 6258	256.3	7.92	0.90	20
Nov.	31	10 45 42.00	+0.823	+ 9 32 37.0	-4.42	0.990 0072	-259.3	7.93	0.90	20
	1	10 46 1.61	0.811	9 30 51.9	4.34	0.989 3814	262.2	7.94	0.90	20
	2	10 46 20.93	0.799	9 29 8.6	4.27	0.988 7486	265.1	7.95	0.90	20
	3	10 46 39.97	0.787	9 27 27.1	4.19	0.988 1090	267.9	7.96	0.90	19
	4	10 46 58.71	0.775	9 25 47.4	4.12	0.987 4627	270.7	7.97	0.91	19
	5	10 47 17.16	+0.763	+ 9 24 9.5	-4.04	0.986 8097	-273.5	7.99	0.91	19
	6	10 47 35.31	0.750	9 22 33.5	3.96	0.986 1502	276.1	8.00	0.91	19
	7	10 47 53.16	0.738	9 20 59.4	3.88	0.985 4844	278.7	8.01	0.91	19
	8	10 48 10.71	0.725	9 19 27.1	3.80	0.984 8124	281.3	8.02	0.91	19
	9	10 48 27.94	0.712	9 17 56.8	3.72	0.984 1342	283.8	8.04	0.91	19
	10	10 48 44.87	+0.699	+ 9 16 28.4	-3.64	0.983 4500	-286.3	8.05	0.91	19
	11	10 49 1.47	0.685	9 15 2.0	3.56	0.982 7600	288.7	8.06	0.92	19
	12	10 49 17.76	0.672	9 13 37.6	3.48	0.982 0642	291.1	8.07	0.92	19
	13	10 49 33.72	0.658	9 12 15.2	3.39	0.981 3628	293.4	8.09	0.92	19
	14	10 49 49.35	0.644	9 10 55.0	3.30	0.980 6559	295.7	8.10	0.92	19
	15	10 50 4.64	+0.630	+ 9 9 36.8	-3.21	0.979 9437	-297.8	8.11	0.92	19
16	10 50 19.60	+0.616	+ 9 8 20.8	-3.12	0.979 2264	-300.0	8.13	0.92	19	

SATURN, 1919.

191

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.	
	Noon.			Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.		
	h	m	s	s	"	'	"	"			"	"	h	m
16	10	50	19.60	+0.616	+9	8	20.8	-3.12	0.979 2264	-300.0	8.13	0.92	19	9.3
17	10	50	34.22	0.602	9	7	6.9	3.04	0.978 5040	302.0	8.14	0.93	19	5.6
18	10	50	48.50	0.588	9	5	55.1	2.95	0.977 7769	303.9	8.15	0.93	19	1.9
19	10	51	2.42	0.573	9	4	45.5	2.85	0.977 0451	305.8	8.17	0.93	18	58.2
20	10	51	15.99	0.558	9	3	38.1	2.76	0.976 3089	307.7	8.18	0.93	18	54.5
21	10	51	29.21	+0.543	+9	2	32.9	-2.67	0.975 5684	-309.4	8.19	0.93	18	50.8
22	10	51	42.07	0.528	9	1	30.0	2.57	0.974 8238	311.1	8.21	0.93	18	47.1
23	10	51	54.56	0.513	9	0	29.4	2.48	0.974 0753	312.7	8.22	0.93	18	43.4
24	10	52	6.69	0.498	8	59	31.1	2.38	0.973 3231	314.2	8.24	0.94	18	39.6
25	10	52	18.44	0.482	8	58	35.1	2.29	0.972 5674	315.6	8.25	0.94	18	35.9
26	10	52	29.82	+0.466	+8	57	41.4	-2.19	0.971 8084	-316.9	8.27	0.94	18	32.1
27	10	52	40.83	0.451	8	56	50.1	2.09	0.971 0463	318.1	8.28	0.94	18	28.4
28	10	52	51.46	0.435	8	56	1.1	1.99	0.970 2815	319.2	8.30	0.94	18	24.6
29	10	53	1.71	0.419	8	55	14.6	1.89	0.969 5140	320.3	8.31	0.94	18	20.9
30	10	53	11.58	0.403	8	54	30.4	1.79	0.968 7441	321.3	8.33	0.95	18	17.1
1	10	53	21.06	+0.387	+8	53	48.6	-1.69	0.967 9720	-322.1	8.34	0.95	18	13.3
2	10	53	30.15	0.371	8	53	9.2	1.59	0.967 1979	322.9	8.35	0.95	18	9.5
3	10	53	38.85	0.354	8	52	32.2	1.49	0.966 4220	323.6	8.37	0.95	18	5.7
4	10	53	47.16	0.338	8	51	57.7	1.38	0.965 6445	324.2	8.39	0.95	18	1.9
5	10	53	55.08	0.322	8	51	25.7	1.28	0.964 8657	324.8	8.40	0.95	17	58.1
6	10	54	2.60	+0.305	+8	50	56.1	-1.18	0.964 0857	-325.2	8.41	0.96	17	54.3
7	10	54	9.73	0.289	8	50	29.0	1.08	0.963 3048	325.6	8.43	0.96	17	50.5
8	10	54	16.45	0.272	8	50	4.3	0.98	0.962 5231	325.8	8.45	0.96	17	46.7
9	10	54	22.78	0.255	8	49	42.2	0.87	0.961 7410	326.0	8.46	0.96	17	42.8
10	10	54	28.70	0.238	8	49	22.6	0.77	0.960 9585	326.1	8.47	0.96	17	39.0
11	10	54	34.22	+0.221	+8	49	5.4	-0.66	0.960 1760	-326.0	8.49	0.97	17	35.1
12	10	54	39.33	0.205	8	48	50.8	0.55	0.959 3937	325.9	8.51	0.97	17	31.3
13	10	54	44.04	0.188	8	48	38.8	0.45	0.958 6117	325.7	8.52	0.97	17	27.4
14	10	54	48.33	0.170	8	48	29.3	0.34	0.957 8303	325.4	8.54	0.97	17	23.6
15	10	54	52.21	0.153	8	48	22.4	0.24	0.957 0499	325.0	8.55	0.97	17	19.7
16	10	54	55.68	+0.136	+8	48	18.0	-0.13	0.956 2706	-324.4	8.57	0.97	17	15.8
17	10	54	58.73	0.118	8	48	16.1	-0.03	0.955 4927	323.8	8.58	0.98	17	11.9
18	10	55	1.36	0.101	8	48	16.8	+0.08	0.954 7165	323.0	8.60	0.98	17	8.0
19	10	55	3.58	0.084	8	48	20.1	0.19	0.953 9423	322.1	8.61	0.98	17	4.1
20	10	55	5.37	0.066	8	48	26.0	0.30	0.953 1703	321.2	8.63	0.98	17	0.2
21	10	55	6.75	+0.049	+8	48	34.4	+0.40	0.952 4008	-320.1	8.64	0.98	16	56.3
22	10	55	7.71	0.032	8	48	45.4	0.51	0.951 6341	318.9	8.66	0.98	16	52.4
23	10	55	8.25	+0.014	8	48	58.9	0.62	0.950 8704	317.5	8.67	0.99	16	48.5
24	10	55	8.36	-0.004	8	49	15.0	0.72	0.950 1101	316.0	8.69	0.99	16	44.5
25	10	55	8.06	0.021	8	49	33.6	0.83	0.949 3535	314.4	8.70	0.99	16	40.6
26	10	55	7.34	-0.039	+8	49	54.8	+0.94	0.948 6009	-312.7	8.72	0.99	16	36.6
27	10	55	6.21	0.056	8	50	18.5	1.04	0.947 8525	310.9	8.73	0.99	16	32.7
28	10	55	4.67	0.073	8	50	44.6	1.14	0.947 1086	309.0	8.75	0.99	16	28.7
29	10	55	2.71	0.090	8	51	13.3	1.25	0.946 3694	307.0	8.76	1.00	16	24.8
30	10	55	0.34	0.108	8	51	44.5	1.35	0.945 6353	304.8	8.78	1.00	16	20.8
31	10	54	57.55	-0.125	+8	52	18.1	+1.45	0.944 9064	-302.5	8.79	1.00	16	16.8
32	10	54	54.36	-0.142	+8	52	54.1	+1.55	0.944 1832	-300.1	8.81	1.00	16	12.8

SATURN, 1919.

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		" ' "	" "	" "	" ' "	"		
Jan.	7	143 27 24.6	2 9.54	+1 25.4	+1 15 45.8	+4.85	0.963 9434	+116.7
	15	143 44 40.7	2 9.49	1 25.8	1 16 24.5	4.83	0.964 0369	117.1
	23	144 1 56.4	2 9.43	1 26.3	1 17 3.0	4.81	0.964 1307	117.5
	31	144 19 11.6	2 9.37	1 26.7	1 17 41.5	4.80	0.964 2249	117.9
Feb.	8	144 36 26.4	2 9.33	1 27.2	1 18 19.8	4.78	0.964 3194	118.4
	16	144 53 40.8	2 9.27	+1 27.6	+1 18 58.0	+4.76	0.964 4143	+118.8
	24	145 10 54.7	2 9.21	1 28.0	1 19 36.0	4.74	0.964 5094	119.1
Mar.	4	145 28 8.2	2 9.16	1 28.4	1 20 13.9	4.73	0.964 6049	119.6
	12	145 45 21.3	2 9.11	1 28.9	1 20 51.7	4.71	0.964 7007	119.9
	20	146 2 33.9	2 9.05	1 29.3	1 21 29.3	4.69	0.964 7967	120.2
	28	146 19 46.1	2 8.99	+1 29.6	+1 22 6.8	+4.68	0.964 8931	+120.6
Apr.	5	146 36 57.8	2 8.94	1 30.0	1 22 44.1	4.66	0.964 9897	121.0
	13	146 54 9.1	2 8.89	1 30.4	1 23 21.4	4.65	0.965 0867	121.4
	21	147 11 20.0	2 8.83	1 30.8	1 23 58.5	4.63	0.965 1839	121.8
	29	147 28 30.4	2 8.78	1 31.1	1 24 35.4	4.61	0.965 2815	122.1
May	7	147 45 40.4	2 8.71	+1 31.4	+1 25 12.2	+4.59	0.965 3793	+122.5
	15	148 2 49.8	2 8.66	1 31.8	1 25 48.8	4.57	0.965 4775	122.9
	23	148 19 58.9	2 8.61	1 32.1	1 26 25.3	4.56	0.965 5759	123.2
	31	148 37 7.5	2 8.54	1 32.4	1 27 1.7	4.54	0.965 6746	123.6
June	8	148 54 15.6	2 8.49	1 32.7	1 27 37.9	4.52	0.965 7736	123.9
	16	149 11 23.3	2 8.43	+1 33.0	+1 28 14.0	+4.50	0.965 8729	+124.4
	24	149 28 30.5	2 8.37	1 33.3	1 28 49.9	4.48	0.965 9726	124.8
July	2	149 45 37.2	2 8.31	1 33.6	1 29 25.6	4.46	0.966 0725	125.0
	10	150 2 43.5	2 8.26	1 33.9	1 30 1.2	4.44	0.966 1726	125.3
	18	150 19 49.3	2 8.19	1 34.1	1 30 36.7	4.42	0.966 2730	125.6
	26	150 36 54.6	2 8.14	+1 34.4	+1 31 12.0	+4.41	0.966 3736	+125.9
Aug.	3	150 53 59.5	2 8.08	1 34.6	1 31 47.2	4.39	0.966 4745	126.2
	11	151 11 3.9	2 8.02	1 34.8	1 32 22.2	4.37	0.966 5756	126.5
	19	151 28 7.8	2 7.96	1 35.1	1 32 57.1	4.35	0.966 6769	126.8
	27	151 45 11.3	2 7.91	1 35.3	1 33 31.8	4.33	0.966 7785	127.2
Sept.	4	152 2 14.3	2 7.84	+1 35.5	+1 34 6.4	+4.31	0.966 8804	+127.5
	12	152 19 16.8	2 7.79	1 35.7	1 34 40.8	4.29	0.966 9825	127.8
	20	152 36 18.9	2 7.73	1 35.9	1 35 15.0	4.27	0.967 0849	128.2
	28	152 53 20.5	2 7.67	1 36.0	1 35 49.1	4.25	0.967 1876	128.5
Oct.	6	153 10 21.6	2 7.61	1 36.2	1 36 23.0	4.23	0.967 2905	128.8
	14	153 27 22.3	2 7.56	+1 36.4	+1 36 56.8	+4.21	0.967 3937	+129.1
	22	153 44 22.5	2 7.49	1 36.5	1 37 30.4	4.19	0.967 4971	129.4
	30	154 1 22.2	2 7.43	1 36.6	1 38 3.9	4.17	0.967 6007	129.6
Nov.	7	154 18 21.4	2 7.38	1 36.8	1 38 37.2	4.15	0.967 7045	129.9
	15	154 35 20.2	2 7.32	1 36.9	1 39 10.3	4.13	0.967 8085	130.1
	23	154 52 18.5	2 7.26	+1 37.0	+1 39 43.3	+4.11	0.967 9127	+130.4
Dec.	1	155 9 16.3	2 7.19	1 37.1	1 40 16.1	4.09	0.968 0171	130.6
	9	155 26 13.6	2 7.13	1 37.2	1 40 48.8	4.07	0.968 1217	130.9
	17	155 43 10.4	2 7.08	1 37.3	1 41 21.3	4.05	0.968 2265	131.1
	25	156 0 6.8	2 7.02	1 37.3	1 41 53.6	4.03	0.968 3315	131.4
	33	156 17 2.7	2 6.96	+1 37.4	+1 42 26.8	+4.01	0.968 4367	+131.6
	41	156 33 58.1	2 6.89	+1 37.4	+1 42 57.8	+3.99	0.968 5421	+131.9

URANUS, 1919.

193

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Day.	Apparent Declination.			Var. per Day.	Logarithm of Distance from Earth.	Var. per Day.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.	
	h	m	s		°	'	"							h	m

5934°—1919—13

URANUS, 1919. GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Day.	Apparent Declination.			Var. per Day.	Logarithm of Distance from Earth.	Var. per Day.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Hour.	Min.	Sec.		Hour.	Min.	Sec.						
July	4	22	14 50.33	-4.765	-11	42	11.0	-28.86	1.286 9030	-2857.6	1.73	0.45	15 26.5
	8	22	14 30.05	5.371	11	44	13.0	32.11	1.285 7930	2689.6	1.74	0.46	15 10.4
	12	22	14 7.41	5.942	11	46	27.6	35.15	1.284 7531	2508.3	1.74	0.46	14 54.3
	16	22	13 42.56	6.479	11	48	53.9	37.97	1.283 7881	2314.2	1.74	0.46	14 38.1
	20	22	13 15.63	6.978	11	51	31.1	40.59	1.282 9035	2106.9	1.75	0.46	14 22.0
	24	22	12 46.79	-7.435	-11	54	18.3	-42.95	1.282 1043	-1886.5	1.75	0.46	14 5.8
	28	22	12 16.21	7.846	11	57	14.3	45.00	1.281 3959	1654.1	1.75	0.46	13 49.5
Aug.	1	22	11 44.09	8.203	12	0	17.9	46.74	1.280 7824	1411.1	1.76	0.46	13 33.3
	5	22	11 10.66	8.502	12	3	27.8	48.16	1.280 2681	1159.8	1.76	0.46	13 17.0
	9	22	10 36.14	8.750	12	6	42.8	49.29	1.279 8553	903.6	1.76	0.46	13 0.7
	13	22	10 0.73	-8.943	-12	10	1.7	-50.09	1.279 5460	-641.6	1.76	0.46	12 44.3
	17	22	9 24.67	9.081	12	13	23.1	50.58	1.279 3427	374.5	1.76	0.46	12 28.0
	21	22	8 48.16	9.163	12	16	45.9	50.75	1.279 2469	-103.8	1.76	0.46	12 11.7
	25	22	8 11.45	9.179	12	20	8.6	50.54	1.279 2600	+169.5	1.76	0.46	11 55.3
	29	22	7 34.81	9.131	12	23	29.8	50.01	1.279 3825	442.6	1.76	0.46	11 39.0
Sept.	2	22	6 58.48	-9.023	-12	26	48.2	-49.12	1.279 6137	+712.9	1.76	0.46	11 22.7
	6	22	6 22.71	8.852	12	30	2.3	47.90	1.279 9522	978.5	1.76	0.46	11 6.4
	10	22	5 47.74	8.626	12	33	11.0	46.41	1.280 3958	1238.9	1.76	0.46	10 50.1
	14	22	5 13.78	8.343	12	36	13.2	44.63	1.280 9425	1493.0	1.76	0.46	10 33.8
	18	22	4 41.07	8.004	12	39	7.6	42.52	1.281 5893	1740.4	1.75	0.46	10 17.5
	22	22	4 9.82	-7.611	-12	41	53.0	-40.13	1.282 3337	+1979.5	1.75	0.46	10 1.3
	26	22	3 40.26	7.160	12	44	28.3	37.47	1.283 1715	2207.9	1.75	0.46	9 45.1
	30	22	3 12.61	6.657	12	46	52.4	34.54	1.284 0983	2423.2	1.74	0.46	9 28.9
Oct.	4	22	2 47.06	6.111	12	49	4.3	31.40	1.285 1081	2623.7	1.74	0.46	9 12.7
	8	22	2 23.78	5.522	12	51	3.3	28.05	1.286 1953	2809.6	1.73	0.46	8 56.6
	12	22	2 2.93	-4.901	-12	52	48.5	-24.55	1.287 3539	+2981.6	1.73	0.45	8 40.5
	16	22	1 44.62	4.245	12	54	19.5	20.86	1.288 5786	3138.9	1.72	0.45	8 24.5
	20	22	1 29.02	3.551	12	55	35.3	17.02	1.289 8628	3279.5	1.72	0.45	8 8.5
	24	22	1 16.25	2.829	12	56	35.5	13.04	1.291 1999	3403.3	1.71	0.45	7 52.6
	28	22	1 6.42	2.083	12	57	19.5	8.96	1.292 5829	3507.8	1.71	0.45	7 36.7
Nov.	1	22	0 59.61	-1.321	-12	57	47.1	-4.81	1.294 0036	+3592.3	1.70	0.45	7 20.9
	5	22	0 55.87	-0.546	12	57	57.9	-0.59	1.295 4547	3659.8	1.70	0.45	7 5.1
	9	22	0 55.25	+0.234	12	57	51.8	+3.64	1.296 9291	3709.2	1.69	0.44	6 49.4
	13	22	0 57.75	1.019	12	57	28.8	7.86	1.298 4197	3741.1	1.69	0.44	6 33.7
	17	22	1 3.41	1.809	12	56	48.9	12.12	1.299 9196	3755.5	1.68	0.44	6 18.1
	21	22	1 12.22	+2.598	-12	55	51.8	+16.40	1.301 4216	+3751.3	1.67	0.44	6 2.5
	25	22	1 24.19	3.383	12	54	37.8	20.58	1.302 9181	3727.9	1.67	0.44	5 47.0
	29	22	1 39.27	4.154	12	53	7.2	24.73	1.304 4015	3686.2	1.66	0.44	5 31.5
Dec.	3	22	1 57.40	4.907	12	51	20.1	28.77	1.305 8648	3627.4	1.66	0.43	5 16.1
	7	22	2 18.50	5.641	12	49	17.2	32.69	1.307 3014	3553.5	1.65	0.43	5 0.7
	11	22	2 42.50	+6.354	-12	46	58.7	+36.53	1.308 7056	+3464.9	1.65	0.43	4 45.4
	15	22	3 9.30	7.044	12	44	25.1	40.26	1.310 0713	3361.2	1.64	0.43	4 30.1
	19	22	3 38.82	7.712	12	41	36.8	43.87	1.311 3926	3242.7	1.64	0.43	4 14.8
	23	22	4 10.96	8.351	12	38	34.4	47.30	1.312 6635	3109.4	1.63	0.43	3 59.6
	27	22	4 45.58	8.954	12	35	18.6	50.57	1.313 8783	2962.4	1.63	0.43	3 44.5
	31	22	5 22.54	+9.520	-12	31	50.1	+53.65	1.315 0318	+2803.0	1.62	0.43	3 29.4

URANUS, 1919.

195

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		° ' "	"	"	° ' "	"		
a.	5	327 13 42.2	38.84	+5.0	-0 44 27.9	-0.15	1.301 4170	+14.2
	15	327 20 10.6	38.84	5.0	0 44 29.4	0.15	1.301 4312	14.2
	25	327 26 38.9	38.83	5.0	0 44 30.8	0.15	1.301 4454	14.2
b.	4	327 33 7.2	38.83	+5.0	-0 44 32.3	-0.15	1.301 4595	+14.1
	14	327 39 35.5	38.82	4.9	0 44 33.7	0.14	1.301 4736	14.1
	24	327 46 3.7	38.82	4.9	0 44 35.1	0.14	1.301 4877	14.0
c.	6	327 52 31.9	38.82	+4.9	-0 44 36.5	-0.14	1.301 5017	+14.0
	16	327 59 0.1	38.82	4.9	0 44 37.9	0.14	1.301 5156	13.9
	26	328 5 28.2	38.81	4.8	0 44 39.3	0.14	1.301 5295	13.8
d.	5	328 11 56.3	38.81	+4.8	-0 44 40.7	-0.14	1.301 5433	+13.8
	15	328 18 24.4	38.81	4.8	0 44 42.1	0.14	1.301 5570	13.7
	25	328 24 52.5	38.80	4.7	0 44 43.5	0.14	1.301 5707	13.6
e.	5	328 31 20.5	38.80	+4.7	-0 44 44.8	-0.14	1.301 5843	+13.6
	15	328 37 48.5	38.80	4.7	0 44 46.2	0.13	1.301 5979	13.6
	25	328 44 16.4	38.79	4.6	0 44 47.5	0.13	1.301 6114	13.5
f.	4	328 50 44.3	38.79	+4.6	-0 44 48.8	-0.13	1.301 6249	+13.5
	14	328 57 12.2	38.79	4.6	0 44 50.1	0.13	1.301 6384	13.4
	24	329 3 40.1	38.78	4.6	0 44 51.4	0.13	1.301 6517	13.3
g.	4	329 10 7.9	38.78	+4.5	-0 44 52.7	-0.13	1.301 6649	+13.3
	14	329 16 35.7	38.78	4.5	0 44 54.0	0.13	1.301 6782	13.2
	24	329 23 3.5	38.78	4.5	0 44 55.3	0.13	1.301 6914	13.2
h.	3	329 29 31.3	38.78	+4.4	-0 44 56.6	-0.13	1.301 7045	+13.1
	13	329 35 59.0	38.77	4.4	0 44 57.8	0.13	1.301 7175	13.0
	23	329 42 26.7	38.77	4.4	0 44 59.1	0.13	1.301 7305	13.0
i.	2	329 48 54.4	38.76	+4.3	-0 45 0.3	-0.12	1.301 7435	+12.9
	12	329 55 22.0	38.76	4.3	0 45 1.6	0.12	1.301 7564	12.8
	22	330 1 49.6	38.76	4.3	0 45 2.8	0.12	1.301 7692	12.8
j.	2	330 8 17.2	38.76	+4.2	-0 45 4.0	-0.12	1.301 7820	+12.7
	12	330 14 44.7	38.76	4.2	0 45 5.2	0.12	1.301 7947	12.7
	22	330 21 12.3	38.75	4.2	0 45 6.4	0.12	1.301 8074	12.6
k.	1	330 27 39.8	38.75	+4.2	-0 45 7.6	-0.12	1.301 8200	+12.6
	11	330 34 7.3	38.75	4.1	0 45 8.8	0.12	1.301 8326	12.5
	21	330 40 34.7	38.74	4.1	0 45 9.9	0.12	1.301 8451	12.4
l.	1	330 47 2.1	38.74	+4.1	-0 45 11.1	-0.12	1.301 8575	+12.4
	11	330 53 29.5	38.74	4.0	0 45 12.2	0.11	1.301 8699	12.4
	21	330 59 56.9	38.74	4.0	0 45 13.4	0.11	1.301 8822	12.3
	31	331 6 24.2	38.73	+4.0	-0 45 14.5	-0.11	1.301 8945	+12.3
	41	331 12 51.5	38.73	+3.9	-0 45 15.6	-0.11	1.301 9067	+12.3

NEPTUNE, 1919.

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Day.	Apparent Declination.	Var. per Day.	Logarithm of Distance from Earth.	Var. per Day.	Semi- diam- eter.	Hor. Paral- lax.	Transit, Meridian of Green- wich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			"	"	h m
Jan. 1	8 44 18.49	-5.805	+18 0 12.1	+23.05	1.465 0830	-1236.1	1.32	0.30	14 1.6
5	8 43 54.70	6.086	18 1 46.4	24.09	1.464 6214	1069.8	1.33	0.30	13 45.5
9	8 43 29.86	6.324	18 3 24.6	24.97	1.464 2280	897.0	1.33	0.30	13 29.3
13	8 43 4.17	6.514	18 5 5.9	25.65	1.463 9042	721.6	1.33	0.30	13 13.2
17	8 42 37.80	6.667	18 6 49.6	26.17	1.463 6512	542.5	1.33	0.30	12 57.0
21	8 42 10.89	-6.778	+18 8 35.1	+26.57	1.463 4707	-359.1	1.33	0.30	12 40.9
25	8 41 43.63	6.846	18 10 21.9	26.78	1.463 3642	-173.4	1.33	0.30	12 24.7
29	8 41 16.18	6.869	18 12 9.1	26.82	1.463 3321	+12.8	1.33	0.30	12 8.5
Feb. 2	8 40 48.74	6.841	18 13 56.2	26.67	1.463 3745	199.8	1.33	0.30	11 52.3
6	8 40 21.49	6.772	18 15 42.2	26.31	1.463 4917	384.6	1.33	0.30	11 36.1
10	8 39 54.62	-6.657	+18 17 26.5	+25.82	1.463 6817	+565.7	1.33	0.30	11 19.9
14	8 39 28.29	6.498	18 19 8.6	25.19	1.463 9438	743.9	1.33	0.30	11 3.8
18	8 39 2.69	6.299	18 20 47.8	24.40	1.464 2761	916.4	1.33	0.30	10 47.6
22	8 38 37.95	6.065	18 22 23.6	23.47	1.464 6762	1083.4	1.33	0.30	10 31.5
26	8 38 14.23	5.786	18 23 55.4	22.40	1.465 1421	1245.5	1.32	0.30	10 15.4
Mar. 2	8 37 51.71	-5.471	+18 25 22.6	+21.18	1.465 6716	+1399.9	1.32	0.30	9 59.3
6	8 37 30.51	5.121	18 26 44.7	19.83	1.466 2608	1545.0	1.32	0.30	9 43.2
10	8 37 10.79	4.736	18 28 1.1	18.38	1.466 9064	1681.2	1.32	0.30	9 27.1
14	8 36 52.66	4.325	18 29 11.6	16.84	1.467 6044	1806.8	1.32	0.30	9 11.1
18	8 36 36.22	3.892	18 30 15.7	15.20	1.468 3505	1922.4	1.31	0.30	8 55.1
22	8 36 21.56	-3.432	+18 31 13.1	+13.50	1.469 1410	+2028.2	1.31	0.30	8 39.1
26	8 36 8.79	2.952	18 32 3.6	11.72	1.469 9716	2123.1	1.31	0.30	8 23.2
30	8 35 57.97	2.453	18 32 46.8	9.87	1.470 8380	2206.8	1.31	0.30	8 7.3
Apr. 3	8 35 49.19	1.936	18 33 22.5	7.96	1.471 7355	2278.9	1.30	0.30	7 51.4
7	8 35 42.50	1.407	18 33 50.4	5.99	1.472 6594	2337.7	1.30	0.30	7 35.6
11	8 35 37.94	-0.873	+18 34 10.4	+4.04	1.473 6041	+2385.0	1.30	0.30	7 19.8
15	8 35 35.52	-0.334	18 34 22.7	2.08	1.474 5659	2421.1	1.30	0.29	7 4.1
19	8 35 35.27	+0.207	18 34 27.0	+0.08	1.475 5394	2444.7	1.29	0.29	6 48.3
23	8 35 37.18	0.750	18 34 23.3	-1.93	1.476 5203	2458.4	1.29	0.29	6 32.6
27	8 35 41.27	1.294	18 34 11.6	3.93	1.477 5046	2460.7	1.29	0.29	6 17.0
May 1	8 35 47.53	+1.835	+18 33 51.9	-5.92	1.478 4872	+2450.4	1.28	0.29	6 1.4
5	8 35 55.94	2.368	18 33 24.3	7.88	1.479 4634	2428.7	1.28	0.29	5 45.8
9	8 36 6.46	2.890	18 32 48.9	9.82	1.480 4287	2396.0	1.28	0.29	5 30.2
13	8 36 19.04	3.399	18 32 5.8	11.72	1.481 3789	2353.5	1.28	0.29	5 14.7
17	8 36 33.63	3.894	18 31 15.2	13.57	1.482 3103	2301.9	1.27	0.29	4 59.2
21	8 36 50.17	+4.373	+18 30 17.3	-15.37	1.483 2192	+2240.9	1.27	0.29	4 43.8
25	8 37 8.60	4.842	18 29 12.3	17.13	1.484 1018	2170.6	1.27	0.29	4 28.3
29	8 37 28.88	5.293	18 28 0.3	18.86	1.484 9545	2091.4	1.27	0.29	4 12.9
June 2	8 37 50.91	5.719	18 26 41.5	20.50	1.485 7737	2002.7	1.26	0.29	3 57.6
6	8 38 14.60	6.124	18 25 16.4	22.05	1.486 5556	1905.8	1.26	0.29	3 42.3
10	8 38 39.87	+6.507	+18 23 45.2	-23.54	1.487 2975	+1802.6	1.26	0.29	3 27.0
14	8 39 6.62	6.863	18 22 8.2	24.96	1.487 9969	1693.4	1.26	0.29	3 11.7
18	8 39 34.74	7.195	18 20 25.6	26.30	1.488 6514	1577.9	1.25	0.29	2 56.4
22	8 40 4.15	7.507	18 18 37.9	27.55	1.489 2584	1456.5	1.25	0.29	2 41.2
26	8 40 34.76	7.792	18 16 45.3	28.73	1.489 8157	1328.2	1.25	0.28	2 25.9
30	8 41 6.45	+8.049	+18 14 48.2	-29.70	1.490 3203	+1195.2	1.25	0.28	2 10.7
July 4	8 41 39.11	+8.275	+18 12 47.1	-30.74	1.490 7713	+1058.3	1.25	0.28	1 55.6

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.			Var. per Day.	Apparent Declination.			Var. per Day.	Logarithm of Distance from Earth.	Var. per Day.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Hour.	Min.	Sec.		Hour.	Min.	Sec.						
July	4	8 41 39.11	+8.275	+18 12 47.1	-30.74	1.490 7713	+1058.3	1.25	0.28	1 55.6			
	8	8 42 12.61	8.469	18 10 42.4	31.60	1.491 1664	917.1	1.25	0.28	1 40.4			
	12	8 42 46.83	8.638	18 8 34.4	32.37	1.491 5046	773.4	1.25	0.28	1 25.2			
	16	8 43 21.68	8.778	18 6 23.6	33.02	1.491 7848	627.2	1.25	0.28	1 10.1			
	20	8 43 57.02	8.890	18 4 10.4	33.58	1.492 0060	478.3	1.25	0.28	0 54.9			
	24	8 44 32.76	+8.974	+18 1 55.1	-34.03	1.492 1671	+ 327.1	1.24	0.28	0 39.8			
	28	8 45 8.77	9.026	17 59 38.3	34.35	1.492 2674	173.8	1.24	0.28	0 24.7			
Aug.	1	8 45 44.92	9.043	17 57 20.5	34.53	1.492 3060	+ 19.7	1.24	0.28	0 9.5			
	5	8 46 21.07	9.028	17 55 2.2	34.60	1.492 2832	- 134.0	1.24	0.28	23 50.6			
	9	8 46 57.11	8.986	17 52 43.8	34.58	1.492 1989	287.0	1.24	0.28	23 35.5			
	13	8 47 32.92	+8.915	+17 50 25.7	-34.42	1.492 0538	- 438.4	1.24	0.28	23 20.3			
	17	8 48 8.39	8.814	17 48 8.6	34.13	1.491 8483	589.3	1.25	0.28	23 5.2			
	21	8 48 43.39	8.683	17 45 52.8	33.75	1.491 5825	739.2	1.25	0.28	22 50.0			
	25	8 49 17.81	8.520	17 43 38.8	33.22	1.491 2572	887.0	1.25	0.28	22 34.9			
	29	8 49 51.51	8.326	17 41 27.2	32.54	1.490 8733	1032.0	1.25	0.28	22 19.7			
Sept.	2	8 50 24.38	+8.102	+17 39 18.6	-31.76	1.490 4322	-1172.5	1.25	0.28	22 4.6			
	6	8 50 56.29	7.849	17 37 13.3	30.84	1.489 9359	1308.2	1.25	0.28	21 49.4			
	10	8 51 27.14	7.570	17 35 12.0	29.82	1.489 3862	1439.7	1.25	0.29	21 34.1			
	14	8 51 56.82	7.267	17 33 14.9	28.70	1.488 7848	1566.3	1.25	0.29	21 18.9			
	18	8 52 25.24	6.937	17 31 22.6	27.43	1.488 1339	1687.2	1.26	0.29	21 3.6			
	22	8 52 52.28	+6.578	+17 29 35.6	-26.04	1.487 4358	-1802.5	1.26	0.29	20 48.3			
	26	8 53 17.83	6.191	17 27 54.4	24.54	1.486 6928	1911.1	1.26	0.29	20 33.0			
	30	8 53 41.78	5.781	17 26 19.4	22.93	1.485 9080	2011.2	1.26	0.29	20 17.7			
Oct.	4	8 54 4.05	5.351	17 24 51.1	21.21	1.485 0850	2102.8	1.27	0.29	20 2.3			
	8	8 54 24.56	4.900	17 23 29.8	19.43	1.484 2269	2185.6	1.27	0.29	19 46.9			
	12	8 54 43.23	+4.433	+17 22 15.8	-17.55	1.483 3377	-2259.4	1.27	0.29	19 31.5			
	16	8 55 0.00	3.947	17 21 9.5	15.59	1.482 4205	2325.3	1.27	0.29	19 16.1			
	20	8 55 14.78	3.443	17 20 11.2	13.53	1.481 4788	2380.8	1.28	0.29	19 0.6			
	24	8 55 27.52	2.923	17 19 21.3	11.42	1.480 5173	2425.6	1.28	0.29	18 45.1			
	28	8 55 38.15	2.391	17 18 39.9	9.25	1.479 5399	2458.6	1.28	0.29	18 29.5			
Nov.	1	8 55 46.64	+1.851	+17 18 7.4	- 7.01	1.478 5520	-2479.4	1.28	0.29	18 13.9			
	5	8 55 52.95	1.305	17 17 43.8	4.77	1.477 5579	2489.0	1.29	0.29	17 58.3			
	9	8 55 57.08	0.760	17 17 29.2	2.54	1.476 5623	2487.2	1.29	0.29	17 42.6			
	13	8 55 59.02	+0.208	17 17 23.5	- 0.26	1.475 5697	2474.0	1.29	0.29	17 26.9			
	17	8 55 58.74	-0.346	17 17 27.1	+ 2.03	1.474 5848	2448.1	1.30	0.29	17 11.2			
	21	8 55 56.26	-0.895	+17 17 39.7	+ 4.29	1.473 6129	-2409.6	1.30	0.30	16 55.4			
	25	8 55 51.59	1.438	17 18 1.4	6.55	1.472 6588	2358.5	1.30	0.30	16 39.6			
	29	8 55 44.77	1.972	17 18 32.0	8.74	1.471 7279	2293.2	1.30	0.30	16 23.7			
Dec.	3	8 55 35.84	2.487	17 19 11.2	10.83	1.470 8258	2216.2	1.31	0.30	16 7.8			
	7	8 55 24.90	2.982	17 19 58.6	12.87	1.469 9564	2128.3	1.31	0.30	15 51.9			
	11	8 55 12.00	-3.466	+17 20 54.1	+14.87	1.469 1246	-2029.4	1.31	0.30	15 36.0			
	15	8 54 57.20	3.931	17 21 57.4	16.76	1.468 3344	1919.0	1.32	0.30	15 20.0			
	19	8 54 40.59	4.369	17 23 8.0	18.52	1.467 5909	1797.0	1.32	0.30	15 4.0			
	23	8 54 22.29	4.778	17 24 25.4	20.17	1.466 8982	1664.5	1.32	0.30	14 48.0			
	27	8 54 2.41	5.156	17 25 49.2	21.69	1.466 2607	1521.4	1.32	0.30	14 31.9			
	31	8 53 41.09	-5.498	+17 27 18.7	+23.04	1.465 6822	-1369.8	1.32	0.30	14 15.8			

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		" ' "	"	"	" ' "	"		
Jan.	5	127 47 31.3	21.75	-5.4	-0 5 45.0	+0.67	1.477 7972	+4.3
	15	127 51 8.8	21.75	5.3	0 5 38.2	0.67	1.477 8015	4.3
	25	127 54 46.3	21.75	5.2	0 5 31.5	0.67	1.477 8057	4.3
Feb.	4	127 58 23.8	21.75	-5.0	-0 5 24.8	+0.67	1.477 8100	+4.3
	14	128 2 1.3	21.75	4.9	0 5 18.1	0.67	1.477 8142	4.3
	24	128 5 38.8	21.75	4.8	0 5 11.4	0.67	1.477 8184	4.3
Mar.	6	128 9 16.3	21.75	-4.7	-0 5 4.7	+0.67	1.477 8226	+4.3
	16	128 12 53.8	21.75	4.6	0 4 58.0	0.67	1.477 8268	4.3
	26	128 16 31.3	21.75	4.5	0 4 51.3	0.67	1.477 8310	4.3
Apr.	5	128 20 8.8	21.75	-4.4	-0 4 44.6	+0.67	1.477 8352	+4.3
	15	128 23 46.3	21.75	4.3	0 4 37.9	0.67	1.477 8393	4.3
	25	128 27 23.8	21.75	4.2	0 4 31.1	0.67	1.477 8435	4.3
May	5	128 31 1.3	21.75	-4.1	-0 4 24.4	+0.67	1.477 8476	+4.3
	15	128 34 38.8	21.75	4.0	0 4 17.7	0.67	1.477 8517	4.3
	25	128 38 16.2	21.75	3.9	0 4 11.0	0.67	1.477 8558	4.3
June	4	128 41 53.7	21.75	-3.8	-0 4 4.3	+0.67	1.477 8599	+4.3
	14	128 45 31.2	21.75	3.7	0 3 57.6	0.67	1.477 8640	4.3
	24	128 49 8.7	21.75	3.6	0 3 50.9	0.67	1.477 8681	4.3
July	4	128 52 46.1	21.75	-3.5	-0 3 44.2	+0.67	1.477 8721	+4.0
	14	128 56 23.6	21.75	3.4	0 3 37.4	0.67	1.477 8761	4.0
	24	129 0 1.1	21.75	3.3	0 3 30.7	0.67	1.477 8801	4.0
Aug.	3	129 3 38.6	21.74	-3.2	-0 3 24.0	+0.67	1.477 8841	+4.0
	13	129 7 16.0	21.74	3.1	0 3 17.3	0.67	1.477 8881	4.0
	23	129 10 53.5	21.74	3.0	0 3 10.6	0.67	1.477 8921	4.0
Sept.	2	129 14 30.9	21.74	-2.9	-0 3 3.9	+0.67	1.477 8961	+4.0
	12	129 18 8.4	21.74	2.8	0 2 57.2	0.67	1.477 9001	3.9
	22	129 21 45.8	21.74	2.7	0 2 50.5	0.67	1.477 9040	3.9
Oct.	2	129 25 23.3	21.74	-2.6	-0 2 43.8	+0.67	1.477 9079	+3.9
	12	129 29 0.7	21.74	2.4	0 2 37.1	0.67	1.477 9118	3.9
	22	129 32 38.2	21.74	2.3	0 2 30.4	0.67	1.477 9157	3.9
Nov.	1	129 36 15.6	21.74	-2.2	-0 2 23.7	+0.67	1.477 9196	+3.9
	11	129 39 53.0	21.74	2.1	0 2 16.9	0.67	1.477 9235	3.9
	21	129 43 30.4	21.74	2.0	0 2 10.2	0.67	1.477 9274	3.9
Dec.	1	129 47 7.8	21.74	-1.9	-0 2 3.5	+0.67	1.477 9313	+3.8
	11	129 50 45.2	21.74	1.8	0 1 56.8	0.67	1.477 9351	3.8
	21	129 54 22.7	21.74	1.7	0 1 50.1	0.67	1.477 9390	3.8
	31	129 58 0.1	21.74	-1.6	-0 1 43.4	+0.67	1.477 9428	+3.8
	41	130 1 37.5	21.74	-1.5	-0 1 36.7	+0.67	1.477 9466	+3.8

PART II.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

200 FORMULÆ FOR THE REDUCTION OF STARS, 1919.

The constants of precession, nutation and aberration adopted by the *Conférence Internationale des Étoiles Fondamentales* which met in Paris in May, 1896, are given on page xvi, and together with the notation of BESSEL are used in the formulæ which follow.

BESSELIAN STAR-NUMBERS.

<i>Terms of Long Period.</i>	<i>Terms of Short Period.</i>
$A-\tau-0.342\ 21\ \sin\ \Omega$	$-0.004\ 05\ \sin\ 2\ \mathfrak{C}$
$+0.004\ 15\ \sin\ 2\ \Omega$	$+0.000\ 23\ \sin\ (\mathfrak{C}+\Gamma')$
$-0.025\ 26\ \sin\ 2\ L$	$+0.001\ 34\ \sin\ (\mathfrak{C}-\Gamma')$
$+0.002\ 51\ \sin\ (L-\Gamma)$	$-0.000\ 68\ \sin\ (2\ \mathfrak{C}-\Omega)$
$-0.000\ 99\ \sin\ (3\ L-\Gamma)$	$-0.000\ 52\ \sin\ (3\ \mathfrak{C}-\Gamma')$
$+0.000\ 42\ \sin\ (L+\Gamma)$	$+0.000\ 30\ \sin\ (\mathfrak{C}-2\ L+\Gamma')$
$+0.000\ 25\ \sin\ (2\ L-\Omega)$	$+0.000\ 12\ \sin\ 2\ (\mathfrak{C}-L)$
"	"
$B=-9.210\ \cos\ \Omega$	$-0.088\ \cos\ 2\ \mathfrak{C}$
$+0.090\ \cos\ 2\ \Omega$	$-0.018\ \cos\ (2\ \mathfrak{C}-\Omega)$
$-0.551\ \cos\ 2\ L$	$-0.011\ \cos\ (3\ \mathfrak{C}-\Gamma')$
$-0.022\ \cos\ (3\ L-\Gamma)$	$+0.005\ \cos\ (\mathfrak{C}+\Gamma')$
$+0.009\ \cos\ (L+\Gamma)$	
$+0.007\ \cos\ (2\ L-\Omega)$	
$C=-20.4700\ \cos\ \omega\ \cos\ \odot$	
$D=-20.4700\ \sin\ \odot$	
$E=-0.0415\ \sin\ \Omega+0''.0005\ \sin\ 2\ \Omega-0''.0031\ \sin\ 2\ L$	

BESSEL'S Star-Constants.

$a=3^s.072\ 69+1^s.336\ 35\ \sin\ \alpha_0\ \tan\ \delta_0$	$a'=-20''.0452\ \cos\ \alpha_0$
$b=\frac{1}{\Gamma}\cos\ \alpha_0\ \tan\ \delta_0$	$b'=-\sin\ \alpha_0$
$c=\frac{1}{\Gamma}\cos\ \alpha_0\ \sec\ \delta_0$	$c'=\tan\ \omega\ \cos\ \delta_0-\sin\ \alpha_0\ \sin\ \delta_0$
$d=\frac{1}{\Gamma}\sin\ \alpha_0\ \sec\ \delta_0$	$d'=\cos\ \alpha_0\ \sin\ \delta_0$

Formulæ for Reduction to Apparent Position.

$$\alpha=\alpha_0+\tau\mu+Aa+Bb+Cc+Dd+\frac{1}{\Gamma}E \quad (\text{in time})$$

$$\delta=\delta_0+\tau\mu'+Aa'+Bb'+Cc'+Dd' \quad (\text{in arc})$$

INDEPENDENT STAR-NUMBERS.

$$f+f'=-46''.0903\ A+E \quad (\text{in arc})$$

$$-3^s.07269A+\frac{1}{\Gamma}E \quad (\text{in time})$$

$$f'=-0^s.0124\ \sin\ 2\ \mathfrak{C}+0^s.0041\ \sin\ (\mathfrak{C}-\Gamma')+0^s.0007\ \sin\ (\mathfrak{C}+\Gamma')$$

$$-0^s.0021\ \sin\ (2\ \mathfrak{C}-\Omega)-0^s.0016\ \sin\ (3\ \mathfrak{C}-\Gamma')$$

$$+0^s.0009\ \sin\ (\mathfrak{C}-2\ L+\Gamma')+0^s.0004\ \sin\ 2\ (\mathfrak{C}-L)$$

$$g\ \sin\ G=B \quad h\ \sin\ H=C \quad i=C\ \tan\ \omega$$

$$g\ \cos\ G=20''.0452\ A \quad h\ \cos\ H=D$$

Formulæ for Reduction to Apparent Position.

$$\alpha=\alpha_0+f+f'+\tau\mu+\frac{1}{\Gamma}g\ \sin\ (G+\alpha_0)\ \tan\ \delta_0+\frac{1}{\Gamma}h\ \sin\ (H+\alpha_0)\ \sec\ \delta_0 \quad (\text{in time})$$

$$\delta=\delta_0+\tau\mu'+g\ \cos\ (G+\alpha_0)+h\ \cos\ (H+\alpha_0)\ \sin\ \delta_0+i\ \cos\ \delta_0 \quad (\text{in arc})$$

In the above formulæ,

τ denotes the time reckoned in units of one year, from the beginning of the Besselian fictitious year (1919, January 0^d.701, Washington mean time),

α_0, δ_0 , the star's mean R. A. and Decl. at the beginning of the fictitious year,
 α, δ , the star's apparent right ascension and declination at the time τ ,
 μ, μ' , the annual proper motion in right ascension and declination,

\odot , the Sun's true longitude,
 L , the Sun's mean longitude,
 Ω , the longitude of the Moon's
ascending node,

ω , the obliquity of the ecliptic,
 Γ , the long. of the Sun's perigee,
 Γ' , the long. of the Moon's perigee,
 \mathfrak{C} , the Moon's mean longitude.

FORMULÆ FOR THE REDUCTION OF STARS, 1919. 201

The independent star-numbers are more convenient than BESSEL's when only one or two apparent positions of a star are required, or when BESSEL's star-constants are not known with sufficient accuracy.

In using the star-constants of the *British Association Catalogue*, $a, b, c, d, a', b', c', d'$, with the star-numbers of this Ephemeris, the quantities to be computed are $Ac, Bd, Ca, Db, -Ac', -Bd', -Ca', -Db'$.

In the computation of the Besselian star-numbers given for Washington mean midnight of each day of the year, on pages 202-205, the short-period terms—that is, the terms involving the Moon's mean longitude—have been included.

In the computation of the independent star-numbers, pages 206-213, the short-period terms have been included in the two columns headed G and $\text{Log } g$. The quantities f and f' give separately the effect of the long-period and short-period terms. f' differs but slightly from the quantity $-0''.1866 \sin 2 \zeta + 0''.0622 \sin (\zeta - \Gamma')$ given on page 37 of the *Procès-Verbaux* of the Paris Conference of 1896, which quantity that conference decided should be omitted in the reduction of stars from mean to apparent place.

In computing the ephemerides of the circumpolar stars in this volume, all short-period terms have been included. The quantity f' , which was omitted from the ephemerides of the circumpolar stars given in the *American Ephemeris and Nautical Almanac* for the years 1900 to 1915, inclusive, is now included in these ephemerides in accordance with the decision of the *Congrès International des Éphémérides Astronomiques* held in Paris in October, 1911. See page 43 of *Procès-Verbaux* of that Congress.

In the computation of the ephemerides of the ten-day stars, no short-period terms have been included. These terms attain two maxima and two minima during the tropical month. At maximum and minimum they may amount in right ascension to $\pm 0''.008 \tan \delta$, and in declination to $\pm 0''.13$. For computing the effect of these terms for the correction of the positions of stars interpolated from the ten-day ephemerides, the following formulæ may be used, in which $\Delta\alpha$ and $\Delta\delta$ denote the effect of the short-period terms in right ascension and declination, respectively, and $\delta''\psi$ and $\delta''\omega$, the sum of the short-period terms of the nutation in longitude and obliquity:

$$\begin{aligned}\Delta\alpha &= D\psi\alpha \delta''\psi + D\omega\alpha \delta''\omega \\ \Delta\delta &= D\psi\delta \delta''\psi + D\omega\delta \delta''\omega\end{aligned}$$

The values of $\delta''\psi$ and of $\delta''\omega$ for Washington mean midnight are given for each day of the year on pages 215-216, and have been computed as follows:

$$\delta''\psi = 50''.37 A_2 \qquad \delta''\omega = -B_2$$

in which A_2 and B_2 are the sums of the short-period terms given in the expressions for A and B on page 200.

The quantities $D\psi\alpha$, $D\omega\alpha$, $D\psi\delta$, and $D\omega\delta$ are given for each ten-day star on pages 316-513, and have been computed by means of the following formulæ:

$$\begin{aligned}D\psi\alpha &= \frac{1}{15} (\cos \omega + \sin \alpha \tan \delta \sin \omega) & D\omega\alpha &= -\frac{1}{15} \cos \alpha \tan \delta \\ D\psi\delta &= \cos \alpha \sin \omega & D\omega\delta &= \sin \alpha\end{aligned}$$

In the *Star List of the American Ephemeris* for the years 1910 and 1911 and in the *American Ephemeris and Nautical Almanac* for the years 1912 to 1915, inclusive, the value used for the derivative of the right ascension with reference to ψ was

$$D'\psi\alpha = \frac{1}{15} \sin \alpha \tan \delta \sin \omega$$

and the addition of the term $\frac{1}{15} \cos \omega$ is made in accordance with the above-mentioned decision of the *Congrès International des Éphémérides Astronomiques* of 1911 with reference to the quantity f' .

BESSELIAN STAR-NUMBERS, 1919.

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Std. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Std. Hr.)	Log A.	Log B.	Log C.	Log D.
Jan. 0	+9.52419	+0.5360	-0.50242	+1.30480	Feb. 15	+9.67801	+0.4638	-1.19474	+1.05312
1	9.53075	0.5351	0.54517	1.30340	16	9.67846	0.4614	1.19971	1.04134
2	9.53696	0.5321	0.58395	1.30186	17	9.67894	0.4613	1.20448	1.02911
3	9.54237	0.5277	0.61943	1.30018	18	9.67966	0.4630	1.20907	1.01638
h	9.54678	0.5224	0.65209	1.29835	h	9.68074	0.4660	1.21348	1.00314
(7.0) 5	+9.55007	+0.5177	-0.68234	+1.29637	(10.0) 20	+9.68228	+0.4693	-1.21771	+0.98934
6	9.55245	0.5146	0.71048	1.29425	21	9.68432	0.4725	1.22176	0.97496
7	9.55444	0.5141	0.73679	1.29198	22	9.68687	0.4748	1.22564	0.95996
8	9.55659	0.5162	0.76145	1.28956	23	9.68985	0.4757	1.22936	0.94428
9	9.55941	0.5205	0.78466	1.28698	24	9.69298	0.4747	1.23290	0.92789
10	+9.56336	+0.5257	-0.80655	+1.28426	25	+9.69608	+0.4717	-1.23628	+0.91072
11	9.56850	0.5304	0.82726	1.28138	26	9.69886	0.4667	1.23951	0.89271
12	9.57446	0.5332	0.84690	1.27834	27	9.70104	0.4604	1.24258	0.87379
13	9.58081	0.5336	0.86554	1.27515	28	9.70254	0.4538	1.24549	0.85388
14	9.58693	0.5310	0.88329	1.27179	Mar. 1	9.70343	0.4484	1.24824	0.83288
15	+9.59230	+0.5262	-0.90021	+1.26827	2	+9.70384	+0.4453	-1.25085	+0.81069
16	9.59666	0.5201	0.91635	1.26458	3	9.70406	0.4455	1.25331	0.78717
17	9.59991	0.5139	0.93178	1.26072	4	9.70451	0.4489	1.25562	0.76218
18	9.60225	0.5088	0.94655	1.25669	5	9.70557	0.4545	1.25778	0.73554
h	9.60397	0.5053	0.96070	1.25249	h	9.70742	0.4609	1.25980	0.70703
(8.0) 20	+9.60541	+0.5039	-0.97427	+1.24810	(11.0) 7	+9.71006	+0.4663	-1.26168	+0.67639
21	9.60693	0.5045	0.98730	1.24354	8	9.71324	0.4695	1.26342	0.64331
22	9.60878	0.5064	0.99980	1.23879	9	9.71657	0.4696	1.26501	0.60738
23	9.61111	0.5091	1.01183	1.23385	10	9.71959	0.4668	1.26647	0.56808
24	9.61401	0.5120	1.02340	1.22871	11	9.72206	0.4618	1.26779	0.52475
25	+9.61749	+0.5144	-1.03452	+1.22337	12	+9.72376	+0.4559	-1.26898	+0.47650
26	9.62150	0.5159	1.04524	1.21783	13	9.72469	0.4506	1.27003	0.42210
27	9.62588	0.5158	1.05557	1.21208	14	9.72502	0.4470	1.27095	0.35977
28	9.63043	0.5138	1.06552	1.20611	15	9.72502	0.4459	1.27173	0.28688
29	9.63480	0.5098	1.07511	1.19993	16	9.72498	0.4473	1.27238	0.19913
30	+9.63871	+0.5040	-1.08436	+1.19352	17	+9.72514	+0.4509	-1.27290	+0.08894
31	9.64187	0.4971	1.09327	1.18688	18	9.72560	0.4559	1.27329	9.94080
Feb. 1	9.64417	0.4903	1.10187	1.17999	19	9.72649	0.4616	1.27354	9.71423
2	9.64568	0.4849	1.11017	1.17286	20	9.72784	0.4672	1.27367	+9.21259
3	9.64668	0.4819	1.11818	1.16548	h	9.72967	0.4722	1.27366	-9.28202
h	+9.64764	+0.4820	-1.12591	+1.15783	(12.0) 22	+9.73184	+0.4759	-1.27353	-9.73692
(9.0) 5	9.64899	0.4847	1.13336	1.14990	23	9.73429	0.4779	1.27326	9.95411
6	9.65111	0.4890	1.14055	1.14170	24	9.73678	0.4779	1.27286	0.09803
7	9.65420	0.4935	1.14749	1.13321	25	9.73915	0.4761	1.27234	0.20582
8	9.65806	0.4965	1.15418	1.12441	26	9.74112	0.4728	1.27168	0.29195
9	+9.66238	+0.4970	-1.16064	+1.11529	27	+9.74257	+0.4689	-1.27090	-0.36364
10	9.66671	0.4945	1.16686	1.10584	28	9.74343	0.4657	1.26998	0.42502
11	9.67057	0.4894	1.17286	1.09605	29	9.74376	0.4645	1.26893	0.47866
12	9.67367	0.4825	1.17864	1.08590	30	9.74391	0.4663	1.26775	0.52625
13	9.67586	0.4751	1.18421	1.07538	31	9.74418	0.4710	1.26644	0.56900
14	+9.67724	+0.4685	-1.18958	+1.06446	Apr. 1	+9.74490	+0.4783	-1.26500	-0.60776
15	+9.67801	+0.4638	-1.19474	+1.05312	2	+9.74638	+0.4867	-1.26342	-0.64322

E = +0°.04 = +0.003

BESSELIAN STAR-NUMBERS, 1919.

203

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.
Apr. 1	+9.74490	+0.4783	-1.26500	-0.60776	May 17	+9.82266	+0.6223	-1.01880	-1.23080
2	9.74638	0.4867	1.26342	0.64322	18	9.82534	0.6233	1.00769	1.23559
3	9.74860	0.4946	1.26171	0.67586	19	9.82785	0.6231	0.99617	1.24021
4	9.75140	0.5008	1.25986	0.70608	20	9.83000	0.6220	0.98421	1.24465
5	9.75452	0.5043	1.25788	0.73419	h 21	9.83169	0.6206	0.97180	1.24893
h 6	+9.75751	+0.5049	-1.25577	-0.76045	(16.0) 22	+9.83293	+0.6200	-0.95889	-1.25305
(13.0) 7	9.76007	0.5033	1.25351	0.78508	23	9.83384	0.6208	0.94547	1.25700
8	9.76193	0.5004	1.25112	0.80826	24	9.83470	0.6236	0.93150	1.26080
9	9.76306	0.4976	1.24859	0.83012	25	9.83577	0.6284	0.91694	1.26444
10	9.76363	0.4962	1.24591	0.85080	26	9.83734	0.6345	0.90175	1.26793
11	+9.76382	+0.4967	-1.24309	-0.87041	27	+9.83953	+0.6410	-0.88589	-1.27127
12	9.76389	0.4996	1.24013	0.88904	28	9.84235	0.6468	0.86931	1.27446
13	9.76411	0.5045	1.23702	0.90677	29	9.84562	0.6510	0.85195	1.27751
14	9.76461	0.5108	1.23376	0.92367	30	9.84903	0.6531	0.83374	1.28041
15	9.76553	0.5178	1.23036	0.93981	31	9.85227	0.6532	0.81462	1.28317
16	+9.76690	+0.5248	-1.22680	-0.95524	June 1	+9.85505	+0.6517	-0.79450	-1.28580
17	9.76865	0.5312	1.22308	0.97001	2	9.85725	0.6496	0.77328	1.28828
18	9.77079	0.5367	1.21921	0.98416	3	9.85886	0.6478	0.75085	1.29063
19	9.77319	0.5408	1.21518	0.99774	4	9.86000	0.6470	0.72707	1.29285
20	9.77574	0.5431	1.21098	1.01078	h 5	9.86091	0.6477	0.70181	1.29493
h 21	+9.77818	+0.5439	-1.20662	-1.02331	(17.0) 6	+9.86178	+0.6500	-0.67485	-1.29689
(14.0) 22	9.78040	0.5431	1.20209	1.03536	7	9.86279	0.6534	0.64600	1.29871
23	9.78215	0.5416	1.19738	1.04696	8	9.86408	0.6576	0.61498	1.30040
24	9.78340	0.5402	1.19250	1.05812	9	9.86571	0.6620	0.58144	1.30197
25	9.78416	0.5401	1.18744	1.06889	10	9.86766	0.6663	0.54497	1.30341
26	+9.78468	+0.5422	-1.18220	-1.07927	11	+9.86993	+0.6698	-0.50504	-1.30472
27	9.78520	0.5468	1.17678	1.08927	12	9.87244	0.6725	0.46094	1.30591
28	9.78610	0.5536	1.17115	1.09893	13	9.87510	0.6740	0.41173	1.30698
29	9.78762	0.5616	1.16532	1.10824	14	9.87776	0.6743	0.35608	1.30792
30	9.78986	0.5698	1.15930	1.11724	15	9.88032	0.6733	0.29213	1.30874
May 1	+9.79275	+0.5767	-1.15306	-1.12592	16	+9.88256	+0.6714	-0.21695	-1.30944
2	9.79602	0.5815	1.14662	1.13431	17	9.88443	0.6690	0.12585	1.31002
3	9.79933	0.5838	1.13995	1.14241	18	9.88586	0.6669	0.01031	1.31047
4	9.80231	0.5839	1.13306	1.15024	19	9.88692	0.6658	9.85219	1.31081
5	9.80472	0.5826	1.12593	1.15781	20	9.88780	0.6664	9.60090	1.31102
h 6	+9.80648	+0.5810	-1.11856	-1.16511	h 21	+9.88881	+0.6688	-8.93560	-1.31111
(15.0) 7	9.80761	0.5801	1.11094	1.17217	(18.0) 22	9.89012	0.6726	+9.35510	1.31109
8	9.80834	0.5807	1.10307	1.17899	23	9.89198	0.6772	9.73174	1.31094
9	9.80888	0.5831	1.09493	1.18559	24	9.89441	0.6815	9.93029	1.31067
10	9.80948	0.5872	1.08651	1.19196	25	9.89728	0.6845	0.06595	1.31028
11	+9.81030	+0.5925	-1.07780	-1.19811	26	+9.90040	+0.6858	+0.16905	-1.30977
12	9.81148	0.5987	1.06880	1.20405	27	9.90344	0.6851	0.25223	1.30914
13	9.81308	0.6049	1.05948	1.20978	28	9.90616	0.6827	0.32188	1.30839
14	9.81504	0.6108	1.04984	1.21532	29	9.90841	0.6795	0.38180	1.30752
15	9.81736	0.6158	1.03985	1.22067	30	9.91011	0.6761	0.43431	1.30652
16	+9.81993	+0.6197	-1.02951	-1.22582	July 1	+9.91133	+0.6735	+0.48105	-1.30540
17	+9.82266	+0.6223	-1.01880	-1.23080	2	+9.91226	+0.6723	+0.52315	-1.30416

$E = +0''.04 - +0''.002$

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.
July 1	+9.91133	+0.6735	+0.48105	-1.30540	Aug. 16	+9.97346	+0.6477	+1.17745	-1.08805
2	9.91226	0.6723	0.52315	1.30416	17	9.97459	0.6508	1.18280	1.07811
3	9.91306	0.6724	0.56139	1.30279	18	9.97616	0.6535	1.18797	1.06782
4	9.91394	0.6740	0.59644	1.30130	19	9.97805	0.6547	1.19295	1.05714
5	9.91500	0.6764	0.62874	1.29968	20	9.98006	0.6539	1.19776	1.04606
h 6	+9.91635	+0.6791	+0.65870	-1.29794	h 21	+9.98195	+0.6512	+1.20240	-1.03456
(19.0) 7	9.91801	0.6818	0.68660	1.29607	(22.0) 22	9.98353	0.6470	1.20687	1.02261
8	9.91991	0.6841	0.71271	1.29407	23	9.98468	0.6421	1.21118	1.01019
9	9.92204	0.6855	0.73723	1.29194	24	9.98538	0.6375	1.21532	0.99728
10	9.92432	0.6859	0.76031	1.28968	25	9.98575	0.6340	1.21930	0.98384
11	+9.92664	+0.6851	+0.78212	-1.28728	26	+9.98594	+0.6323	+1.22313	-0.96983
12	9.92890	0.6831	0.80278	1.28475	27	9.98607	0.6322	1.22680	0.95522
13	9.93092	0.6801	0.82238	1.28209	28	9.98630	0.6335	1.23032	0.93998
14	9.93261	0.6765	0.84102	1.27928	29	9.98675	0.6357	1.23369	0.92404
15	9.93390	0.6729	0.85879	1.27634	30	9.98745	0.6382	1.23691	0.90736
16	+9.93486	+0.6701	+0.87573	-1.27326	31	+9.98837	+0.6405	+1.23999	-0.88987
17	9.93556	0.6687	0.89193	1.27003	Sept. 1	9.98949	0.6422	1.24292	0.87151
18	9.93623	0.6691	0.90744	1.26666	2	9.99076	0.6431	1.24572	0.85221
19	9.93712	0.6711	0.92230	1.26313	3	9.99212	0.6428	1.24837	0.83187
20	9.93840	0.6742	0.93655	1.25946	4	9.99348	0.6413	1.25088	0.81040
h 21	+9.94017	+0.6774	+0.95024	-1.25563	h 5	+9.99476	+0.6388	+1.25326	-0.78767
(20.0) 22	9.94239	0.6797	0.96339	1.25165	(23.0) 6	9.99584	0.6353	1.25550	0.76353
23	9.94490	0.6805	0.97605	1.24750	7	9.99664	0.6315	1.25761	0.73783
24	9.94746	0.6792	0.98823	1.24320	8	9.99712	0.6280	1.25958	0.71037
25	9.94980	0.6761	0.99996	1.23872	9	9.99734	0.6258	1.26142	0.68090
26	+9.95175	+0.6718	+1.01127	-1.23408	10	+9.99742	+0.6254	+1.26313	-0.64914
27	9.95321	0.6672	1.02218	1.22926	11	9.99755	0.6270	1.26471	0.61472
28	9.95421	0.6631	1.03270	1.22428	12	9.99789	0.6303	1.26616	0.57717
29	9.95489	0.6602	1.04286	1.21910	13	9.99861	0.6346	1.26748	0.53590
30	9.95541	0.6589	1.05267	1.21374	14	9.99974	0.6387	1.26867	0.49013
31	+9.95592	+0.6590	+1.06214	-1.20818	15	+0.00122	+0.6417	+1.26974	-0.43878
Aug. 1	9.95656	0.6604	1.07130	1.20244	16	0.00290	0.6429	1.27067	0.38035
2	9.95744	0.6622	1.08015	1.19649	17	0.00452	0.6420	1.27148	0.31264
3	9.95860	0.6641	1.08871	1.19033	18	0.00592	0.6394	1.27217	0.23217
4	9.95999	0.6658	1.09698	1.18396	19	0.00695	0.6359	1.27272	0.13309
h 5	+9.96157	+0.6667	+1.10498	-1.17738	h 20	+0.00755	+0.6324	+1.27315	-0.00422
(21.0) 6	9.96332	0.6667	1.11272	1.17056	(0.0) 21	0.00781	0.6298	1.27346	9.81990
7	9.96513	0.6655	1.12021	1.16352	22	0.00782	0.6289	1.27363	-9.49250
8	9.96690	0.6631	1.12745	1.15623	23	0.00777	0.6297	1.27368	+8.59219
9	9.96853	0.6596	1.13446	1.14869	24	0.00780	0.6322	1.27360	9.59017
10	+9.96990	+0.6554	+1.14124	-1.14089	25	+0.00802	+0.6357	+1.27340	+9.86893
11	9.97091	0.6509	1.14779	1.13283	26	0.00848	0.6397	1.27306	0.03729
12	9.97160	0.6471	1.15413	1.12448	27	0.00918	0.6437	1.27260	0.15827
13	9.97201	0.6445	1.16026	1.11584	28	0.01009	0.6471	1.27202	0.25274
14	9.97232	0.6439	1.16619	1.10690	29	0.01117	0.6498	1.27130	0.33021
15	+9.97274	+0.6451	+1.17192	-1.09764	30	+0.01236	+0.6514	+1.27045	+0.39586
16	+9.97346	+0.6477	+1.17745	-1.08805	Oct. 1	+0.01357	+0.6519	+1.26947	+0.45278

E = +0".04 = +0.003

BESSELIAN STAR-NUMBERS, 1919.

205

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.
Oct. 1	+0.01357	+0.6519	+1.26947	+0.45278	Nov. 16	+0.05476	+0.7303	+1.04490	+1.21801
2	0.01472	0.6513	1.26836	0.50301	17	0.05516	0.7330	1.03425	1.22350
3	0.01575	0.6499	1.26712	0.54794	18	0.05569	0.7368	1.02320	1.22880
4	0.01654	0.6479	1.26575	0.58854	19	0.05641	0.7411	1.01171	1.23390
h	0.01704	0.6461	1.26424	0.62558	h	0.05739	0.7456	0.99977	1.23880
(1.0) 6	+0.01731	+0.6452	+1.26260	+0.65961	(4.0) 21	+0.05859	+0.7498	+0.98733	+1.24353
7	0.01743	0.6458	1.26082	0.69105	22	0.05995	0.7534	0.97439	1.24807
8	0.01755	0.6483	1.25890	0.72027	23	0.06145	0.7561	0.96091	1.25243
9	0.01783	0.6526	1.25684	0.74754	24	0.06302	0.7580	0.94685	1.25661
10	0.01844	0.6581	1.25464	0.77309	25	0.06458	0.7589	0.93218	1.26062
11	+0.01946	+0.6637	+1.25230	+0.79711	26	+0.06606	+0.7589	+0.91684	+1.26446
12	0.02087	0.6686	1.24982	0.81976	27	0.06738	0.7584	0.90080	1.26814
13	0.02252	0.6719	1.24719	0.84119	28	0.06848	0.7575	0.88400	1.27165
14	0.02421	0.6732	1.24441	0.86149	29	0.06935	0.7569	0.86637	1.27500
15	0.02575	0.6729	1.24148	0.88078	30	0.07001	0.7570	0.84786	1.27818
16	+0.02694	+0.6713	+1.23840	+0.89913	Dec. 1	+0.07061	+0.7583	+0.82838	+1.28122
17	0.02775	0.6695	1.23516	0.91662	2	0.07125	0.7610	0.80783	1.28409
18	0.02820	0.6683	1.23176	0.93332	3	0.07209	0.7648	0.78611	1.28681
19	0.02839	0.6684	1.22821	0.94929	4	0.07327	0.7692	0.76310	1.28938
h	0.02846	0.6701	1.22448	0.96457	h	0.07484	0.7735	0.73865	1.29180
(2.0) 21	+0.02859	+0.6734	+1.22060	+0.97922	(5.0) 6	+0.07674	+0.7769	+0.71259	+1.29408
22	0.02888	0.6778	1.21654	0.99326	7	0.07882	0.7789	0.68472	1.29620
23	0.02939	0.6827	1.21231	1.00675	8	0.08088	0.7793	0.65477	1.29818
24	0.03018	0.6877	1.20791	1.01971	9	0.08274	0.7783	0.62244	1.30002
25	0.03118	0.6922	1.20332	1.03218	10	0.08428	0.7766	0.58737	1.30171
26	+0.03235	+0.6961	+1.19855	+1.04417	11	+0.08545	+0.7748	+0.54905	+1.30326
27	0.03364	0.6990	1.19359	1.05572	12	0.08631	0.7736	0.50685	1.30467
28	0.03498	0.7010	1.18843	1.06685	13	0.08697	0.7735	0.45993	1.30594
29	0.03631	0.7019	1.18308	1.07758	14	0.08755	0.7745	0.40717	1.30706
30	0.03755	0.7019	1.17753	1.08792	15	0.08821	0.7767	0.34691	1.30805
31	+0.03858	+0.7013	+1.17176	+1.09790	16	+0.08901	+0.7795	+0.27675	+1.30890
Nov. 1	0.03936	0.7007	1.16578	1.10753	17	0.09004	0.7826	0.19282	1.30962
2	0.03991	0.7006	1.15959	1.11682	18	0.09127	0.7855	0.08851	1.31019
3	0.04028	0.7016	1.15317	1.12579	19	0.09267	0.7879	9.95072	1.31063
4	0.04062	0.7042	1.14650	1.13445	h	0.09419	0.7895	9.74750	1.31093
h	0.04109	+0.7082	+1.13960	+1.14282	(6.0) 21	+0.09579	+0.7904	+9.35265	+1.31109
(3.0) 6	0.04184	0.7135	1.13244	1.15091	22	0.09738	0.7903	-9.03662	1.31111
7	0.04298	0.7192	1.12503	1.15872	23	0.09892	0.7895	9.64621	1.31100
8	0.04450	0.7245	1.11736	1.16626	24	0.10032	0.7879	9.89023	1.31075
9	0.04632	0.7285	1.10940	1.17355	25	0.10151	0.7860	0.04543	1.31036
10	+0.04825	+0.7309	+1.10116	+1.18059	26	+0.10248	+0.7840	-0.15946	+1.30983
11	0.05011	0.7316	1.09261	1.18739	27	0.10324	0.7826	0.24955	1.30917
12	0.05171	0.7311	1.08375	1.19395	28	0.10385	0.7822	0.32401	1.30836
13	0.05294	0.7299	1.07456	1.20029	29	0.10448	0.7829	0.38746	1.30742
14	0.05377	0.7290	1.06503	1.20641	30	0.10521	0.7849	0.44268	1.30634
15	+0.05435	+0.7290	+1.05515	+1.21232	31	+0.10622	+0.7877	-0.49153	+1.30511
16	+0.05476	+0.7303	+1.04490	+1.21801	32	+0.10758	+0.7905	-0.53532	+1.30375

$$E = +0''.03 - +0''.002$$

206

INDEPENDENT STAR-NUMBERS, 1919.

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f'	G		H		Log g .	Log h .	i	Log i .
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	"	"	"	"			"	
Jan. 0	-0.0006	+1.033	-0.003	27 8.5	1 48.6	351 2.5	23 24.2	0.87687	1.31013	-1.38	-0.1397
1	+0.0022	1.044	+0.002	26 44.2	1 46.9	350 6.1	23 20.4	0.88187	1.30992	1.52	0.1824
2	0.0049	1.054	0.006	26 15.6	1 45.0	349 9.7	23 16.6	0.88628	1.30968	1.66	0.2212
3	0.0077	1.065	0.009	25 44.8	1 43.0	348 13.1	23 12.9	0.88979	1.30943	1.81	0.2567
h (7.0) 4	0.0104	1.076	0.009	25 15.1	1 41.0	347 16.5	23 9.1	0.89241	1.30915	1.95	0.2894
5	0.0131	+1.087	+0.006	24 50.8	1 39.4	346 19.9	23 5.3	0.89427	1.30884	-2.09	-0.3196
6	0.0159	1.097	+0.002	24 34.3	1 38.3	345 23.1	23 1.5	0.89569	1.30853	2.23	0.3477
7	0.0186	1.108	-0.004	24 26.6	1 37.8	344 26.3	22 57.8	0.89722	1.30820	2.37	0.3740
8	0.0214	1.119	0.009	24 26.7	1 37.8	343 29.4	22 54.0	0.89936	1.30784	2.50	0.3987
9	0.0241	1.129	0.012	24 31.2	1 38.1	342 32.4	22 50.2	0.90248	1.30746	2.64	0.4219
10	0.0268	+1.140	-0.013	24 34.8	1 38.3	341 35.3	22 46.4	0.90667	1.30708	-2.78	-0.4438
11	0.0296	1.150	0.010	24 33.6	1 38.2	340 38.1	22 42.5	0.91167	1.30668	2.91	0.4645
12	0.0323	1.160	-0.004	24 24.5	1 37.6	339 40.8	22 38.7	0.91711	1.30625	3.05	0.4841
13	0.0350	1.171	+0.003	24 6.4	1 36.4	338 43.5	22 34.9	0.92244	1.30581	3.18	0.5028
14	0.0378	1.181	0.009	23 40.9	1 34.7	337 46.0	22 31.1	0.92714	1.30534	3.32	0.5206
15	0.0405	+1.191	+0.014	23 11.6	1 32.8	336 48.3	22 27.2	0.93091	1.30487	-3.45	-0.5375
16	0.0433	1.201	0.016	22 41.8	1 30.8	335 50.6	22 23.4	0.93368	1.30438	3.58	0.5536
17	0.0460	1.211	0.015	22 15.5	1 29.0	334 52.7	22 19.5	0.93555	1.30388	3.71	0.5690
18	0.0487	1.221	0.012	21 54.8	1 27.7	333 54.7	22 15.6	0.93683	1.30336	3.84	0.5838
h (8.0) 19	0.0515	1.231	0.007	21 40.7	1 26.7	332 56.6	22 11.8	0.93784	1.30283	3.96	0.5980
20	0.0542	+1.240	+0.001	21 33.0	1 26.2	331 58.4	22 7.9	0.93889	1.30228	-4.09	-0.6116
21	0.0570	1.250	-0.004	21 30.3	1 26.0	331 0.0	22 4.0	0.94028	1.30172	4.21	0.6246
22	0.0597	1.259	0.008	21 30.5	1 26.0	330 1.5	22 0.1	0.94214	1.30115	4.34	0.6371
23	0.0624	1.269	0.011	21 31.6	1 26.1	329 2.8	21 56.2	0.94452	1.30057	4.46	0.6491
24	0.0652	1.278	0.012	21 31.6	1 26.1	328 3.9	21 52.3	0.94742	1.29998	4.58	0.6607
25	0.0679	+1.287	-0.011	21 28.7	1 25.9	327 4.9	21 48.3	0.95076	1.29938	-4.70	-0.6718
26	0.0706	1.297	0.008	21 21.9	1 25.5	326 5.8	21 44.4	0.95444	1.29877	4.81	0.6825
27	0.0734	1.306	-0.004	21 10.0	1 24.7	325 6.5	21 40.4	0.95823	1.29815	4.93	0.6928
28	0.0761	1.315	0.000	20 52.6	1 23.5	324 7.0	21 36.5	0.96193	1.29752	5.04	0.7028
29	0.0788	1.324	+0.005	20 30.5	1 22.0	323 7.3	21 32.5	0.96525	1.29689	5.16	0.7124
30	0.0816	+1.332	+0.008	20 5.6	1 20.4	322 7.6	21 28.5	0.96799	1.29624	-5.27	-0.7216
31	0.0843	1.341	0.009	19 40.2	1 18.7	321 7.7	21 24.5	0.96999	1.29559	5.38	0.7305
Feb. 1	0.0871	1.350	0.008	19 17.6	1 17.2	320 7.5	21 20.5	0.97128	1.29494	5.48	0.7391
2	0.0898	1.358	+0.004	19 0.5	1 16.0	319 7.2	21 16.5	0.97207	1.29428	5.59	0.7474
3	0.0925	1.366	-0.001	18 51.0	1 15.4	318 6.8	21 12.5	0.97266	1.29363	5.69	0.7554
h (9.0) 4	0.0953	+1.375	-0.007	18 48.8	1 15.3	317 6.2	21 8.4	0.97349	1.29298	-5.80	-0.7632
5	0.0980	1.383	0.011	18 52.1	1 15.5	316 5.4	21 4.4	0.97498	1.29232	5.90	0.7706
6	0.1008	1.391	0.012	18 57.5	1 15.8	315 4.5	21 0.3	0.97734	1.29164	5.99	0.7777
7	0.1035	1.399	0.010	19 0.9	1 16.1	314 3.5	20 56.2	0.98055	1.29098	6.09	0.7847
8	0.1062	1.407	-0.006	18 58.8	1 15.9	313 2.3	20 52.2	0.98433	1.29033	6.19	0.7914
9	0.1090	+1.414	0.000	18 49.4	1 15.3	312 0.9	20 48.1	0.98826	1.28967	-6.28	-0.7979
10	0.1117	1.422	+0.007	18 33.1	1 14.2	310 59.3	20 44.0	0.99189	1.28901	6.37	0.8041
11	0.1144	1.429	0.012	18 11.8	1 12.8	309 57.6	20 39.8	0.99486	1.28835	6.46	0.8101
12	0.1172	1.437	0.015	17 48.5	1 11.2	308 55.7	20 35.7	0.99700	1.28770	6.54	0.8159
13	0.1199	1.444	0.015	17 26.6	1 9.8	307 53.7	20 31.6	0.99831	1.28706	6.63	0.8215
14	0.1226	+1.452	+0.013	17 8.8	1 8.6	306 51.5	20 27.4	0.99899	1.28643	-6.71	-0.8268
15	0.1254	+1.459	+0.008	16 56.6	1 7.8	305 49.2	20 23.3	0.99929	1.28580	-6.79	-0.8320

INDEPENDENT STAR-NUMBERS, 1919.

207

FOR WASHINGTON MEAN MIDNIGHT.

Star Day. (sidereal hour.)	τ	f		f'		G		H		Log g .	Log h .	i	Log i .
		In Time.	In Time.	In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$			$''$	
b. 15	0.1254	+1.459	+0.008	16 56.6	1 7.8	305 49.2	20 23.3	0.99929	1.28580	-6.79	-0.8320		
16	0.1281	1.466	+0.002	16 50.2	1 7.3	304 46.6	20 19.1	0.99950	1.28516	6.87	0.8370		
17	0.1309	1.473	-0.003	16 49.0	1 7.3	303 44.0	20 14.9	0.99993	1.28455	6.95	0.8417		
18	0.1336	1.480	0.007	16 51.3	1 7.4	302 41.2	20 10.7	1.00071	1.28395	7.02	0.8463		
h 19	0.1363	1.486	0.011	16 55.4	1 7.7	301 38.2	20 6.5	1.00194	1.28335	7.09	0.8507		
1.0) 20	0.1391	+1.493	-0.012	16 59.3	1 8.0	300 35.1	20 2.3	1.00366	1.28277	-7.16	-0.8550		
21	0.1418	1.500	0.012	17 1.8	1 8.1	299 31.9	19 58.1	1.00580	1.28220	7.23	0.8590		
22	0.1446	1.506	0.010	17 1.4	1 8.1	298 28.5	19 53.9	1.00833	1.28164	7.29	0.8629		
23	0.1473	1.513	0.006	16 56.7	1 7.8	297 25.0	19 49.7	1.01112	1.28110	7.35	0.8666		
24	0.1500	1.519	-0.001	16 47.6	1 7.2	296 21.4	19 45.4	1.01391	1.28057	7.42	0.8702		
25	0.1528	+1.526	+0.003	16 34.3	1 6.3	295 17.6	19 41.2	1.01650	1.28005	-7.47	-0.8735		
26	0.1555	1.532	0.007	16 17.5	1 5.2	294 13.6	19 36.9	1.01865	1.27955	7.53	0.8768		
27	0.1582	1.538	0.009	15 59.4	1 4.0	293 9.6	19 32.6	1.02020	1.27907	7.58	0.8798		
28	0.1610	1.544	0.008	15 42.9	1 2.9	292 5.5	19 28.4	1.02110	1.27861	7.64	0.8828		
r. 1	0.1637	1.550	+0.005	15 29.9	1 2.0	291 1.2	19 24.1	1.02153	1.27815	7.68	0.8855		
2	0.1665	+1.556	0.000	15 22.8	1 1.5	289 56.9	19 19.8	1.02170	1.27773	-7.73	-0.8881		
3	0.1692	1.562	-0.005	15 22.8	1 1.5	288 52.4	19 15.5	1.02191	1.27731	7.77	0.8906		
4	0.1719	1.568	0.009	15 28.7	1 1.9	287 47.9	19 11.2	1.02254	1.27692	7.81	0.8929		
5	0.1747	1.574	0.011	15 38.1	1 2.5	286 43.3	19 6.9	1.02393	1.27654	7.85	0.8950		
h 6	0.1774	1.580	0.010	15 47.5	1 3.2	285 38.7	19 2.6	1.02614	1.27620	7.89	0.8971		
1.0) 7	0.1802	+1.585	-0.006	15 53.3	1 3.6	284 33.9	18 58.3	1.02899	1.27587	-7.92	-0.8989		
8	0.1829	1.591	-0.001	15 53.2	1 3.5	283 29.2	18 54.0	1.03217	1.27556	7.96	0.9007		
9	0.1856	1.597	+0.006	15 46.5	1 3.1	282 24.4	18 49.6	1.03526	1.27527	7.99	0.9023		
10	0.1884	1.602	0.012	15 34.4	1 2.3	281 19.5	18 45.3	1.03785	1.27501	8.01	0.9037		
11	0.1911	1.608	0.015	15 19.3	1 1.3	280 14.6	18 41.0	1.03979	1.27477	8.04	0.9050		
12	0.1938	+1.613	+0.016	15 4.2	1 0.3	279 9.6	18 36.6	1.04097	1.27455	-8.06	-0.9062		
13	0.1966	1.619	0.014	14 51.8	0 59.5	278 4.7	18 32.3	1.04148	1.27436	8.08	0.9073		
14	0.1993	1.624	0.010	14 44.2	0 58.9	276 59.7	18 28.0	1.04156	1.27419	8.09	0.9082		
15	0.2020	1.630	+0.004	14 42.0	0 58.8	275 54.7	18 23.6	1.04148	1.27405	8.11	0.9090		
16	0.2048	1.635	-0.001	14 44.9	0 59.0	274 49.7	18 19.3	1.04154	1.27393	8.12	0.9096		
17	0.2075	+1.641	-0.006	14 51.5	0 59.4	273 44.7	18 15.0	1.04192	1.27383	-8.13	-0.9102		
18	0.2103	1.646	0.010	15 0.4	1 0.0	272 39.8	18 10.7	1.04268	1.27376	8.14	0.9106		
19	0.2130	1.651	0.012	15 10.0	1 0.7	271 34.8	18 6.3	1.04390	1.27371	8.14	0.9108		
20	0.2157	1.657	0.012	15 18.6	1 1.2	270 29.9	18 2.0	1.04556	1.27369	8.15	0.9109		
h 21	0.2185	1.662	0.010	15 24.9	1 1.7	269 25.0	17 57.7	1.04759	1.27368	8.15	0.9109		
1.0) 22	0.2212	+1.667	-0.007	15 28.0	1 1.9	268 20.1	17 53.3	1.04989	1.27371	-8.14	-0.9108		
23	0.2240	1.673	-0.004	15 27.2	1 1.8	267 15.3	17 49.0	1.05229	1.27376	8.14	0.9105		
24	0.2267	1.678	+0.001	15 22.2	1 1.5	266 10.5	17 44.7	1.05461	1.27383	8.13	0.9101		
25	0.2294	1.683	0.004	15 13.6	1 0.9	265 5.7	17 40.4	1.05668	1.27393	8.12	0.9096		
26	0.2322	1.689	0.007	15 3.1	1 0.2	264 1.1	17 36.1	1.05829	1.27405	8.11	0.9089		
27	0.2349	+1.694	+0.007	14 52.7	0 59.5	262 56.5	17 31.8	1.05939	1.27420	-8.09	-0.9082		
28	0.2376	1.700	0.005	14 44.8	0 59.0	261 52.0	17 27.5	1.05998	1.27437	8.08	0.9072		
29	0.2404	1.705	+0.001	14 41.8	0 58.8	260 47.6	17 23.2	1.06021	1.27456	8.06	0.9062		
30	0.2431	1.711	-0.004	14 44.9	0 59.0	259 43.3	17 18.9	1.06047	1.27477	8.04	0.9050		
31	0.2459	1.716	0.009	14 53.7	0 59.6	258 39.1	17 14.6	1.06103	1.27502	8.01	0.9037		
ir. 1	0.2486	+1.722	-0.011	15 6.6	1 0.4	257 35.0	17 10.3	1.06219	1.27528	-7.99	-0.9023		
2	0.2513	+1.727	-0.011	15 20.4	1 1.4	256 31.0	17 6.1	1.06415	1.27556	-7.96	-0.9007		

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sideral Hour.)		τ	f	f'	G		H		Log g .	Log h .	i	Log i .	
			In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.					
Apr.	1	0.2486	+1.722	-0.011	15 6.6	1 0.4	257 35.0	17 10.3	1.06219	1.27528	-7.99	-0.9023	
	2	0.2513	1.727	0.011	15 20.4	1 1.4	256 31.0	17 6.1	1.06415	1.27556	7.96	0.9007	
	3	0.2541	1.733	0.008	15 32.1	1 2.1	255 27.1	17 1.8	1.06677	1.27587	7.92	0.8990	
	4	0.2568	1.738	-0.002	15 39.1	1 2.6	254 23.4	16 57.5	1.06982	1.27619	7.89	0.8971	
	5	0.2596	1.745	+0.004	15 39.8	1 2.7	253 19.8	16 53.3	1.07296	1.27653	7.85	0.8951	
	h (13.0)	6	0.2623	+1.750	+0.011	15 34.9	1 2.3	252 16.4	16 49.1	1.07579	1.27689	-7.82	-0.8930
	7	0.2650	1.756	0.015	15 26.4	1 1.8	251 13.1	16 44.9	1.07804	1.27727	7.78	0.8908	
	8	0.2678	1.761	0.017	15 16.7	1 1.1	250 10.0	16 40.7	1.07957	1.27768	7.73	0.8884	
	9	0.2705	1.767	0.016	15 9.0	1 0.6	249 7.0	16 36.5	1.08043	1.27810	7.69	0.8858	
	10	0.2732	1.773	0.012	15 4.9	1 0.3	248 4.2	16 32.3	1.08087	1.27853	7.64	0.8832	
	11	0.2760	+1.779	+0.007	15 5.7	1 0.4	247 1.5	16 28.1	1.08108	1.27899	-7.59	-0.8804	
	12	0.2787	1.785	+0.001	15 11.2	1 0.7	245 59.0	16 23.9	1.08134	1.27946	7.54	0.8774	
	13	0.2814	1.792	-0.004	15 20.6	1 1.4	244 56.7	16 19.8	1.08188	1.27996	7.49	0.8743	
	14	0.2842	1.798	0.008	15 32.2	1 2.1	243 54.6	16 15.6	1.08279	1.28046	7.43	0.8710	
	15	0.2869	1.804	0.011	15 44.9	1 3.0	242 52.7	16 11.5	1.08416	1.28096	7.37	0.8676	
	16	0.2897	+1.810	-0.011	15 56.6	1 3.8	241 50.9	16 7.4	1.08594	1.28148	-7.31	-0.8641	
	17	0.2924	1.817	0.010	16 6.5	1 4.4	240 49.3	16 3.3	1.08806	1.28201	7.25	0.8603	
	18	0.2951	1.823	0.008	16 13.5	1 4.9	239 47.9	15 59.2	1.09045	1.28256	7.19	0.8565	
	19	0.2979	1.830	-0.005	16 17.0	1 5.1	238 46.7	15 55.1	1.09299	1.28312	7.12	0.8524	
	20	0.3006	1.836	0.000	16 16.7	1 5.1	237 45.7	15 51.0	1.09552	1.28369	7.05	0.8482	
h (14.0)	21	0.3034	+1.843	+0.003	16 13.0	1 4.9	236 44.9	15 47.0	1.09783	1.28428	-6.98	-0.8439	
22	0.3061	1.850	0.006	16 6.7	1 4.4	235 44.3	15 43.0	1.09981	1.28487	6.91	0.8394		
23	0.3088	1.856	0.007	15 59.9	1 4.0	234 43.8	15 38.9	1.10132	1.28546	6.83	0.8346		
24	0.3116	1.863	0.005	15 54.4	1 3.6	233 43.6	15 34.9	1.10237	1.28606	6.76	0.8298		
25	0.3143	1.870	+0.001	15 52.5	1 3.5	232 43.5	15 30.9	1.10306	1.28667	6.68	0.8247		
26	0.3170	+1.877	-0.004	15 55.9	1 3.7	231 43.6	15 26.9	1.10370	1.28729	-6.60	-0.8195		
27	0.3198	1.885	0.009	16 4.3	1 4.3	230 44.0	15 22.9	1.10452	1.28792	6.52	0.8140		
28	0.3225	1.892	0.012	16 16.9	1 5.1	229 44.5	15 19.0	1.10589	1.28855	6.43	0.8084		
29	0.3253	1.899	0.013	16 30.9	1 6.1	228 45.3	15 15.0	1.10793	1.28917	6.35	0.8026		
30	0.3280	1.907	0.010	16 43.8	1 6.9	227 46.2	15 11.1	1.11065	1.28981	6.26	0.7966		
May	1	0.3307	+1.914	-0.005	16 52.5	1 7.5	226 47.4	15 7.2	1.11388	1.29044	-6.17	-0.7903	
	2	0.3335	1.922	+0.002	16 55.8	1 7.7	225 48.7	15 3.3	1.11727	1.29107	6.08	0.7839	
	3	0.3362	1.929	0.009	16 53.6	1 7.6	224 50.3	14 59.4	1.12049	1.29171	5.99	0.7772	
	4	0.3390	1.937	0.014	16 47.3	1 7.2	223 52.0	14 55.5	1.12323	1.29234	5.89	0.7703	
	5	0.3417	1.945	0.017	16 39.3	1 6.6	222 53.9	14 51.6	1.12534	1.29297	5.80	0.7632	
	h (15.0)	6	0.3444	+1.953	+0.017	16 32.0	1 6.1	221 56.1	14 47.7	1.12683	1.29359	-5.70	-0.7558
	7	0.3472	1.961	0.014	16 27.6	1 5.8	220 58.5	14 43.9	1.12779	1.29422	5.60	0.7482	
	8	0.3499	1.969	0.009	16 27.2	1 5.8	220 1.0	14 40.1	1.12851	1.29484	5.50	0.7403	
	9	0.3526	1.977	+0.004	16 31.3	1 6.1	219 3.8	14 36.3	1.12920	1.29547	5.40	0.7322	
	10	0.3554	1.986	-0.002	16 38.9	1 6.6	218 6.7	14 32.4	1.13009	1.29609	5.29	0.7238	
	11	0.3581	+1.994	-0.006	16 48.7	1 7.2	217 9.8	14 28.6	1.13128	1.29670	-5.19	-0.7151	
	12	0.3608	2.002	0.009	16 59.8	1 8.0	216 13.1	14 24.9	1.13288	1.29730	5.08	0.7061	
	13	0.3636	2.011	0.011	17 10.0	1 8.7	215 16.7	14 21.1	1.13488	1.29790	4.97	0.6967	
	14	0.3663	2.020	0.010	17 18.7	1 9.2	214 20.3	14 17.4	1.13718	1.29849	4.86	0.6871	
	15	0.3691	2.028	0.008	17 24.8	1 9.7	213 24.2	14 13.6	1.13974	1.29908	4.75	0.6771	
	16	0.3718	+2.037	-0.005	17 27.9	1 9.9	212 28.2	14 9.9	1.14244	1.29965	-4.64	-0.6668	
	17	0.3745	+2.046	-0.001	17 27.5	1 9.8	211 32.4	14 6.2	1.14515	1.30022	-4.53	-0.6561	

INDEPENDENT STAR-NUMBERS, 1919.

209

FOR WASHINGTON MEAN MIDNIGHT.

Star Day. (Sideral Hour.)	τ	f		f'	G		H		Log g .	Log h .	i	Log i .
		In Time.	In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
ay	17	0.3745	+2.046	-0.001	17 27.5	1 9.8	211 32.4	14 6.2	1.14515	1.30022	-4.53	-0.6561
	18	0.3773	2.055	+0.003	17 23.8	1 9.6	210 36.8	14 2.5	1.14768	1.30078	4.42	0.6450
	19	0.3800	2.064	0.006	17 17.6	1 9.2	209 41.3	13 58.8	1.14993	1.30132	4.30	0.6334
	20	0.3828	2.073	0.007	17 10.2	1 8.7	208 46.0	13 55.1	1.15181	1.30186	4.18	0.6215
h	21	0.3855	2.082	0.006	17 3.6	1 8.2	207 50.8	13 51.4	1.15324	1.30238	4.06	0.6091
6.0)	22	0.3882	+2.091	+0.003	16 59.3	1 8.0	206 55.7	13 47.7	1.15432	1.30289	-3.95	-0.5962
	23	0.3910	2.100	-0.002	16 59.2	1 7.9	206 0.9	13 44.1	1.15523	1.30339	3.82	0.5827
	24	0.3937	2.110	0.008	17 3.6	1 8.2	205 6.2	13 40.4	1.15625	1.30388	3.70	0.5688
	25	0.3964	2.119	0.012	17 11.7	1 8.8	204 11.6	13 36.8	1.15764	1.30437	3.58	0.5542
	26	0.3992	2.129	0.014	17 22.0	1 9.5	203 17.1	13 33.1	1.15961	1.30483	3.46	0.5390
	27	0.4019	+2.138	-0.013	17 31.7	1 10.1	202 22.8	13 29.5	1.16219	1.30528	-3.34	-0.5232
	28	0.4047	2.148	0.008	17 38.5	1 10.6	201 28.5	13 25.9	1.16528	1.30571	3.21	0.5066
	29	0.4074	2.158	-0.002	17 40.6	1 10.7	200 34.4	13 22.3	1.16864	1.30613	3.08	0.4892
	30	0.4101	2.167	+0.005	17 37.6	1 10.5	199 40.4	13 18.7	1.17195	1.30653	2.96	0.4710
	31	0.4129	2.177	0.012	17 30.4	1 10.0	198 46.6	13 15.1	1.17488	1.30692	2.83	0.4519
ine	1	0.4156	+2.187	+0.016	17 20.8	1 9.4	197 52.9	13 11.5	1.17727	1.30731	-2.70	-0.4318
	2	0.4184	2.197	0.017	17 11.2	1 8.7	196 59.2	13 8.0	1.17910	1.30767	2.57	0.4105
	3	0.4211	2.207	0.015	17 3.5	1 8.2	196 5.7	13 4.4	1.18041	1.30800	2.44	0.3881
	4	0.4238	2.217	0.011	16 59.3	1 8.0	195 12.3	13 0.8	1.18139	1.30833	2.31	0.3643
h	5	0.4266	2.227	+0.006	16 58.8	1 7.9	194 19.0	12 57.3	1.18228	1.30863	2.18	0.3391
7.0)	6	0.4293	+2.237	0.000	17 1.8	1 8.1	193 25.7	12 53.7	1.18326	1.30893	-2.05	-0.3121
	7	0.4320	2.247	-0.005	17 7.2	1 8.5	192 32.6	12 50.2	1.18449	1.30920	1.92	0.2833
	8	0.4348	2.257	0.008	17 13.7	1 8.9	191 39.5	12 46.6	1.18603	1.30946	1.79	0.2522
	9	0.4375	2.267	0.010	17 20.0	1 9.3	190 46.5	12 43.1	1.18790	1.30970	1.65	0.2187
	10	0.4402	2.278	0.010	17 25.2	1 9.7	189 53.6	12 39.6	1.19006	1.30992	1.52	0.1822
	11	0.4430	+2.288	-0.008	17 28.1	1 9.9	189 0.7	12 36.0	1.19244	1.31011	-1.39	-0.1423
	12	0.4457	2.298	0.005	17 28.5	1 9.9	188 7.9	12 32.5	1.19497	1.31030	1.25	0.0982
	13	0.4485	2.309	-0.002	17 26.0	1 9.7	187 15.2	12 29.0	1.19753	1.31048	-1.12	0.0490
	14	0.4512	2.319	+0.002	17 20.6	1 9.4	186 22.5	12 25.5	1.19997	1.31062	0.98	9.9933
	15	0.4539	2.329	0.006	17 12.6	1 8.8	185 29.9	12 22.0	1.20222	1.31074	0.85	9.9294
	16	0.4567	+2.340	+0.007	17 3.2	1 8.2	184 37.2	12 18.5	1.20410	1.31085	-0.71	-9.8542
	17	0.4594	2.350	0.007	16 53.8	1 7.6	183 44.6	12 15.0	1.20560	1.31095	0.58	9.7631
	18	0.4622	2.360	+0.004	16 46.1	1 7.1	182 52.1	12 11.5	1.20674	1.31102	0.44	9.6476
	19	0.4649	2.371	0.000	16 41.5	1 6.8	181 59.6	12 8.0	1.20762	1.31107	0.31	9.4894
	20	0.4676	2.381	-0.006	16 40.9	1 6.7	181 7.0	12 4.5	1.20849	1.31110	0.17	9.2382
h	21	0.4704	+2.391	-0.011	16 43.8	1 6.9	180 14.5	12 1.0	1.20960	1.31111	-0.04	-8.5729
8.0)	22	0.4731	2.402	0.014	16 49.3	1 7.3	179 22.0	11 57.5	1.21112	1.31112	+0.10	+8.9924
	23	0.4758	2.412	0.014	16 55.3	1 7.7	178 29.4	11 54.0	1.21321	1.31109	0.23	9.3690
	24	0.4786	2.423	0.011	16 59.3	1 8.0	177 36.9	11 50.5	1.21580	1.31105	0.37	9.5676
	25	0.4813	2.433	-0.005	16 59.8	1 8.0	176 44.4	11 47.0	1.21868	1.31098	0.50	9.7032
	26	0.4841	+2.444	+0.002	16 55.7	1 7.7	175 51.9	11 43.5	1.22165	1.31090	+0.64	+9.8063
	27	0.4868	2.454	0.009	16 47.5	1 7.2	174 59.2	11 40.0	1.22437	1.31081	0.77	9.8895
	28	0.4895	2.464	0.014	16 36.4	1 6.4	174 6.6	11 36.4	1.22668	1.31069	0.91	9.9591
	29	0.4923	2.475	0.016	16 24.5	1 5.6	173 14.0	11 32.9	1.22848	1.31056	1.05	0.0191
	30	0.4950	2.485	0.016	16 13.7	1 4.9	172 21.4	11 29.4	1.22978	1.31040	1.18	0.0716
ily	1	0.4978	+2.495	+0.012	16 5.7	1 4.4	171 28.7	11 25.9	1.23071	1.31022	+1.31	+0.1183
	2	0.5005	+2.505	+0.007	16 1.1	1 4.1	170 35.9	11 22.4	1.23146	1.31003	+1.45	+0.1601

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sideral Hour.)	τ	f		f'		G		H		Log g .	Log h .	i	Log l .
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.						
July	1	0.4978	+2.495	+0.012	16 5.7	1 4.4	171 28.7	11 25.9	1.23071	1.31022	+1.31	+0.1183	
	2	0.5005	2.505	0.007	16 1.1	1 4.1	170 35.9	11 22.4	1.23146	1.31003	1.45	0.1604	
	3	0.5032	2.516	+0.002	15 59.7	1 4.0	169 43.2	11 18.9	1.23222	1.30982	1.58	0.1966	
	4	0.5060	2.526	-0.003	16 1.1	1 4.1	168 50.3	11 15.4	1.23314	1.30959	1.71	0.2337	
	5	0.5087	2.536	0.007	16 3.9	1 4.3	167 57.4	11 11.8	1.23431	1.30935	1.85	0.2660	
	h (19.0)	6	0.5114	+2.546	-0.009	16 6.9	1 4.5	167 4.5	11 8.3	1.23577	1.30908	+1.98	+0.2960
	7	0.5142	2.556	0.010	16 9.1	1 4.6	166 11.5	11 4.8	1.23751	1.30881	2.11	0.3239	
	8	0.5169	2.566	0.009	16 9.8	1 4.7	165 18.4	11 1.2	1.23943	1.30852	2.24	0.3500	
	9	0.5196	2.576	0.006	16 8.3	1 4.5	164 25.3	10 57.7	1.24151	1.30821	2.37	0.3745	
	10	0.5224	2.586	-0.002	16 4.3	1 4.3	163 32.1	10 54.1	1.24364	1.30786	2.50	0.3976	
	11	0.5251	+2.596	+0.002	15 57.9	1 3.9	162 38.8	10 50.6	1.24574	1.30751	+2.63	+0.4194	
	12	0.5279	2.606	0.005	15 49.0	1 3.3	161 45.4	10 47.0	1.24767	1.30714	2.75	0.4400	
	13	0.5306	2.616	0.008	15 38.6	1 2.6	160 51.9	10 43.5	1.24932	1.30677	2.88	0.4596	
	14	0.5333	2.626	0.008	15 27.7	1 1.8	159 58.3	10 39.9	1.25063	1.30637	3.01	0.4783	
	15	0.5361	2.635	0.006	15 17.8	1 1.2	159 4.6	10 36.3	1.25160	1.30597	3.13	0.4960	
h (20.0)	16	0.5388	+2.645	+0.002	15 10.2	1 0.7	158 10.8	10 32.7	1.25228	1.30555	+3.26	+0.5130	
	17	0.5416	2.654	-0.003	15 6.1	1 0.4	157 16.9	10 29.1	1.25283	1.30511	3.38	0.5292	
	18	0.5443	2.664	0.008	15 5.5	1 0.4	156 22.8	10 25.5	1.25348	1.30466	3.51	0.5447	
	19	0.5470	2.673	0.012	15 7.8	1 0.5	155 28.6	10 21.9	1.25445	1.30419	3.63	0.5596	
	20	0.5498	2.683	0.014	15 11.4	1 0.8	154 34.3	10 18.3	1.25586	1.30371	3.75	0.5738	
	21	0.5525	+2.692	-0.012	15 14.2	1 0.9	153 39.9	10 14.7	1.25772	1.30322	+3.87	+0.5875	
	22	0.5552	2.701	0.008	15 14.5	1 1.0	152 45.3	10 11.0	1.25995	1.30272	3.99	0.6006	
	23	0.5580	2.710	-0.001	15 11.0	1 0.7	151 50.5	10 7.4	1.26234	1.30220	4.10	0.6133	
	24	0.5607	2.719	+0.006	15 3.3	1 0.2	150 55.7	10 3.7	1.26464	1.30168	4.22	0.6255	
	25	0.5635	2.728	0.011	14 52.6	0 59.5	150 0.7	10 0.0	1.26662	1.30114	4.34	0.6372	
	26	0.5662	+2.737	+0.015	14 40.4	0 58.7	149 5.5	9 56.4	1.26816	1.30060	+4.45	+0.6485	
	27	0.5689	2.746	0.015	14 28.7	0 57.9	148 10.2	9 52.7	1.26924	1.30004	4.56	0.6594	
	28	0.5717	2.755	0.013	14 19.0	0 57.3	147 14.8	9 49.0	1.26992	1.29948	4.68	0.6700	
	29	0.5744	2.764	0.009	14 12.2	0 56.8	146 19.2	9 45.3	1.27039	1.29891	4.79	0.6801	
	30	0.5772	2.772	+0.003	14 8.8	0 56.6	145 23.4	9 41.6	1.27079	1.29832	4.90	0.6899	
Aug.	31	0.5799	+2.781	-0.002	14 8.1	0 56.5	144 27.4	9 37.8	1.27128	1.29773	+5.00	+0.6994	
	1	0.5826	2.789	0.006	14 9.4	0 56.6	143 31.3	9 34.1	1.27196	1.29714	5.11	0.7086	
	2	0.5854	2.798	0.009	14 11.1	0 56.7	142 35.0	9 30.3	1.27289	1.29654	5.21	0.7174	
	3	0.5881	2.806	0.010	14 12.6	0 56.8	141 38.6	9 26.6	1.27411	1.29592	5.32	0.7260	
	4	0.5908	2.814	0.009	14 13.1	0 56.9	140 42.0	9 22.8	1.27551	1.29531	5.42	0.7342	
	h (21.0)	5	0.5936	+2.822	-0.007	14 11.8	0 56.8	139 45.2	9 19.0	1.27705	1.29470	+5.52	+0.7422
	6	0.5963	2.830	-0.004	14 8.6	0 56.6	138 48.2	9 15.2	1.27870	1.29408	5.62	0.7500	
	7	0.5990	2.838	0.000	14 3.0	0 56.2	137 51.1	9 11.4	1.28033	1.29346	5.72	0.7575	
	8	0.6018	2.846	+0.004	13 55.3	0 55.7	136 53.8	9 7.6	1.28186	1.29284	5.82	0.7647	
	9	0.6045	2.854	0.007	13 45.8	0 55.1	135 56.3	9 3.8	1.28319	1.29221	5.91	0.7717	
	10	0.6073	+2.861	+0.008	13 35.6	0 54.4	134 58.6	8 59.9	1.28425	1.29158	+6.01	+0.7785	
	11	0.6100	2.869	0.007	13 25.8	0 53.7	134 0.8	8 56.1	1.28496	1.29096	6.10	0.7850	
	12	0.6127	2.876	+0.004	13 17.8	0 53.2	133 2.7	8 52.2	1.28541	1.29032	6.19	0.7914	
	13	0.6155	2.884	0.000	13 12.5	0 52.8	132 4.5	8 48.3	1.28566	1.28970	6.27	0.7975	
	14	0.6182	2.891	-0.006	13 10.8	0 52.7	131 6.1	8 44.4	1.28592	1.28908	6.36	0.8034	
15	0.6210	+2.898	-0.010	13 12.2	0 52.8	130 7.4	8 40.5	1.28639	1.28845	+6.44	+0.8092		
16	0.6237	+2.906	-0.013	13 15.5	0 53.0	129 8.6	8 36.6	1.28721	1.28784	+6.53	+0.8147		

INDEPENDENT STAR-NUMBERS, 1919.

211

FOR WASHINGTON MEAN MIDNIGHT.

Star Day. (Sidereal Hour.)	τ	f		f'		G		H		Log g .	Log h .	i	Log i .
		In Time.	In Time.	In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	s	s	h	m	h	m			$''$	
16	0.6237	+2.906	-0.013	13 15.5	0 53.0	129 8.6	8 36.6	1.28721	1.28784			+6.53	+0.8147
17	0.6264	2.913	0.012	13 19.1	0 53.3	128 9.6	8 32.6	1.28844	1.28722			6.61	0.8201
18	0.6292	2.920	0.009	13 21.0	0 53.4	127 10.4	8 28.7	1.29007	1.28662			6.69	0.8252
19	0.6319	2.927	-0.003	13 19.7	0 53.3	126 11.0	8 24.7	1.29192	1.28601			6.76	0.8302
20	0.6346	2.934	+0.004	13 14.9	0 53.0	125 11.4	8 20.8	1.29379	1.28541			6.84	0.8350
21	0.6374	+2.940	+0.010	13 6.8	0 52.5	124 11.7	8 16.8	1.29543	1.28483			+6.91	+0.8397
22	0.6401	2.947	0.014	12 56.6	0 51.8	123 11.7	8 12.8	1.29672	1.28424			6.98	0.8441
23	0.6429	2.954	0.015	12 46.3	0 51.1	122 11.5	8 8.8	1.29757	1.28367			7.05	0.8484
24	0.6456	2.960	0.013	12 37.3	0 50.5	121 11.1	8 4.7	1.29802	1.28311			7.12	0.8526
25	0.6483	2.966	0.010	12 30.9	0 50.1	120 10.6	8 0.7	1.29821	1.28254			7.19	0.8566
26	0.6511	+2.973	+0.004	12 27.6	0 49.8	119 9.9	7 56.7	1.29830	1.28199			+7.25	+0.8604
27	0.6538	2.979	-0.001	12 27.2	0 49.8	118 9.0	7 52.6	1.29844	1.28147			7.31	0.8641
28	0.6566	2.985	0.005	12 29.0	0 49.9	117 8.0	7 48.5	1.29872	1.28096			7.37	0.8676
29	0.6593	2.991	0.009	12 32.0	0 50.1	116 6.8	7 44.5	1.29923	1.28045			7.43	0.8710
30	0.6620	2.998	0.010	12 35.0	0 50.3	115 5.4	7 40.4	1.30002	1.27995			7.49	0.8742
31	0.6648	+3.004	-0.010	12 37.4	0 50.5	114 3.8	7 36.3	1.30101	1.27948			+7.54	+0.8772
1	0.6675	3.010	0.008	12 38.4	0 50.6	113 2.1	7 32.1	1.30215	1.27901			7.59	0.8802
2	0.6702	3.016	0.005	12 37.7	0 50.5	112 0.2	7 28.0	1.30340	1.27856			7.64	0.8830
3	0.6730	3.021	-0.001	12 34.8	0 50.3	110 58.2	7 23.9	1.30468	1.27813			7.70	0.8856
4	0.6757	3.027	+0.002	12 30.1	0 50.0	109 56.1	7 19.7	1.30591	1.27772			7.73	0.8881
5	0.6784	+3.033	+0.005	12 23.7	0 49.6	108 53.8	7 15.6	1.30701	1.27732			+7.77	+0.8905
6	0.6812	3.039	0.007	12 16.2	0 49.1	107 51.3	7 11.4	1.30789	1.27694			7.81	0.8928
7	0.6839	3.044	0.007	12 8.7	0 48.6	106 48.7	7 7.2	1.30848	1.27657			7.85	0.8949
8	0.6867	3.050	0.005	12 2.3	0 48.2	105 46.0	7 3.1	1.30879	1.27623			7.88	0.8968
9	0.6894	3.055	+0.001	11 58.4	0 47.9	104 43.2	6 58.9	1.30890	1.27592			7.92	0.8987
10	0.6921	+3.061	-0.004	11 57.6	0 47.8	103 40.2	6 54.7	1.30896	1.27561			+7.95	+0.9004
11	0.6949	3.066	0.009	12 0.0	0 48.0	102 37.2	6 50.5	1.30916	1.27533			7.98	0.9020
12	0.6976	3.072	0.012	12 4.8	0 48.3	101 34.0	6 46.3	1.30964	1.27507			8.01	0.9034
13	0.7004	3.077	0.012	12 10.5	0 48.7	100 30.7	6 42.1	1.31050	1.27483			8.03	0.9047
14	0.7031	3.082	0.009	12 15.4	0 49.0	99 27.2	6 37.8	1.31176	1.27461			8.05	0.9059
15	0.7058	+3.088	-0.004	12 17.9	0 49.2	98 23.6	6 33.6	1.31332	1.27442			+8.07	+0.9070
16	0.7086	3.093	+0.002	12 17.1	0 49.1	97 20.1	6 29.3	1.31497	1.27424			8.09	0.9079
17	0.7113	3.098	0.009	12 13.0	0 48.9	96 16.5	6 25.1	1.31648	1.27409			8.10	0.9087
18	0.7140	3.104	0.014	12 6.5	0 48.4	95 12.7	6 20.8	1.31770	1.27397			8.12	0.9094
19	0.7168	3.109	0.016	11 59.1	0 47.9	94 8.8	6 16.6	1.31853	1.27386			8.13	0.9100
20	0.7195	+3.114	+0.015	11 52.5	0 47.4	93 4.9	6 12.3	1.31896	1.27378			+8.14	+0.9104
21	0.7223	3.119	0.011	11 48.1	0 47.2	92 0.9	6 8.1	1.31910	1.27373			8.14	0.9107
22	0.7250	3.125	0.006	11 46.6	0 47.1	90 56.9	6 3.8	1.31907	1.27369			8.15	0.9109
23	0.7277	3.130	+0.001	11 48.0	0 47.2	89 52.8	5 59.5	1.31906	1.27368			8.15	0.9109
24	0.7305	3.135	-0.004	11 51.8	0 47.3	88 48.8	5 55.3	1.31919	1.27369			8.15	0.9109
25	0.7332	+3.140	-0.008	11 57.1	0 47.8	87 44.7	5 51.0	1.31955	1.27373			+8.14	+0.9107
26	0.7360	3.145	0.010	12 2.8	0 48.2	86 40.5	5 46.7	1.32017	1.27380			8.13	0.9103
27	0.7387	3.151	0.010	12 8.1	0 48.5	85 36.3	5 42.4	1.32100	1.27388			8.13	0.9099
28	0.7414	3.156	0.010	12 12.3	0 48.8	84 32.1	5 38.1	1.32203	1.27400			8.12	0.9093
29	0.7442	3.161	0.006	12 14.9	0 49.0	83 28.0	5 33.9	1.32318	1.27413			8.10	0.9086
30	0.7469	+3.166	-0.003	12 15.6	0 49.0	82 23.8	5 29.6	1.32439	1.27428			+8.09	+0.9077
1	0.7496	+3.172	+0.001	12 14.4	0 49.0	81 19.7	5 25.3	1.32557	1.27447			+8.07	+0.9067

INDEPENDENT STAR-NUMBERS, 1919.
FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)		τ	f		f'		G		H		Log g .	Log h .	i	Log i .
			In Time.		In Time.		In Arc.	In Time.	In Arc.	In Time.				
		y	s	s	$^{\circ}$ $'$	h m	$^{\circ}$ $'$	h m						
Oct.	1	0.7496	+3.172	+0.001	12 14.4	0 49.0	81 19.7	5 25.3	1.32557	1.27447	+8.07	+0.9067		
	2	0.7524	3.177	0.004	12 11.6	0 48.8	80 15.6	5 21.0	1.32664	1.27467	8.05	0.9056		
	3	0.7551	3.182	0.006	12 7.5	0 48.5	79 11.5	5 16.8	1.32756	1.27489	8.02	0.9044		
	4	0.7578	3.188	0.007	12 3.0	0 48.2	78 7.5	5 12.5	1.32823	1.27515	8.00	0.9030		
	h	5	0.7606	3.193	0.005	11 59.3	0 48.0	77 3.5	5 8.2	1.32863	1.27542	7.97	0.9015	
	(1.0)	6	0.7633	+3.198	+0.001	11 57.4	0 47.8	75 59.6	5 4.0	1.32884	1.27571	+7.94	+0.8999	
	7	0.7661	3.204	-0.003	11 58.2	0 47.9	74 55.7	4 59.7	1.32899	1.27602	7.91	0.8981		
	8	0.7688	3.209	0.008	12 2.1	0 48.1	73 51.9	4 55.5	1.32922	1.27636	7.87	0.8962		
	9	0.7715	3.215	0.011	12 8.6	0 48.6	72 48.1	4 51.2	1.32967	1.27671	7.84	0.8941		
	10	0.7743	3.220	0.012	12 16.5	0 49.1	71 44.4	4 47.0	1.33050	1.27708	7.80	0.8919		
	11	0.7770	+3.226	-0.011	12 24.1	0 49.6	70 40.8	4 42.7	1.33172	1.27747	+7.76	+0.8896		
	12	0.7798	3.232	-0.006	12 29.9	0 50.0	69 37.3	4 38.5	1.33330	1.27789	7.71	0.8871		
	13	0.7825	3.238	+0.001	12 32.7	0 50.2	68 33.8	4 34.3	1.33502	1.27832	7.66	0.8844		
	14	0.7852	3.244	0.007	12 32.1	0 50.1	67 30.4	4 30.0	1.33669	1.27877	7.61	0.8817		
	15	0.7880	3.249	0.013	12 28.9	0 49.9	66 27.1	4 25.8	1.33815	1.27924	7.56	0.8787		
h	16	0.7907	+3.255	+0.016	12 24.3	0 49.6	65 23.9	4 21.6	1.33921	1.27972	+7.51	+0.8757		
	17	0.7934	3.261	0.016	12 20.0	0 49.3	64 20.9	4 17.4	1.33990	1.28022	7.45	0.8724		
	18	0.7962	3.267	0.013	12 17.2	0 49.1	63 17.9	4 13.2	1.34028	1.28074	7.40	0.8690		
	19	0.7989	3.274	0.009	12 17.1	0 49.1	62 15.0	4 9.0	1.34046	1.28127	7.34	0.8655		
	(2.0)	20	0.8017	3.280	+0.003	12 19.9	0 49.3	61 12.3	4 4.8	1.34061	1.28181	7.27	0.8617	
	21	0.8044	+3.286	-0.002	12 25.0	0 49.7	60 9.7	4 0.6	1.34088	1.28236	+7.21	+0.8579		
	22	0.8071	3.293	0.007	12 31.9	0 50.1	59 7.2	3 56.5	1.34136	1.28293	7.14	0.8538		
	23	0.8099	3.299	0.009	12 39.3	0 50.6	58 4.8	3 52.3	1.34208	1.28351	7.07	0.8496		
	24	0.8126	3.306	0.010	12 46.4	0 51.1	57 2.6	3 48.2	1.34307	1.28410	7.00	0.8452		
	25	0.8154	3.312	0.009	12 52.5	0 51.5	56 0.5	3 44.0	1.34425	1.28470	6.93	0.8406		
	26	0.8181	+3.319	-0.007	12 57.2	0 51.8	54 58.5	3 39.9	1.34556	1.28532	+6.85	+0.8358		
	27	0.8208	3.326	-0.004	13 0.0	0 52.0	53 56.7	3 35.8	1.34693	1.28594	6.77	0.8308		
	28	0.8236	3.333	0.000	13 1.1	0 52.1	52 55.0	3 31.7	1.34830	1.28656	6.69	0.8257		
	29	0.8263	3.340	+0.003	13 0.4	0 52.0	51 53.5	3 27.6	1.34961	1.28719	6.61	0.8203		
	30	0.8290	3.347	0.005	12 58.2	0 51.9	50 52.2	3 23.5	1.35079	1.28783	6.53	0.8148		
Nov.	31	0.8318	+3.354	+0.006	12 55.5	0 51.7	49 50.9	3 19.4	1.35173	1.28847	+6.44	+0.8090		
	1	0.8345	3.361	0.005	12 53.0	0 51.5	48 49.8	3 15.3	1.35244	1.28912	6.35	0.8030		
	2	0.8372	3.368	+0.002	12 51.9	0 51.5	47 49.0	3 11.3	1.35296	1.28977	6.26	0.7968		
	3	0.8400	3.376	-0.003	12 53.0	0 51.5	46 48.3	3 7.2	1.35336	1.29042	6.17	0.7904		
	4	0.8427	3.384	0.007	12 56.8	0 51.8	45 47.7	3 3.2	1.35383	1.29107	6.08	0.7838		
	h	5	0.8454	+3.391	-0.012	13 3.1	0 52.2	44 47.2	2 59.1	1.35446	1.29172	+5.98	+0.7769	
	(3.0)	6	0.8482	3.399	0.014	13 11.0	0 52.7	43 46.9	2 55.1	1.35545	1.29239	5.88	0.7697	
	7	0.8509	3.407	0.013	13 19.1	0 53.3	42 46.8	2 51.1	1.35683	1.29305	5.78	0.7623		
	8	0.8537	3.415	0.009	13 25.8	0 53.7	41 46.9	2 47.1	1.35855	1.29370	5.68	0.7546		
	9	0.8564	3.423	-0.002	13 29.7	0 54.0	40 47.1	2 43.1	1.36049	1.29435	5.58	0.7467		
	10	0.8592	+3.431	+0.005	13 30.5	0 54.0	39 47.4	2 39.2	1.36244	1.29500	+5.48	+0.7384		
	11	0.8619	3.439	0.011	13 28.5	0 53.9	38 47.8	2 35.2	1.36424	1.29564	5.37	0.7299		
	12	0.8646	3.447	0.016	13 24.6	0 53.6	37 48.5	2 31.2	1.36573	1.29629	5.26	0.7210		
	13	0.8674	3.456	0.017	13 20.4	0 53.4	36 49.2	2 27.3	1.36683	1.29692	5.15	0.7118		
	14	0.8701	3.464	0.015	13 17.3	0 53.3	35 50.1	2 23.3	1.36757	1.29755	5.04	0.7023		
15	0.8728	+3.473	+0.011	13 16.2	0 53.1	34 51.1	2 19.4	1.36812	1.29817	+4.92	+0.6924			
16		0.8756	+3.482	+0.006	13 17.9	0 53.2	33 52.3	2 15.5	1.36858	1.29878	+4.81	+0.6822		

INDEPENDENT STAR-NUMBERS, 1919.

213

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f		f'		G		H		Log g .	Log h .	i	Log i .
		In Time.	In Time.	In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	s	s	h	m	h	m			$''$	
Nov. 16	0.8756	+3.482	+0.006	13 17.9	0 53.2	33 52.3	2 15.5	1.36858	1.29878			+4.81	+0.6822
17	0.8783	3.491	0.000	13 22.0	0 53.5	32 53.6	2 11.6	1.36910	1.29939			4.69	0.6715
18	0.8811	3.500	-0.005	13 27.7	0 53.8	31 55.1	2 7.7	1.36980	1.30000			4.58	0.6605
19	0.8838	3.509	0.008	13 34.3	0 54.3	30 56.6	2 3.8	1.37072	1.30058			4.46	0.6490
20	0.8865	3.518	0.009	13 40.6	0 54.7	29 58.4	1 59.9	1.37189	1.30115			4.34	0.6370
h (4.0) 21	0.8893	+3.527	-0.009	13 46.0	0 55.1	29 0.2	1 56.0	1.37326	1.30172			+4.21	+0.6246
22	0.8920	3.536	0.007	13 50.2	0 55.3	28 2.1	1 52.1	1.37475	1.30228			4.09	0.6117
23	0.8948	3.546	-0.004	13 52.3	0 55.5	27 4.2	1 48.3	1.37632	1.30282			3.96	0.5982
24	0.8975	3.555	0.000	13 52.8	0 55.5	26 6.4	1 44.4	1.37791	1.30334			3.84	0.5841
25	0.9002	3.565	+0.003	13 51.7	0 55.4	25 8.7	1 40.6	1.37943	1.30386			3.71	0.5694
26	0.9030	+3.574	+0.005	13 49.1	0 55.3	24 11.2	1 36.7	1.38082	1.30437			+3.58	+0.5541
27	0.9057	3.584	0.006	13 45.6	0 55.0	23 13.7	1 32.9	1.38204	1.30485			3.45	0.5381
28	0.9084	3.594	0.006	13 42.0	0 54.8	22 16.4	1 29.1	1.38303	1.30533			3.32	0.5213
29	0.9112	3.604	+0.003	13 39.3	0 54.6	21 19.2	1 25.3	1.38381	1.30579			3.19	0.5036
30	0.9139	3.614	-0.001	13 38.3	0 54.6	20 22.1	1 21.5	1.38444	1.30623			3.06	0.4851
Dec. 1	0.9166	+3.624	-0.006	13 39.7	0 54.6	19 25.0	1 17.7	1.38508	1.30665			+2.92	+0.4656
2	0.9194	3.633	0.011	13 43.3	0 54.9	18 28.1	1 13.9	1.38584	1.30705			2.79	0.4451
3	0.9221	3.644	0.014	13 48.8	0 55.3	17 31.3	1 10.1	1.38684	1.30744			2.65	0.4234
4	0.9249	3.654	0.014	13 54.7	0 55.6	16 34.6	1 6.3	1.38823	1.30781			2.51	0.4004
h (5.0) 5	0.9276	3.664	0.011	13 59.7	0 56.0	15 37.9	1 2.5	1.38994	1.30817			2.38	0.3759
6	0.9303	+3.674	-0.006	14 2.4	0 56.2	14 41.3	0 58.8	1.39192	1.30851			+2.24	+0.3498
7	0.9331	3.685	+0.001	14 2.3	0 56.2	13 44.8	0 55.0	1.39400	1.30882			2.10	0.3220
8	0.9358	3.695	0.008	13 59.3	0 56.0	12 48.3	0 51.2	1.39596	1.30912			1.96	0.2920
9	0.9386	3.706	0.014	13 54.1	0 55.6	11 51.9	0 47.5	1.39766	1.30939			1.82	0.2597
10	0.9413	3.716	0.017	13 48.1	0 55.2	10 55.6	0 43.7	1.39901	1.30966			1.68	0.2246
11	0.9440	+3.727	+0.016	13 42.6	0 54.8	9 59.3	0 40.0	1.40002	1.30990			+1.54	+0.1863
12	0.9468	3.737	0.013	13 38.9	0 54.6	9 3.0	0 36.2	1.40076	1.31011			1.39	0.1441
13	0.9495	3.748	0.008	13 37.4	0 54.5	8 6.8	0 32.5	1.40137	1.31031			1.25	0.0972
14	0.9522	3.759	+0.002	13 38.2	0 54.5	7 10.6	0 28.7	1.40198	1.31048			1.11	0.0444
15	0.9550	3.769	-0.003	13 41.1	0 54.7	6 14.4	0 25.0	1.40272	1.31063			0.96	9.9842
16	0.9577	+3.780	-0.006	13 44.8	0 55.0	5 18.3	0 21.2	1.40364	1.31077			+0.82	+9.9140
17	0.9605	3.791	0.008	13 48.5	0 55.2	4 22.2	0 17.5	1.40479	1.31088			0.68	9.8301
18	0.9632	3.802	0.008	13 51.5	0 55.4	3 26.1	0 13.7	1.40611	1.31097			0.53	9.7258
19	0.9659	3.812	0.007	13 53.4	0 55.6	2 30.0	0 10.0	1.40757	1.31104			0.39	9.5880
20	0.9687	3.823	0.004	13 53.6	0 55.6	1 33.9	0 6.3	1.40910	1.31109			0.24	9.3848
h (6.0) 21	0.9714	+3.834	-0.001	13 52.2	0 55.5	0 37.8	0 2.5	1.41066	1.31112			+0.10	+8.9899
22	0.9741	3.845	+0.002	13 49.2	0 55.3	359 41.7	23 58.8	1.41215	1.31112			-0.05	-8.6739
23	0.9769	3.855	0.005	13 44.8	0 55.0	358 45.6	23 55.0	1.41355	1.31110			0.19	9.2835
24	0.9796	3.866	0.007	13 39.5	0 54.6	357 49.4	23 51.3	1.41479	1.31106			0.34	9.5275
25	0.9824	3.877	0.007	13 33.8	0 54.2	356 53.3	23 47.6	1.41580	1.31100			0.48	9.6827
26	0.9851	+3.888	+0.005	13 28.5	0 53.9	355 57.2	23 43.8	1.41662	1.31092			-0.63	-9.7967
27	0.9878	3.899	+0.001	13 24.6	0 53.6	355 1.1	23 40.1	1.41726	1.31081			0.77	9.8868
28	0.9906	3.909	-0.004	13 22.7	0 53.5	354 4.9	23 36.3	1.41781	1.31069			0.91	9.9613
29	0.9933	3.920	0.009	13 23.0	0 53.5	353 8.6	23 32.6	1.41845	1.31054			1.06	0.0247
30	0.9960	3.931	0.014	13 25.2	0 53.7	352 12.3	23 28.8	1.41925	1.31037			1.20	0.0799
31	0.9988	+3.941	-0.015	13 28.4	0 53.9	351 16.0	23 25.1	1.42035	1.31017			-1.35	-0.1288
32	1.0015	+3.952	-0.013	13 31.1	0 54.1	350 19.7	23 21.3	1.42179	1.30997			-1.49	-0.172

214 BESSELIAN AND INDEPENDENT STAR-NUMBERS, 1919.

FOR WASHINGTON SIDEREAL TWELVE HOURS.

Mean Solar Date.	Log A ₁ .	Log B ₁ .	Log C.	Log D.	f	G ₁	H	Log g ₁ .	Log h.	Log i.
Jan. 0.72	+9.5263	+0.5259	-0.5124	+1.3045	+1.035	26 30	350 50	0.8765	1.3101	-0.1497
10.70	9.5690	0.5238	0.8107	1.2838	1.142	24 12	341 24	0.9109	1.3070	0.4480
20.67	9.6056	0.5146	0.9765	1.2473	1.242	22 2	331 49	0.9405	1.3022	0.6138
30.64	9.6365	0.5005	1.0856	1.1926	1.333	20 2	321 59	0.9656	1.2961	0.7229
Feb. 9.61	9.6624	0.4842	1.1614	1.1142	1.415	18 19	311 54	0.9870	1.2896	0.7986
19.59	+9.6840	+0.4692	-1.2138	+1.0020	+1.487	16 55	301 33	1.0052	1.2833	-0.8511
Mar. 1.56	9.7022	0.4591	1.2484	0.8316	1.550	15 55	290 57	1.0212	1.2781	0.8857
11.53	9.7180	0.4567	1.2678	+0.5233	1.608	15 17	280 13	1.0356	1.2748	0.9051
21.50	9.7324	0.4640	1.2736	-9.2851	1.662	15 8	269 25	1.0496	1.2737	0.9109
31.48	9.7463	0.4806	1.2664	0.5679	1.716	15 8	258 41	1.0636	1.2750	0.9037
Apr. 10.45	+9.7606	+0.5048	-1.2460	-0.8497	+1.773	15 28	248 8	1.0786	1.2785	-0.8833
20.42	9.7757	0.5339	1.2113	1.0098	1.836	15 57	237 50	1.0947	1.2836	0.8486
30.39	9.7920	0.5648	1.1599	1.1163	1.906	16 28	227 52	1.1122	1.2897	0.7972
May 10.37	9.8096	0.5948	1.0876	1.1911	1.985	16 55	218 14	1.1308	1.2960	0.7249
20.34	9.8283	0.6218	0.9861	1.2440	2.071	17 14	208 55	1.1502	1.3018	0.6234
30.31	+9.8476	+0.6443	-0.8371	-1.2799	+2.166	17 21	199 51	1.1698	1.3065	-0.4744
June 9.29	9.8672	0.6615	0.5889	1.3016	2.265	17 15	190 58	1.1892	1.3097	0.2262
19.26	9.8865	0.6730	-9.8960	1.3107	2.368	16 58	182 12	1.2078	1.3111	-9.5333
29.23	9.9051	0.6789	+0.3665	1.3078	2.472	16 30	173 28	1.2254	1.3106	+0.0038
July 9.20	9.9226	0.6794	0.7301	1.2926	2.573	15 54	164 41	1.2415	1.3083	0.3674
19.18	+9.9386	+0.6754	+0.9176	-1.2643	+2.670	15 13	155 46	1.2561	1.3043	+0.5549
29.15	9.9531	0.6678	1.0394	1.2209	2.761	14 30	146 39	1.2692	1.2991	0.6767
Aug. 8.12	9.9659	0.6581	1.1247	1.1590	2.843	13 48	137 16	1.2806	1.2931	0.7620
18.09	9.9770	0.6479	1.1859	1.0721	2.917	13 10	127 35	1.2906	1.2869	0.8232
28.07	9.9867	0.6393	1.2288	0.9467	2.982	12 38	117 34	1.2993	1.2812	0.8661
Sept. 7.04	+9.9952	+0.6342	+1.2566	-0.7500	+3.042	12 16	107 17	1.3072	1.2767	+0.8939
17.01	0.0029	0.6344	1.2711	-0.3470	3.096	12 8	96 47	1.3146	1.2742	0.9084
26.99	0.0102	0.6406	1.2729	+0.1002	3.148	12 2	86 9	1.3218	1.2738	0.9102
Oct. 6.96	0.0175	0.6529	1.2618	0.6743	3.201	12 10	75 30	1.3294	1.2759	0.8991
16.93	0.0251	0.6704	1.2370	0.9068	3.258	12 26	64 57	1.3374	1.2799	0.8743
26.90	+0.0336	+0.6914	+1.1966	+1.0489	+3.322	12 47	54 34	1.3465	1.2856	+0.8339
Nov. 5.88	0.0430	0.7138	1.1370	1.1459	3.394	13 10	44 25	1.3566	1.2920	0.7743
15.85	0.0533	0.7355	1.0517	1.2143	3.476	13 30	34 31	1.3675	1.2984	0.6890
25.82	0.0646	0.7549	0.9273	1.2619	3.568	13 44	24 50	1.3792	1.3040	0.5646
Dec. 5.79	0.0766	0.7704	0.7311	1.2925	3.667	13 51	15 21	1.3914	1.3083	0.3684
15.77	+0.0888	+0.7813	+0.3294	+1.3083	+3.772	13 48	6 0	1.4035	1.3107	+9.9667
25.74	0.1010	0.7871	-0.0755	1.3103	3.880	13 37	356 40	1.4154	1.3110	-9.7128
35.71	+0.1128	+0.7879	-0.6511	+1.2984	+3.986	13 17	347 18	1.4266	1.3092	-0.2884

E = +0.003

The above numbers give the same reductions from mean to apparent place as are employed in computing the apparent places of the fixed stars, given on pages 316 to 513, from the mean places, given on pages 217 to 230. In order to render exact interpolation possible through intervals of ten days, all short period terms have been omitted.

TERMS OF SHORT PERIOD IN THE NUTATION, 1919. 215

FOR WASHINGTON MEAN MIDNIGHT.

Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$
	"	"		"	"		"	"		"	"
1. 0	-0.04	-0.08	Feb. 15	+0.13	+0.08	Apr. 1	-0.19	+0.03	May 17	-0.02	-0.07
1	+0.04	0.07	16	+0.04	0.08	2	0.18	-0.01	18	+0.05	0.06
2	0.10	0.05	17	-0.05	0.07	3	0.13	0.05	19	0.09	-0.03
3	0.14	-0.01	18	0.12	0.05	4	-0.04	0.08	20	0.11	0.00
4	0.15	+0.03	19	0.17	+0.02	5	+0.07	0.10	21	0.09	+0.04
5	+0.10	+0.06	20	-0.20	-0.01	6	+0.18	-0.08	22	+0.04	+0.07
6	+0.03	0.08	21	0.19	0.04	7	0.25	0.05	23	-0.04	0.08
7	-0.06	0.07	22	0.16	0.06	8	0.28	-0.01	24	0.12	0.08
8	0.15	0.07	23	0.09	0.08	9	0.26	+0.03	25	0.19	0.06
9	0.20	+0.03	24	-0.02	0.08	10	0.20	0.06	26	0.23	+0.02
10	-0.20	-0.01	25	+0.05	-0.06	11	+0.11	+0.08	27	-0.21	-0.03
11	0.16	0.05	26	0.11	-0.03	12	+0.02	0.08	28	0.14	0.06
12	-0.07	0.08	27	0.14	0.00	13	-0.07	0.07	29	-0.03	0.09
13	+0.04	0.09	28	0.12	+0.04	14	0.13	0.04	30	+0.09	0.09
14	0.15	0.08	Mar. 1	+0.08	0.07	15	0.17	+0.01	31	0.19	0.07
15	+0.22	-0.05	2	0.00	+0.09	16	-0.19	-0.02	June 1	+0.26	-0.03
16	0.26	-0.01	3	-0.08	0.08	17	0.17	0.05	2	0.28	+0.01
17	0.24	+0.03	4	0.15	0.06	18	0.13	0.07	3	0.25	0.05
18	0.19	0.06	5	0.18	+0.02	19	0.07	0.08	4	0.19	0.07
19	0.11	0.08	6	0.17	-0.03	20	-0.01	0.07	5	0.10	0.08
20	+0.02	+0.08	7	-0.11	-0.06	21	+0.05	-0.05	6	+0.01	+0.08
21	-0.07	0.07	8	-0.01	0.09	22	0.10	-0.02	7	-0.08	0.06
22	0.14	0.04	9	+0.10	0.09	23	0.11	+0.01	8	0.13	+0.03
23	0.18	+0.01	10	0.19	0.07	24	0.08	0.05	9	0.16	0.00
24	0.20	-0.02	11	0.25	-0.03	25	+0.02	0.08	10	0.16	-0.03
25	-0.18	-0.05	12	+0.26	+0.01	26	-0.06	+0.09	11	-0.14	-0.06
26	0.14	0.07	13	0.23	0.04	27	0.14	0.07	12	0.09	0.07
27	-0.07	0.08	14	0.16	0.07	28	0.20	+0.04	13	-0.03	0.08
28	0.00	0.07	15	+0.07	0.08	29	0.21	0.00	14	+0.04	0.07
29	+0.08	0.06	16	-0.02	0.08	30	0.17	-0.04	15	0.09	0.04
30	+0.13	-0.02	17	-0.10	+0.06	May 1	-0.09	-0.07	16	+0.12	-0.01
31	0.15	+0.01	18	0.16	+0.03	2	+0.03	0.09	17	0.12	+0.03
2. 1	0.13	0.05	19	0.19	0.00	3	0.14	0.08	18	+0.07	0.06
2	+0.07	0.08	20	0.19	-0.03	4	0.23	0.06	19	0.00	0.08
3	-0.02	0.09	21	0.17	0.06	5	0.28	-0.02	20	-0.09	0.08
4	-0.11	+0.08	22	-0.12	-0.07	6	+0.28	+0.02	21	-0.17	+0.07
5	0.17	+0.04	23	-0.06	0.08	7	0.23	0.06	22	0.23	+0.03
6	0.19	0.00	24	+0.01	0.07	8	0.16	0.08	23	0.23	-0.01
7	0.16	-0.04	25	0.07	0.04	9	+0.06	0.08	24	0.18	0.05
8	-0.09	0.07	26	0.11	-0.01	10	-0.03	0.07	25	-0.09	0.08
9	+0.01	-0.09	27	+0.11	+0.03	11	-0.11	+0.05	26	+0.03	-0.09
10	0.12	0.08	28	0.08	0.06	12	0.15	+0.02	27	0.14	0.08
11	0.20	0.06	29	+0.01	0.08	13	0.17	-0.01	28	0.22	0.05
12	0.25	-0.02	30	-0.07	0.08	14	0.17	0.04	29	0.27	-0.01
13	0.25	+0.02	31	0.14	0.07	15	0.13	0.06	30	0.28	+0.03
14	+0.21	+0.05	Apr. 1	-0.19	+0.03	16	-0.08	-0.08	July 1	+0.20	+0.06
15	+0.13	+0.08	2	-0.18	-0.01	17	-0.02	-0.07	2	+0.12	+0.06

216 TERMS OF SHORT PERIOD IN THE NUTATION, 1919.
FOR WASHINGTON MEAN MIDNIGHT.

Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$
	"	"		"	"		"	"		"	"
July 1	+0.20	+0.06	Aug. 16	-0.21	+0.02	Oct. 1	+0.01	-0.07	Nov. 16	+0.09	+0.08
2	0.12	0.08	17	0.20	-0.02	2	0.07	0.05	17	0.00	0.07
3	+0.03	0.08	18	0.14	0.06	3	0.10	-0.02	18	-0.08	0.05
4	-0.05	0.06	19	-0.05	0.08	4	0.11	+0.01	19	0.13	+0.02
5	0.12	0.04	20	+0.06	0.09	5	0.08	0.05	20	0.15	-0.01
6	-0.15	+0.01	21	+0.16	-0.07	6	+0.02	+0.07	21	-0.14	-0.04
7	0.16	-0.02	22	0.23	-0.03	7	-0.05	0.08	22	0.11	0.06
8	0.14	0.05	23	0.25	+0.01	8	0.13	0.07	23	0.06	0.07
9	0.10	0.07	24	0.22	0.05	9	0.19	0.04	24	-0.01	0.07
10	-0.04	0.07	25	0.16	0.07	10	0.20	+0.01	25	+0.04	0.06
11	+0.02	-0.07	26	+0.07	+0.08	11	-0.17	-0.04	26	+0.09	-0.04
12	0.08	0.05	27	-0.02	0.08	12	-0.10	0.07	27	0.11	-0.01
13	0.12	-0.02	28	0.09	0.05	13	+0.01	0.09	28	0.09	+0.03
14	0.13	+0.01	29	0.14	+0.03	14	0.12	0.08	29	+0.05	0.08
15	0.10	0.05	30	0.16	-0.01	15	0.21	0.06	30	-0.02	0.08
16	+0.04	+0.07	31	-0.16	-0.03	16	+0.26	-0.02	Dec. 1	-0.11	+0.03
17	-0.05	0.08	Sept. 1	0.13	0.06	17	0.26	+0.02	2	0.18	0.06
18	0.13	0.07	2	0.08	0.07	18	0.22	0.06	3	0.23	+0.03
19	0.20	+0.04	3	-0.02	0.07	19	0.14	0.08	4	0.23	-0.01
20	0.22	0.00	4	+0.04	0.06	20	+0.05	0.08	5	0.19	0.05
21	-0.20	-0.04	5	+0.09	-0.04	21	-0.04	+0.07	6	-0.10	-0.03
22	0.12	0.07	6	0.12	-0.01	22	0.11	0.04	7	+0.02	0.09
23	-0.02	0.09	7	0.12	+0.03	23	0.15	+0.01	8	0.14	0.07
24	+0.09	0.08	8	0.08	0.06	24	0.16	-0.02	9	0.23	0.05
25	0.19	0.06	9	+0.02	0.08	25	0.14	0.04	10	0.27	-0.01
26	+0.24	-0.02	10	-0.07	+0.08	26	-0.11	-0.06	11	+0.26	+0.03
27	0.25	+0.02	11	0.14	0.06	27	-0.06	0.07	12	0.21	0.06
28	0.21	0.06	12	0.19	+0.03	28	0.00	0.07	13	0.13	0.08
29	0.14	0.08	13	0.20	-0.01	29	+0.05	0.05	14	+0.04	0.08
30	+0.05	0.08	14	0.15	0.05	30	0.09	-0.03	15	-0.04	0.06
31	-0.03	+0.07	15	-0.07	-0.08	31	+0.10	0.00	16	-0.10	+0.03
Aug. 1	0.10	0.05	16	+0.04	0.09	Nov. 1	0.08	+0.04	17	0.14	0.00
2	0.15	+0.02	17	0.14	0.07	2	+0.03	0.06	18	0.14	-0.03
3	0.16	-0.01	18	0.22	0.05	3	-0.04	0.08	19	0.11	0.05
4	0.15	0.04	19	0.26	-0.01	4	0.12	0.08	20	0.07	0.07
5	-0.12	-0.06	20	+0.24	+0.03	5	-0.19	+0.06	21	-0.01	-0.07
6	-0.06	0.07	21	0.19	0.06	6	0.22	+0.02	22	+0.04	0.06
7	0.00	0.07	22	0.10	0.08	7	0.20	-0.02	23	0.09	0.05
8	+0.06	0.06	23	+0.01	0.08	8	0.14	0.06	24	0.12	-0.02
9	0.11	-0.03	24	-0.07	0.06	9	-0.04	0.08	25	0.11	+0.02
10	+0.13	0.00	25	-0.13	+0.04	10	+0.08	-0.08	26	+0.08	+0.05
11	0.12	+0.04	26	0.16	0.00	11	0.19	0.07	27	+0.01	0.07
12	+0.07	0.07	27	0.16	-0.03	12	0.26	-0.03	28	-0.07	0.08
13	-0.01	0.08	28	0.14	0.05	13	0.28	+0.01	29	0.16	0.07
14	0.09	0.08	29	-0.10	0.07	14	0.25	0.05	30	0.22	0.04
15	-0.17	+0.06	30	-0.05	-0.07	15	+0.18	+0.07	31	-0.25	+0.01
16	-0.21	+0.02	Oct. 1	+0.01	-0.07	16	+0.09	+0.08	32	-0.22	-0.03

MEAN PLACES OF TEN-DAY STARS, 1919. 217

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spec- trum.	Right Ascension.			Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h	m	s	s	s	" ' "	"	"
33 Piscium	4.7	K0	0	1	11.398	+3.0714	-.0006	- 6 9 38.49	+20.136	+0.091
α Andromedæ (<i>Alpheratz</i>)	2.2	A0p	0	4	11.835	3.0968	+0.0107	+28 38 35.75	19.879	-0.163
β Cassiopeie	2.4	F5	0	4	50.801	3.1872	+0.0681	+58 42 11.00	19.860	-0.180
ε Andromedæ	3.9	K0	0	5	18.189	3.0501	+0.0096	-46 11 40.02	19.847	-0.193
22 Andromedæ	5.1	F0	0	6	6.340	3.1111	+0.0021	+45 37 17.51	20.034	-0.004
γ Pegasi	2.9	B2	0	9	3.767	+3.0869	+0.0003	+14 43 59.89	+20.020	-0.010
σ Andromedæ	4.5	A2	0	14	5.508	3.1286	-.0044	+36 20 10.26	19.961	-0.047
ι Ceti	3.8	K0	0	15	18.072	3.0569	-.0013	- 9 16 22.23	19.971	-0.030
ξ Tucanæ	4.3	F8	0	15	51.774	3.1450	+0.2738	-65 21 1.61	21.169	+1.172
44 Piscium	6.0	G5	0	21	14.985	3.0745	-.0014	+ 1 29 28.06	19.936	-0.023
β Hydri	2.9	G0	0	21	31.014	+3.1942	+0.0066	-77 42 37.54	+20.275	+0.318
α Phœnicis	2.4	K0	0	22	17.060	2.9716	+0.0188	-42 44 45.11	19.547	-0.403
12 Ceti	6.0	K5	0	25	54.320	3.0622	+0.0011	- 4 24 16.81	19.917	0.000
13 Ceti	5.2	G0	0	31	4.690	3.0872	+0.0273	- 4 2 18.65	19.844	-0.017
ξ Cassiopeie	3.7	B2	0	32	27.051	3.3308	+0.0036	+53 27 4.75	19.837	-0.007
π Andromedæ	4.4	B3	0	32	33.017	+3.1987	+0.0019	+33 16 25.15	+19.844	0.000
ε Andromedæ	4.5	G5	0	34	16.283	3.1653	-.0172	+28 52 19.68	19.568	-0.254
δ Andromedæ	3.5	K0	0	34	59.554	3.2030	+0.0110	+30 25 4.00	19.715	-0.097
α Cassiopeie (<i>Schedir</i>)	var.	K0	0	35	54.050	3.3892	+0.0063	+56 5 35.94	19.768	-0.032
μ Phœnicis	4.6	K0	0	37	29.961	2.8384	-.0046	-46 31 47.69	19.746	-0.032
β Ceti	2.2	K0	0	39	31.468	+3.0122	+0.0160	-18 25 51.27	+19.789	+0.041
c Cassiopeie	4.7	B2	0	40	12.282	3.3331	+0.0028	+47 50 28.75	19.731	-0.006
21 Cassiopeie	5.6	A2	0	40	16.332	3.9127	-.0030	+74 32 44.07	19.710	-0.026
ξ Andromedæ	4.3	K0	0	43	2.497	3.1735	-.0073	+23 49 36.37	19.614	-0.078
η Cassiopeie	3.6	F8	0	44	11.422	3.6162	+0.1433	+57 23 13.95	19.198	-0.476
δ Piscium	4.6	K5	0	44	28.692	+3.1105	+0.0055	+ 7 8 40.23	+19.625	-0.044
λ Hydri	5.0	K5	0	45	47.458	2.0996	+0.0425	-75 21 50.28	19.646	-0.001
20 Ceti	4.9	K0	0	48	52.004	3.0644	-.0005	- 1 35 1.29	19.588	-0.003
γ Cassiopeie	2.2	B0p	0	51	48.432	3.6009	+0.0036	+60 16 42.30	19.530	-0.005
μ Andromedæ	3.9	A2	0	52	15.104	3.3224	+0.0132	+38 3 36.91	19.556	+0.030
α Sculptoris	4.4	B5	0	54	42.150	+2.8900	-.0018	-29 47 42.77	+19.464	-0.013
ε Piscium	4.4	K0	0	58	44.253	3.1116	-.0054	+ 7 27 15.58	19.416	+0.026
β Phœnicis	3.4	K0	1	2	28.165	2.6791	-.0057	-47 9 9.49	19.281	-0.024
μ Cassiopeie	5.3	G5	1	2	52.150	3.9725	+0.3919	+54 31 25.22	17.740	-1.556
η Ceti	3.6	K0	1	4	30.897	3.0175	+0.0143	-10 36 40.39	19.131	-0.126
β Andromedæ	2.4	Ma	1	5	11.466	+3.3519	+0.0148	+35 11 29.10	+19.123	-0.117
τ Piscium	4.7	K0	1	7	11.687	3.2982	+0.0056	+29 39 35.88	19.161	-0.029
ξ Piscium	5.6	A5	1	9	29.862	3.1323	+0.0096	+ 7 8 50.53	19.079	-0.052
κ Tucanæ	5.0	F8	1	13	1.387	2.0388	+0.0744	-69 18 23.02	19.125	+0.089
f Piscium	5.3	A2	1	13	37.173	3.0929	-.0033	+ 3 11 17.64	18.994	-0.025
υ Piscium	4.7	A2	1	15	0.602	+3.2017	+0.0016	+26 50 19.32	+18.972	-0.008
θ Ceti	3.8	K0	1	19	58.440	2.9979	-.0057	- 8 36 3.43	18.622	-0.215
δ Cassiopeie	2.8	A5	1	20	30.250	3.9039	+0.0407	+59 48 53.84	18.784	-0.037
γ Phœnicis	3.4	K5	1	24	50.929	2.6072	-.0029	-43 43 59.31	18.462	-0.225
38 Cassiopeie	6.0	F5	1	25	10.654	4.4215	+0.0263	+69 50 54.15	18.605	-0.072
η Piscium	3.7	G5	1	27	8.748	+3.2064	+0.0015	+14 55 43.29	+18.611	-0.003
40 Cassiopeie	5.5	K0	1	32	0.786	4.7408	-.0011	+72 37 40.60	18.450	-0.002
υ Andromedæ	4.2	G0	1	32	2.169	3.5115	-.0153	+41 0 3.03	18.074	-0.377
π Piscium	5.6	F0	1	32	48.104	3.1771	-.0049	+11 43 39.27	18.459	+0.034
υ Persei	3.8	K0	1	33	0.694	3.6695	+0.0064	+48 13 5.87	18.297	-0.119
α Eridani (<i>Achernar</i>)	0.6	B5	1	34	41.924	+2.2359	+0.0103	-57 38 53.03	+18.317	-0.041
ω Cassiopeie	5.5	A0p	1	36	19.221	4.4067	+0.0088	+67 38 2.41	18.299	-0.002
υ Piscium	4.7	K0	1	37	12.857	3.1201	-.0015	+ 5 4 41.50	18.272	+0.003
φ Persei	4.2	B0p	1	38	34.455	3.7465	+0.0031	+50 16 52.51	18.204	-0.015
τ Ceti	3.6	K0	1	40	18.268	2.7866	-.1198	-16 21 48.80	19.015	+0.559
ο Piscium	4.5	K0	1	41	6.847	+3.1654	+0.0049	+ 8 45 1.80	+18.171	+0.045
ε Sculptoris	5.4	F0	1	41	50.899	+2.8044	+0.0052	-25 27 24.73	+18.047	-0.051

13 Ceti, dup., 5=5, 6=2, 0'' 3
α Cassiop., var. irreg., 2=2, 2=8
γ Cassiop., comp. 7=6, 4'' s. pr.

β Phœnicis, dup., 4=1, 4=1, 1''
ξ Piscium, star 6=5, 24'' n. f.

κ Tucanæ, comp. 7=6, 6'' n.
ε Sculptoris, comp. 6=5, 5'' n. f.

218 MEAN PLACES OF TEN-DAY STARS, 1919.

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spect- rum.	Right Ascension.	Annual Variation.	Annual P. M.	Declination.	Annual Variation.	Annual P. M.
			h m s	s	s	° ' "	"	"
ζ Ceti	3.9	K0	1 47 27.704	+2.9602	+0.0020	-10 44 4.71	+17.855	-0.027
α Trianguli	3.6	F5	1 48 27.574	3.4143	+0.0015	+29 11 5.34	17.611	-0.231
ε Cassiopeiae	3.4	B3	1 48 33.062	4.2885	+0.0033	+63 16 18.86	17.824	-0.015
ξ Piscium	4.8	K0	1 49 21.630	3.1041	+0.0015	+ 2 47 17.41	17.827	+0.021
β Arietis	2.7	A5	1 50 9.675	3.3091	+0.0064	+20 24 45.37	17.663	-0.111
ψ Phoenicis	4.4	Mb	1 50 23.808	+2.4033	-0.0124	-46 41 57.54	+17.660	-0.104
ν Ceti	4.2	K5	1 56 11.269	2.8257	+0.0082	-21 28 11.09	17.515	-0.008
α Hydri	3.0	F0	1 56 12.608	1.8817	+0.0276	-61 57 49.28	17.549	+0.026
50 Cassiopeiae	4.1	A0	1 56 29.160	5.0687	-0.0092	+72 1 48.57	17.531	+0.029
γ Andromedæ pr.	2.3	K0	1 58 55.208	3.6728	+0.0046	+41 56 30.18	17.356	-0.051
γ Andromedæ seq.	5.1	A	Δα +0.842	....	....	Δδ + 4.57	....	....
α Arietis	2.2	K2	2 2 36.182	+3.3769	+0.0139	+23 4 48.20	+17.101	-0.144
β Trianguli	3.1	A5	2 4 43.090	3.5627	+0.0126	+34 36 17.20	17.105	-0.044
55 Cassiopeiae	6.2	F5	2 8 6.296	4.6734	-0.0020	+66 8 44.26	16.992	-0.002
6 Persei	5.4	K0	2 8 12.506	3.9757	+0.0368	+50 41 24.91	16.823	-0.167
ξ ¹ Ceti	4.5	G5	2 8 42.264	+3.1774	-0.0012	+ 8 28 2.00	+16.950	-0.016
μ Fornacis	5.2	A0	2 9 20.182	2.6377	-0.0037	-31 6 13.21	16.915	-0.022
γ Trianguli	4.1	A0	2 12 29.609	3.5596	+0.0040	+33 28 23.70	16.736	-0.032
67 Ceti	5.7	G5	2 12 56.515	2.9908	+0.0051	- 6 47 41.72	16.656	-0.110
φ Eridani	3.8	B8	2 13 36.838	2.1410	+0.0062	-51 53 12.46	16.705	-0.029
ο Ceti (Mira)	†	var.	Md 2 15 15.209	+3.0294	+0.0002	- 3 20 40.97	+16.426	-0.229
κ Fornacis	5.4	F5	2 18 50.135	2.7447	+0.0138	-24 11 2.49	16.401	-0.077
δ Hydri	4.3	A2	2 20 18.136	1.0595	-0.0097	-69 1 39.63	16.425	+0.020
ι Cassiopeiae	†	A5p	2 22 22.323	4.9083	-0.0093	+67 2 21.13	16.310	+0.018
ξ ² Ceti	4.3	A0	2 23 50.991	3.1869	+0.0025	+ 8 5 51.63	16.218	-0.007
σ Ceti	4.8	F5	2 28 14.799	+2.8416	-0.0063	-15 35 57.66	+15.894	-0.102
36 H. Cassiopeiae	5.3	K0	2 30 17.917	5.6466	-0.0052	+72 27 54.51	15.904	+0.017
ν Ceti	5.0	G5	2 31 37.258	+3.1455	-0.0025	+ 5 14 25.96	15.798	-0.018
μ Hydri	5.3	K0	2 33 21.032	-1.3413	+0.0425	-79 27 46.74	15.685	-0.008
ν Arietis	5.4	A2	2 34 12.813	+3.4028	+0.0001	+21 36 42.61	15.655	-0.031
δ Ceti	4.0	B2	2 35 19.754	+3.0735	+0.0011	- 0 1 12.51	+15.619	+0.004
ε Hydri	4.3	B9	2 38 20.292	0.9152	+0.0169	-68 36 49.84	15.454	+0.005
θ Persei	4.2	G0	2 38 39.530	4.0854	+0.0333	+48 53 12.45	15.343	-0.088
γ Ceti seq.	†	A0	2 39 6.089	3.1063	-0.0096	+ 2 53 42.48	15.255	-0.151
π Ceti	4.4	B5	2 40 15.976	2.8539	-0.0012	-14 12 3.85	15.329	-0.011
μ Ceti	4.4	A5	2 40 33.633	+3.2399	+0.0188	+ 9 46 22.69	+15.299	-0.025
η Persei	†	K0	2 44 46.664	4.3603	+0.0041	+55 33 37.25	15.072	-0.012
41 Arietis	3.7	B8	2 45 12.683	3.5257	+0.0050	+26 55 39.06	14.947	-0.111
β Fornacis	4.5	K0	2 45 42.041	2.5121	+0.0080	-32 44 44.18	15.186	+0.159
σ Arietis	5.5	B5	2 47 1.045	3.3086	+0.0016	+14 44 56.15	14.920	-0.034
τ ² Eridani	4.8	K0	2 47 21.773	+2.7201	-0.0014	-21 20 13.77	+14.917	-0.017
τ Persei	4.1	G0p	2 48 30.287	4.2388	+0.0068	+52 25 55.17	14.863	-0.003
η Eridani	4.0	K0	2 52 28.190	2.9304	+0.0060	- 9 13 11.26	14.419	-0.213
ε Arietis (mean)	†	A2	2 54 34.587	3.4261	-0.0009	+21 1 1.67	14.496	-0.010
θ Eridani	†	A2	2 55 11.518	2.2767	-0.0025	-40 37 43.35	14.492	+0.024
47 H. Cephei	5.7	Ma	2 55 15.335	+7.8671	-0.0102	+79 6 1.49	+14.475	+0.010
α Ceti	2.8	Ma	2 58 2.590	3.1336	-0.0009	+ 3 46 21.74	14.217	-0.075
τ ³ Eridani	4.2	A3	2 58 49.235	2.6449	-0.0104	-23 56 28.34	14.203	-0.044
γ Persei	3.1	G0p	2 58 55.196	4.3304	+0.0010	+53 11 25.22	14.237	-0.004
ρ Persei	†	var.	Mb 2 59 58.790	3.8366	+0.0116	+38 31 38.07	14.060	-0.115
μ Horologii	5.2	F0	3 1 41.993	+1.4082	-0.0123	-60 3 4.84	+14.015	-0.054
θ Hydri	5.5	B8	3 2 4.529	0.1030	+0.0034	-72 13 7.57	14.059	+0.014
β Persei (Algol)	†	var.	B8 3 2 53.513	3.8948	+0.0068	+40 38 40.41	13.992	-0.002
δ Arietis	4.5	K0	3 6 59.641	3.4268	+0.0110	+19 25 16.67	13.736	+0.001
12 Eridani	†	F8	3 8 37.749	2.5468	+0.0241	-29 18 20.91	14.267	+0.636
48 H. Cephei	5.5	F0	3 9 59.384	+7.5149	+0.0204	+77 26 20.41	+13.488	-0.055
ζ Arietis	5.0	A0	3 10 14.519	+3.4443	-0.0019	+20 44 42.16	+13.445	-0.082

ο Ceti, var., 331^d, 1^m.7-9^m.6, star 9^m.1.5^s
 ι Cassiop., triple, 7^m, 8^m, 2^m, 8^m
 γ Ceti, comp. 8^m.2, 2^m.7 pr.

η Persei, star 8^m.5, 28^m n. pr.
 ε Arietis, dup., 5^m.2, 5^m.6, 1^m.2
 θ Eridani, comp. 4^m.4, f. 8^m.

ρ Persei, var. irreg., 3^m.4-4^m.2
 β Persei, var., 24^m.27, 2^m.1-3^m.2
 12 Eridani, comp. 7^m, 1^m.4 n. pr.

MEAN PLACES OF TEN-DAY STARS, 1919. 219

FOR JANUARY 0^h.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spect- rum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h m s	s	s	" ' "	" "	" "
38 G. Horologii	5.7	N	3 10 29.823	+1.5151	-.0005	-57 37 28.59	+13.504	-0.008
ζ Eridani	4.9	A3	3 11 53.853	2.9126	-.0008	- 9 7 11.18	13.473	+0.053
τ Arietis	5.2	B3	3 16 32.848	3.4600	+0.0023	+20 51 21.16	13.082	-0.033
ε Eridani	4.3	G5	3 16 41.552	+2.3980	+2.808	-43 22 43.88	13.862	+0.756
ε Hydri	5.5	F2	3 17 56.939	-1.5460	+0.0351	-77 41 5.55	13.062	+0.040
α Persei	1.9	F5	3 18 31.876	+1.2709	+0.0030	+49 34 26.37	+12.955	-0.028
o Tauri	3.8	G5	3 20 27.115	3.2259	-.0046	+ 8 44 40.90	12.781	-0.074
2 H. Camelopardalis	4.4	A0	3 22 29.918	4.8403	+0.0027	+59 39 33.58	12.718	+0.001
ξ Tauri	3.8	B8	3 22 46.625	3.2489	+0.0040	+ 9 27 3.61	12.651	-0.046
f Tauri	4.3	K0	3 26 23.923	3.3095	+0.0016	+12 39 36.02	12.453	+0.002
ε Eridani	3.8	K0p	3 29 6.792	+2.8254	-.0660	- 9 43 53.62	+12.291	+0.027
τ Eridani	4.3	B8	3 30 12.499	2.6484	+0.0023	-21 54 14.13	12.149	-0.039
δ Persei	3.1	B5	3 37 9.027	4.2616	+0.0035	+47 31 47.01	11.664	-0.036
δ Eridani	3.7	K0	3 39 22.040	2.8732	-.0061	-10 2 13.01	12.274	+0.731
ν Persei	3.9	F5	3 39 41.113	4.0682	-.0004	+42 19 25.99	11.520	0.000
5 H. Camelopardalis	4.7	A0	3 41 47.039	+6.2904	+0.0059	+71 5 3.18	+11.313	-0.057
η Tauri (<i>Alcyone</i>)	3.0	B5	3 42 39.967	3.5623	+0.0016	+23 51 20.24	11.256	-0.050
τ Eridani	4.3	F8	3 43 21.756	2.5807	-.0115	-23 29 15.14	10.774	-0.481
g Eridani	4.2	K0	3 46 25.414	+2.2452	-.0036	-36 26 40.87	11.005	-0.028
γ Hydri	3.2	Ma	3 48 28.590	-0.9610	+0.0097	-74 29 14.95	10.999	+0.117
ζ Persei	2.9	B1	3 49 2.169	+3.7664	+0.0010	+31 38 38.89	+10.827	-0.014
9 H. Camelopardalis	5.2	K0p	3 50 13.126	5.0969	+0.0003	+60 52 22.62	10.737	-0.017
ε Persei	3.0	B0	3 52 24.826	4.0203	+0.0031	+39 46 37.36	10.565	-0.027
ξ Persei	4.0	Oe5	3 53 42.305	3.8878	+0.0012	+35 33 32.63	10.478	-0.017
η Eridani	3.2	K5	3 54 14.987	2.7986	+0.0047	-13 44 17.23	10.344	-0.111
λ Tauri	† var.	B3	3 56 11.446	+3.3220	+0.0002	+12 15 44.79	+10.298	-0.011
δ Reticuli	4.4	Ma	3 57 27.451	0.9416	-.0020	-61 37 41.95	10.212	-0.002
ν Tauri	3.9	A0	3 58 50.761	3.1900	+0.0008	+ 5 45 55.73	10.104	-0.008
Δ Tauri	† 4.5	K0	3 59 54.226	3.5439	+0.0069	+21 51 41.91	9.972	-0.058
c Persei	4.0	B3p	4 2 46.541	4.3485	+0.0042	+47 29 50.96	9.780	-0.032
p Tauri	5.6	F0	4 5 53.677	+3.6499	-.0024	+26 16 14.15	+ 9.531	-0.042
ε Eridani	4.1	F5	4 7 54.644	2.9275	+0.0007	- 7 2 52.24	9.503	+0.086
μ Tauri	4.3	B3	4 11 8.056	3.2560	+0.0016	+ 8 41 25.69	9.143	-0.024
α Horologii	3.8	K0	4 11 19.047	1.9875	+0.0040	-42 29 37.85	8.923	-0.230
α Reticuli	3.4	G5	4 13 22.602	0.7658	+0.0048	-62 40 34.93	9.037	+0.044
γ Tauri	3.9	K0	4 15 10.901	+3.4120	+0.0083	+15 25 58.98	+ 8.825	-0.028
δ Tauri	3.9	K0	4 18 15.670	3.4574	+0.0075	+17 21 12.87	8.579	-0.030
ν Eridani	4.1	K5	4 20 59.644	+2.2530	+0.0052	-34 12 15.70	8.435	+0.042
δ Mensæ	5.6	K0	4 23 24.703	-4.1364	+0.0043	-80 24 17.28	8.272	+0.072
ε Tauri	3.6	K0	4 23 53.088	+3.5012	+0.0082	+19 0 6.69	8.128	-0.034
m Persei	† 6.1	F0	4 27 42.688	+4.2161	+0.0012	+42 53 31.72	+ 7.859	+0.004
α Tauri (<i>Aldebaran</i>)	1.1	K5	4 31 16.239	3.4404	+0.0047	+16 20 51.07	7.379	-0.189
α Doradus	3.5	A0p	4 32 14.699	1.2950	+0.0067	-55 12 43.91	7.478	-0.011
ν Eridani	4.1	B2	4 32 16.223	2.9960	-.0005	- 3 31 1.44	7.487	0.000
53 Eridani	4.0	K0	4 34 28.138	2.7457	-.0061	-14 27 41.10	7.154	-0.154
τ Tauri	4.3	B5	4 37 22.890	+3.5991	+0.0007	+22 48 9.45	+ 7.051	-0.020
Groombridge 848	6.0	F0	4 37 54.413	8.0267	+0.0094	+75 47 45.95	6.884	-0.144
α Coeli	4.5	F2	4 37 56.985	1.9301	-.0149	-42 1 5.45	6.917	-0.106
4 Camelopardalis	5.4	A2	4 41 14.985	4.9882	+0.0062	+56 36 53.56	6.605	-0.148
μ Eridani	4.2	B5	4 41 27.089	2.9990	+0.0011	- 3 24 7.64	6.727	-0.009
τ Orionis	3.3	F8	4 45 26.492	+3.2554	+0.0312	+ 6 49 15.62	+ 6.430	+0.023
9 Camelopardalis	4.4	B0	4 45 59.338	5.9508	+0.0038	+66 12 25.02	6.366	+0.005
i Tauri	5.1	F0	4 46 38.026	3.5080	+0.0050	+18 42 11.17	6.273	-0.035
τ Orionis	3.9	B3	4 50 1.877	3.1242	+0.0002	+ 2 18 32.88	6.030	+0.005
i Aurigæ	2.9	K2	4 51 42.964	3.9044	+0.0009	+33 2 20.63	5.863	-0.021
ε Aurigæ	† var.	F5p	4 56 9.224	+4.3019	+0.0012	+43 42 17.12	+ 5.499	-0.013
β Camelopardalis	4.2	G0	4 56 12.329	+5.3273	-.0004	+60 19 32.10	+ 5.497	-0.011

8 Horologii, remarkable purplish red star.

ε Eridani, comp. 9^m, s. 7"

γ Tauri, quad., comps. 6^m.3, 7^m.6, 8^m.2, 117", 131", 190"

9 H. Camelop., comp. 8^m, 1' 9 n. f.

ε Persei, comp. 8^m, 8' 6 n. f.

λ Tauri, var., 3^d.95, 3^m.3-4^m.2

Δ Tauri, star 6^m.5 f. 39", 253" s.

m Persei, star 7^m, 115" s. pr.

ε Aurigæ, var. irreg., 3^m.3-4^m.5

220 MEAN PLACES OF TEN-DAY STARS, 1919.

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spec- trum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h m s	s	s	" ' "	"	"
ζ Aurigæ	3.9	K0p	4 56 48.782	+4.1902	+0.0013	+40 57 32.32	+5.435	-0.022
ι Tauri	4.7	A5	4 58 15.176	3.5850	+0.0056	+21 28 31.02	5.288	-0.049
11 Orionis	4.6	B9	4 59 56.357	3.4269	+0.0013	+15 17 32.63	5.157	-0.036
η Aurigæ	3.3	B3	5 0 49.935	4.2048	+0.0039	+41 7 34.42	5.046	-0.072
ε Leporis	3.3	K5	5 2 1.889	2.5385	+0.0012	-22 28 44.32	4.953	-0.064
β Eridani	2.9	A2	5 3 52.046	+2.9493	-0.0056	- 5 11 24.44	+4.786	-0.074
μ Aurigæ	4.8	A3	5 7 52.945	4.1022	-0.0020	+38 23 23.39	4.440	-0.080
19 H. Camelopardalis	5.2	F8	5 9 10.862	9.8412	-0.0275	+79 8 28.38	4.564	+0.155
μ Leporis	3.3	A0p	5 9 17.549	2.6941	+0.0027	-16 18 1.71	4.371	-0.028
β Orionis (<i>Rigel</i>)	† 0.3	B8p	5 10 38.656	2.8824	.0000	- 8 17 39.27	4.284	0.000
α Aurigæ (<i>Capella</i>)	0.2	G0	5 10 42.164	+4.4293	+0.0086	+45 55 1.38	+3.850	-0.429
λ Aurigæ	4.8	G0	5 13 26.457	4.2181	+0.0461	+40 1 42.40	3.384	-0.060
τ Orionis	3.7	B5	5 13 40.376	2.9127	-0.0009	- 6 55 51.42	4.020	-0.005
ο Columbae	4.9	K0	5 14 33.610	2.1589	+0.0027	-34 58 26.15	3.597	-0.352
γ Orionis (<i>Bellatrix</i>)	1.7	B2	5 20 47.145	3.2171	-0.0004	+ 6 16 38.37	3.396	-0.017
β Tauri	1.8	B8	5 21 10.218	+3.7916	+0.0025	+28 32 24.94	+3.203	-0.177
17 Camelopardalis	5.8	K5	5 22 30.964	5.6609	+0.0003	+63 0 4.74	3.257	-0.007
β Leporis	3.0	G0	5 24 46.481	2.5704	.0000	-20 49 23.22	2.980	-0.089
χ Aurigæ	4.9	B1	5 27 27.279	3.9042	+0.0006	+32 7 59.98	2.824	-0.013
δ Orionis	† 2.5	B0	5 27 52.066	3.0644	.0000	- 0 21 29.08	2.799	-0.002
Groombridge 966	6.4	K5	5 28 53.086	+8.0114	-0.0002	+74 59 33.91	+2.730	+0.017
α Leporis	2.7	F0	5 29 9.448	2.6458	+0.0003	-17 52 45.87	2.689	0.000
φ ¹ Orionis	4.5	B0	5 30 22.364	3.2928	-0.0002	+ 9 26 8.49	2.569	-0.015
ε Orionis	† 2.9	Oe5	5 31 28.228	2.9343	+0.0001	- 5 57 43.68	2.487	-0.002
ε Orionis	1.8	B0	5 32 6.163	3.0437	.0000	- 1 15 9.33	2.435	+0.001
ζ Tauri	3.0	B3	5 32 48.190	+3.5851	+0.0006	+21 5 39.09	+2.341	-0.032
ζ Orionis	† 2.0	B0	5 36 40.282	3.0271	+0.0005	- 1 59 4.42	2.023	-0.014
α Columbae	2.8	B5p	5 36 42.954	2.1726	+0.0006	-34 7 0.00	1.995	-0.038
ο Aurigæ	5.5	A0	5 39 37.398	4.6455	-0.0018	+49 47 31.94	1.761	-0.018
ζ Leporis	3.7	A2	5 43 17.080	2.7180	-0.0013	-14 51 4.39	1.460	-0.001
κ Orionis	2.2	B0	5 43 54.876	+2.8450	+0.0001	- 9 41 50.84	+1.402	-0.003
δ Doradus	4.5	A5	5 44 37.517	0.1025	-0.0081	-65 45 57.32	1.343	-0.001
ν Aurigæ	4.2	K0	5 45 52.513	4.1575	-0.0061	+39 7 34.19	1.248	+0.013
δ Leporis	3.9	K0	5 47 50.243	2.5797	+0.0162	-20 53 6.28	0.414	-0.649
α Orionis (<i>Betelgeux</i>)	† var.	Ma	5 50 47.179	3.2480	+0.0020	+ 7 23 34.96	0.815	+0.009
η Leporis	3.8	F5	5 52 42.926	+2.7324	-0.0028	-14 10 53.70	+0.778	+0.141
δ Aurigæ	3.9	K0	5 52 51.520	4.9420	+0.0118	+54 16 48.70	0.506	-0.118
θ Aurigæ	2.1	A0p	5 53 35.268	4.4019	-0.0038	+44 56 26.34	0.555	-0.006
β Aurigæ	† 2.7	A0p	5 54 11.868	4.0917	+0.0047	+37 12 29.40	+0.417	-0.091
1 Geminorum	4.3	G5	5 59 11.800	3.6475	+0.0002	+23 16 7.77	-0.039	-0.109
1 G. Puppis	† 6.2	F8	6 2 8.534	+1.7259	-0.0088	-45 2 9.72	+0.038	+0.225
ν Orionis	4.4	B2	6 2 56.863	3.4265	+0.0012	+14 46 45.24	-0.283	-0.025
22 H. Camelopardalis	4.7	A0	6 9 55.461	6.6179	+0.0026	+69 21 1.52	0.981	-0.114
η Geminorum	† var.	Ma	6 9 59.344	3.6227	-0.0039	+22 31 53.15	0.890	-0.016
2 Lyncis	4.4	A0	6 12 28.801	5.2983	+0.0012	+59 2 31.41	1.061	+0.000
ζ Canis Majoris	3.1	B3	6 17 12.133	+2.3019	-0.0006	-30 1 37.07	-1.527	-0.023
μ Geminorum	3.2	Ma	6 18 3.648	3.6307	+0.0046	+22 33 22.93	1.692	-0.114
ψ ¹ Aurigæ	5.1	K2	6 18 39.790	4.6257	+0.0029	+49 19 50.77	1.634	-0.004
β Canis Majoris	2.0	B1	6 19 7.938	2.6416	-0.0006	-17 54 53.01	1.668	+0.004
8 Monocerotis	† 4.5	A5	6 19 28.585	3.1802	-0.0004	+ 4 38 6.17	1.692	+0.009
α Argus (<i>Canopus</i>)	-0.9	F0	6 22 9.229	+1.3319	+0.0022	-52 39 3.89	-1.926	+0.009
10 Monocerotis	5.0	B3	6 23 57.646	2.9642	+0.0010	- 4 42 39.69	2.086	+0.006
ν Geminorum	4.1	B5	6 24 9.231	3.5629	-0.0006	+20 15 52.52	2.124	-0.016
8 Lyncis	6.0	G0	6 30 17.588	5.4913	-0.0267	+61 33 15.02	2.918	-0.276
ξ ² Canis Majoris	4.5	A0	6 31 39.717	2.5158	+0.0022	-22 53 57.30	2.726	+0.035
23 H. Camelopardalis	5.6	F8	6 32 26.159	+10.2926	-0.0281	+79 39 19.04	-3.460	-0.633
γ Geminorum	1.9	A0	6 33 1.997	+3.4670	+0.0033	+16 28 10.22	-2.927	-0.048

β Orionis, comp. 8=0.9".5 s. pr.
 δ Orionis, star 8=9.52".6 n.
 ε Orionis, comp. 7=3.11".5 s. f.

ζ Orionis, comp. 4=2.2".4 s. f.
 α Orionis, red star, var. irreg., 1=0-1=4
 θ Aurigæ, comp. 7=5.2".5 n. pr.

1 Puppis, star 5=8. f. 12", 150" s.
 ν Gem. var. 2314.4, 3=2-4=2, comp. 8=5, 1".2 n. pr.
 8 Monoc., star 6=5, 13".7 n. f.

MEAN PLACES OF TEN-DAY STARS, 1919. 221

FOR JANUARY 0^h.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spec- trum.	Right Ascension.			Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h	m	s	s	s	" ' "	"	"
51 Aurigæ	5.7	K0	6	33	2.854	+4.1595	-.0020	+39 27 48.82	- 2.993	-0.113
γ Argus	3.2	B8	6	35	17.056	1.8367	+.0008	-43 7 27.75	3.093	-0.019
8 Monocerotis	4.7	Oe5	6	36	31.054	3.3046	.0000	+ 9 58 18.15	3.189	-0.008
ε Geminorum	3.2	G5	6	38	56.975	3.6927	-.0001	+25 12 45.15	3.408	-0.018
ξ Geminorum	3.4	F5	6	40	44.633	3.3683	-.0076	+12 59 2.57	3.738	-0.193
ψ ⁵ Aurigæ	5.3	G0	6	40	54.280	+4.3295	+.0018	+43 39 33.91	- 3.399	+0.180
α Canis Majoris (<i>Sirius</i>) †	-1.6	A0	6	41	34.720	2.6434	-.0373	-16 36 15.03	4.823	-1.206
18 Monocerotis	4.7	K0	6	43	38.219	3.1280	-.0020	+ 2 30 6.60	3.809	-0.016
43 Camelopardalis	5.1	B5	6	44	58.824	6.4865	+.0021	+68 59 4.44	3.897	+0.012
α Pictoris	3.3	A5	6	47	21.711	0.6174	-.0104	-61 51 15.66	3.875	+0.238
θ Geminorum	3.6	A2	6	47	27.161	+3.9579	+.0010	+34 3 36.69	- 4.171	-0.050
τ Argus	2.8	K0	6	47	55.561	1.4883	+.0025	-50 31 4.85	4.268	-0.107
15 Lyncis	4.5	K0	6	50	16.215	5.2058	+.0021	+58 31 50.18	4.492	-0.130
θ Canis Majoris	4.2	K2	6	50	25.623	2.7880	-.0091	-11 56 10.00	4.382	-0.007
ε Canis Majoris	1.6	B1	6	55	26.532	2.3575	-.0001	-28 51 39.69	4.799	+0.003
ζ Geminorum	var.	G0	6	59	18.369	+3.5604	-.0002	+20 41 24.79	- 5.137	-0.007
σ ² Canis Majoris	3.1	B5p	6	59	38.530	2.5049	-.0006	-23 42 50.58	5.153	+0.005
γ Canis Majoris	4.1	B5	7	0	5.649	2.7147	+.0003	-15 30 45.69	5.206	-0.010
δ Canis Majoris	2.0	F8	7	5	5.807	2.4382	-.0015	-26 15 49.59	5.614	+0.003
63 Aurigæ	5.1	K2	7	6	5.255	4.1323	+.0052	+39 27 14.30	5.703	-0.003
51 Geminorum	5.3	Mb	7	8	43.313	+3.4478	+.0019	+16 17 51.06	- 5.963	-0.042
γ ² Volantis	3.9	K0	7	9	26.276	-0.5025	+.0004	-70 22 3.50	5.903	+0.078
λ Geminorum	3.6	A2	7	13	26.372	+3.4500	-.0029	+16 41 15.10	6.359	-0.045
τ Argus	2.7	K5	7	14	16.918	2.1189	-.0008	-36 57 5.73	6.393	-0.010
δ Geminorum	3.5	F0	7	15	17.258	+3.5862	-.0010	+22 7 57.40	6.482	-0.015
δ Volantis	4.0	F5	7	16	52.918	-0.0204	+.0004	-67 48 32.55	- 6.605	-0.006
ε Geminorum	3.9	K0	7	20	41.898	+3.7300	-.0086	+27 57 36.81	7.001	-0.087
η Canis Majoris	2.4	B5p	7	20	53.518	2.3738	+.0003	-29 8 39.45	6.922	+0.007
Groombridge 1308	5.8	K0	7	22	28.056	6.2715	+.0018	+68 37 58.70	7.103	-0.045
β Canis Minoris	3.1	B8	7	22	45.560	3.2553	-.0032	+ 8 27 12.68	7.129	-0.047
ρ Geminorum	4.2	F0	7	23	54.241	+3.8626	+.0118	+31 56 48.96	- 6.993	+0.183
σ Argus	3.3	K5	7	26	39.604	1.9018	-.0072	-43 8 12.52	7.220	+0.180
α ² Geminorum (<i>Castor</i>)	2.0	A0	7	29	26.068	3.8326	-.0144	+32 4 3.66	7.707	-0.082
α ¹ Geminorum	2.8	A0	Δα - 0.245					Δδ - 4.12		
25 Monocerotis	5.2	F5	7	33	15.027	2.9818	-.0066	- 3 55 44.77	7.911	+0.022
α Can. Min. (<i>Procyon</i>) †	0.5	F5	7	35	3.760	+3.1419	-.0471	+ 5 26 0.15	- 9.115	-1.037
24 Lyncis	5.0	A2	7	36	9.762	5.0917	-.0042	+58 54 5.06	8.222	-0.056
κ Geminorum	3.7	G5	7	39	33.628	3.6261	-.0014	+24 35 35.71	8.497	-0.060
β Geminorum (<i>Pollux</i>)	1.2	K0	7	40	21.720	3.6752	-.0470	+28 13 22.53	8.555	-0.055
4 Puppis	5.1	F2	7	42	13.090	2.7636	-.0003	-14 21 57.88	8.649	-0.002
ξ Argus	3.5	G0	7	45	53.258	+2.5232	-.0004	-24 39 20.43	- 8.935	0.000
φ Geminorum	5.0	A2	7	48	32.587	3.6761	-.0020	+26 58 35.82	9.169	-0.027
26 Lyncis	5.7	K0	7	48	49.294	4.3801	-.0022	+47 46 33.06	9.170	-0.006
Groombridge 1374	5.6	K0	7	50	31.767	7.2366	-.0023	+74 8 10.85	9.334	-0.037
χ Argus	3.6	B3	7	54	43.195	1.5258	-.0043	-52 45 53.15	9.614	+0.006
ω Cancri	5.9	K0	7	56	1.942	+3.6334	+.0003	+25 36 56.00	- 9.725	-0.004
χ Geminorum	5.0	K0	7	58	32.819	3.6897	-.0012	+28 1 20.69	9.965	-0.053
27 Lyncis	4.9	A2	8	2	22.454	4.5282	-.0032	+51 44 29.40	10.204	-0.003
ρ Argus	2.9	F5	8	4	5.646	2.5547	-.0065	-24 4 11.74	10.279	+0.052
3 H. Ursæ Majoris	5.5	G5	8	4	46.259	6.0071	+.0002	+68 42 51.13	10.377	+0.005
γ Argus	2.2	Oap	8	7	2.246	+1.8498	-.0003	-47 5 50.89	-10.562	-0.011
ζ Cancri (<i>mean</i>)	4.7	G0	8	7	34.130	3.4441	+.0051	+17 53 35.32	10.719	-0.129
Bradley 1147	5.7	G5	8	9	24.306	7.6103	+.0077	+76 0 21.71	10.734	-0.008
20 Puppis	5.0	G5	8	9	36.588	2.7579	-.0009	-15 32 36.06	10.740	+0.001
β Cancri	3.8	K2	8	12	7.426	3.2554	-.0035	+ 9 26 9.98	10.979	-0.052
31 Lyncis	4.4	F5	8	17	17.895	+4.1196	+.0015	+43 26 56.90	-11.403	-0.100
d ¹ Cancri	5.9	F0	8	18	43.693	+3.4386	-.0038	+18 35 35.44	-11.437	-0.031

8 Monoc., comp. 8^m.8, 2^m.9 s. pr. γ² Volantis, comp. 5^m.8, 12^m.9 n. pr. γ Argus, star 5^m, 42^m.5 s. pr.
15 Lyncis, dup., 4^m.9, 6^m.2, 0^m.7 δ Gem., comp. 8^m, 7^m.0 s. pr. { Cancri, triple; binary 5^m.8, 6^m.3, 1^m.
ε Can. Maj., comp. 9^m, 7^m.8 s. f. σ Argus, star 8^m, 22^m.4 n. f. with comp. 6^m.3, 5^m.4 s. f.
ζ Gem., var., 10^m.15, 3^m.7-4^m.3 α Gem., comp. 8^m.5, 6^m.6 s. pr.

Positions given for *Sirius* and *Procyon* are those of the centers of their orbits. Corrections given on page x remain to be applied to reduce to the positions of the stars.

222 MEAN PLACES OF TEN-DAY STARS, 1919.

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spect- rum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h m s	s	s	° ' "	"	"
ε Argus	1.7	K0p	8 20 51.181	+1.2334	-.0042	-59 14 54.66	-11.551	+0.008
30 Monocerotis	4.0	A0	8 21 36.867	+2.9995	-.0039	- 3 38 28.68	11.632	-0.020
θ Chamæleontis	4.3	K0	8 23 5.617	-1.7538	-.0451	-77 13 25.62	11.700	+0.018
ο Ursæ Majoris	3.5	G0	8 23 32.950	+5.0091	-.0160	+60 59 25.06	11.862	-0.112
Groombridge 1450	6.0	K0	8 27 39.352	3.9082	-.0082	+38 17 42.76	12.218	-0.179
η Cancrī	5.5	K0	8 28 1.657	+3.4738	-.0025	+20 43 1.89	-12.120	-0.055
Groombridge 1446	6.3	K0	8 30 44.168	6.7360	-.0043	+73 54 51.78	12.371	-0.117
δ Hydræ	4.2	A0	8 33 22.176	3.1779	-.0048	+ 5 59 13.42	12.449	-0.014
σ Hydræ	4.5	K0	8 34 31.520	3.1380	-.0008	+ 3 37 36.15	12.527	-0.013
γ Cancrī	4.7	A0	8 38 36.107	3.4763	-.0071	+21 45 38.51	12.834	-0.043
δ Cancrī	4.2	K0	8 40 5.083	+3.4133	-.0009	+18 27 10.21	-13.130	-0.240
α Pyxidīs	3.7	B2	8 40 20.206	2.4111	-.0003	-32 53 37.47	12.897	+0.011
ι Cancrī	4.2	G5	8 41 48.010	3.6371	-.0006	+29 3 25.49	13.055	-0.051
δ Argus	2.0	A0	8 42 27.805	1.6516	-.0035	-54 24 40.77	13.149	-0.100
ε Hydræ	3.5	F8	8 42 29.300	3.1795	-.0127	+ 6 43 0.76	13.099	-0.048
σ² Cancrī (mean)	5.5	K0	8 49 18.425	+3.6671	+ .0034	+30 53 13.47	-13.519	-0.021
ζ Hydræ	3.3	K0	8 51 6.851	3.1741	-.0060	+ 6 15 16.60	13.607	+0.007
ι Ursæ Majoris	3.1	A5	8 53 40.201	4.1209	-.0435	+48 21 38.19	14.026	-0.248
α Cancrī	4.3	A3	8 54 3.562	3.2842	+ .0024	+12 10 19.25	13.844	-0.042
b¹ Carinæ	5.1	B3	8 54 59.435	1.4679	-.0034	-58 54 59.42	13.880	-0.019
κ Ursæ Majoris	3.7	A0	8 58 6.216	+4.1089	-.0027	+47 28 40.07	-14.123	-0.067
σ² Ursæ Majoris	4.9	F8	9 3 17.278	5.3168	-.0003	+67 27 52.65	14.442	-0.066
κ Cancrī	5.1	B8	9 3 21.729	3.2523	-.0012	+10 59 41.70	14.393	-0.013
λ Argus	2.2	K5	9 5 0.963	2.2064	-.0015	-43 6 18.77	14.487	-0.007
θ Hydræ	3.8	A0	9 10 9.107	3.1234	+ .0088	+ 2 39 24.36	15.100	-0.312
β Argus	1.8	A0	9 12 19.002	+0.6685	-.0310	-69 23 0.47	-14.821	+0.094
83 Cancrī	6.6	F5	9 14 27.838	3.3531	-.0076	+18 2 57.98	15.176	-0.136
ι Argus	2.2	F0	9 14 55.198	1.6040	-.0055	-58 56 5.68	15.060	+0.006
40 Lyncis	3.3	K5	9 16 7.530	3.6624	-.0178	+34 44 9.16	15.123	+0.012
θ Pyxidīs	4.9	Ma	9 17 54.186	2.6515	-.0048	-25 37 13.95	15.269	-0.032
α Hydræ	2.2	K2	9 23 36.448	+2.9486	-.0010	- 8 18 24.48	-15.523	+0.033
h Ursæ Majoris	3.8	F0	9 25 9.712	4.7611	+ .0183	+63 25 1.11	15.618	+0.024
d Ursæ Majoris	4.6	G0	9 27 20.888	5.3535	-.0112	+70 11 14.68	15.690	+0.071
θ Ursæ Majoris	3.3	F8	9 27 26.972	4.0282	-.1026	+52 2 50.49	16.309	-0.543
ψ Argus	3.6	F5	9 27 30.401	2.3596	-.0181	-40 6 42.94	15.731	+0.038
ξ Leonis	5.1	G5	9 27 34.920	+3.2365	-.0063	+11 39 33.18	-15.857	-0.084
10 Leonis Minoris	4.6	G5	9 29 16.020	3.6839	+ .0011	+36 45 28.79	15.885	-0.021
ο Leonis	3.8	F5p	9 36 49.779	3.2046	-.0096	+10 15 41.67	16.292	-0.033
θ Antilæ	5.0	F5	9 40 35.426	2.6733	-.0036	-27 23 53.09	16.421	+0.029
ε Leonis	3.1	G0p	9 41 15.414	3.4102	-.0034	+24 8 52.02	16.505	-0.022
υ Argus	3.2	F0	9 45 4.691	+1.5006	-.0025	-64 41 46.09	-16.688	-0.017
υ Ursæ Majoris	3.9	F0	9 45 14.613	4.2889	-.0382	+59 25 13.85	16.836	-0.157
6 Sextantis	6.0	A3	9 47 9.185	3.0244	+ .0011	- 3 51 47.18	16.799	-0.028
μ Leonis	4.1	K0	9 48 9.588	3.4163	-.0171	+26 23 20.77	16.873	-0.054
Groombridge 1586	6.0	K0	9 51 10.444	5.4218	-.0197	+73 15 55.72	17.021	-0.080
19 Leonis Minoris	5.2	F5	9 52 43.766	+3.6836	-.0111	+41 26 31.54	-17.055	-0.022
φ Argus	3.7	B5	9 54 0.964	2.1020	-.0033	-54 10 55.33	17.113	-0.020
π Leonis	4.9	Ma	9 55 56.064	3.1719	-.0029	+ 8 26 0.29	17.205	-0.027
η Leonis	3.6	A0p	10 2 55.041	3.2722	-.0022	+17 9 29.56	17.491	-0.004
α Leonis (Regulus)	1.3	B8	10 4 3.617	3.1978	-.0169	+12 21 48.93	17.536	-0.002
λ Hydræ	3.8	K0	10 6 38.353	+2.9247	-.0137	-11 57 11.34	-17.730	-0.088
γ Velorum	4.1	A2	10 11 19.913	2.5134	-.0153	-41 43 12.88	17.802	+0.032
32 Ursæ Majoris	5.7	A3	10 12 10.218	4.3888	-.0140	+65 30 47.09	17.879	-0.012
ζ Leonis	3.6	F0	10 12 11.322	3.3415	+ .0014	+23 49 17.39	17.877	-0.009
λ Ursæ Majoris	3.5	A0	10 12 13.157	3.6295	-.0142	+43 19 10.15	17.907	-0.038
γ Leonis pr.	2.6	K0	10 15 30.561	+3.3110	+ .0212	+20 15 6.41	-18.149	-0.152
μ Ursæ Majoris	3.2	K5	10 17 30.616	+3.5845	-.0068	+41 54 26.65	-18.047	+0.027

ι Cancrī, star 6^m.6, 30ⁿ.6 n. pr.

δ Argus, comp. 5^m, 2ⁿ s.

ε Hydræ, triple; binary 3^m.5, 6^m.5, 0ⁿ.2, with comp. 7^m.8, 3ⁿ.3

σ² Cancrī, dup., 5^m.9, 6^m.4, 1ⁿ.4

b¹ Carinæ, comp. 7^m.2, 5ⁿ f.

σ² Urs. Maj., binary, 4^m.9, 8^m, 1ⁿ.3

ψ Argus, dup., 3^m.8, 6^m.0, 0ⁿ.8

υ Argus, comp. 6^m.6, 4ⁿ.9 s. f.

γ Leonis, comp. 3^m.8, 3ⁿ.7 s. f.

MEAN PLACES OF TEN-DAY STARS, 1919. 223

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spec- trum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h m s	s	s	" ' "	"	"
30 H. Ursæ Majoris . . .	4.9	A0	10 18 18.879	+4.3574	-.0024	+65 58 35.99	-18.122	-0.018
μ Hydræ . . .	4.1	K5	10 22 10.338	2.9007	-.0089	-16 25 20.32	18.326	-0.079
31 Leonis Minoris . . .	4.4	K0	10 23 12.334	3.4780	-.0094	+37 7 21.62	18.396	-0.112
α Antliæ . . .	4.4	K5	10 23 26.600	2.7428	-.0060	-30 39 19.18	18.315	-0.023
36 Ursæ Majoris . . .	4.8	F5	10 25 27.290	3.8582	-.0208	+56 23 46.95	18.403	-0.039
9 H. Draconis . . .	5.0	G5	10 28 15.102	+5.1738	-.0084	+76 7 51.11	-18.470	-0.009
ρ Leonis . . .	3.8	B0p	10 28 32.882	3.1613	-.0004	+ 9 43 25.99	18.474	-0.003
33 Sextantis . . .	6.4	K0	10 37 16.940	3.0518	-.0100	- 1 18 54.52	18.864	-0.110
41 Leonis Minoris . . .	5.0	A2	10 39 0.909	3.2664	-.0084	+23 36 46.33	18.797	+0.009
θ Argus . . .	3.0	B0	10 40 3.754	2.1332	-.0043	-63 58 13.43	18.865	-0.027
42 Leonis Minoris . . .	5.4	B9	10 41 21.897	+3.3416	-.0024	+31 6 33.50	-18.918	-0.041
η Argus . . .	var.	Pec.	10 41 54.877	2.3217	-.0002	-59 15 30.38	18.902	-0.009
μ Argus . . .	†	G5	10 43 16.907	2.5744	+0.0066	-48 59 31.96	19.014	-0.081
ι Leonis . . .	5.3	A0	10 45 0.099	3.1561	+0.0001	+10 58 26.64	19.015	-0.033
δ ² Chamæleontis . . .	†	B3	10 45 2.198	0.5901	-.0192	-80 6 46.61	18.986	-0.004
ν Hydræ . . .	3.3	Ma	10 45 37.607	+2.9584	+0.0061	-15 46 9.24	-18.788	+0.211
46 Leonis Minoris . . .	3.9	K0	10 48 47.199	3.3625	+0.0074	+34 39 6.97	19.368	-0.283
54 Leonis . . .	†	A0	10 51 13.823	3.2524	-.0060	+25 10 55.59	19.167	-0.018
ε Antliæ . . .	4.7	K0	10 52 56.700	2.7966	+0.0112	-36 42 7.54	19.331	-0.138
Groombridge 1706 . . .	6.3	G5	10 53 31.007	4.8767	-.0264	+78 12 16.06	19.243	-0.035
α Crateris . . .	4.2	K0	10 55 49.578	+2.9209	-.0327	-17 52 2.57	-19.157	+0.108
δ Leonis . . .	5.0	K0	10 56 22.678	3.0990	+0.0004	+ 4 3 9.49	19.300	-0.022
β Ursæ Majoris . . .	2.4	A0	10 56 57.873	3.6382	+0.0105	+56 49 0.82	19.266	+0.026
α Ursæ Majoris . . .	2.0	K0	10 58 44.585	3.7254	-.0164	+62 11 18.89	19.404	-0.071
χ Leonis . . .	4.7	F0	11 0 50.397	3.0959	-.0234	+ 7 46 27.54	19.422	-0.041
p ⁴ Leonis . . .	5.7	K0	11 2 46.368	+3.0612	-.0253	+ 2 23 44.26	-19.504	-0.080
ψ Ursæ Majoris . . .	3.2	K0	11 5 7.006	3.3837	-.0053	+44 56 17.80	19.506	-0.033
β Crateris . . .	4.5	A2	11 7 40.321	2.9480	.0000	-22 23 0.66	19.631	-0.106
δ Leonis . . .	2.6	A2	11 9 48.213	3.1947	+0.0108	+20 58 3.59	19.707	+0.141
θ Leonis . . .	3.4	A0	11 9 59.460	3.1501	-.0049	+15 52 21.01	19.655	-0.085
ν Ursæ Majoris . . .	3.7	K0	11 14 6.492	+3.2471	-.0018	+33 32 11.51	-19.618	+0.026
δ Crateris . . .	3.8	K0	11 15 17.371	2.9977	-.0088	-14 20 24.13	19.470	+0.195
σ Leonis . . .	4.1	A0	11 16 57.650	3.0948	-.0062	+ 6 28 24.68	19.705	-0.013
π Centauri . . .	4.3	B5	11 17 18.453	2.7274	-.0041	-54 2 49.08	19.711	-0.013
ι Leonis . . .	†	F5	11 19 42.148	3.1284	+0.0103	+10 58 32.03	19.819	-0.083
τ Leonis . . .	5.2	K0	11 23 46.327	+3.0857	+0.0008	+ 3 18 9.05	-19.812	-0.016
λ Draconis . . .	4.1	Ma	11 26 36.816	3.5921	-.0072	+69 46 41.85	19.854	-0.021
ξ Hydræ . . .	3.7	G5	11 29 0.898	2.9469	-.0158	-31 24 33.85	19.917	-0.055
λ Centauri . . .	3.3	B9	11 32 2.145	2.7520	-.0073	-62 34 17.72	19.923	-0.027
ν Leonis . . .	4.5	K0	11 32 48.085	3.0716	.0000	- 0 22 35.07	19.865	+0.039
π Chamæleontis . . .	5.7	F0	11 33 54.643	+2.4556	-.0323	-75 26 53.34	-19.938	-0.023
3 Draconis . . .	5.5	K0	11 37 58.134	3.3698	-.0080	+67 11 35.76	19.918	+0.035
ζ Crateris . . .	4.9	G5	11 40 39.305	3.0381	+0.0018	-17 54 1.32	20.015	-0.041
χ Ursæ Majoris . . .	3.8	K0	11 41 46.807	3.1787	-.0128	+48 13 42.81	19.962	+0.020
β Leonis (<i>Denebola</i>) . . .	2.2	A2	11 44 55.777	3.0621	-.0341	+15 1 29.68	20.120	-0.118
β Virginis . . .	3.8	F8	11 46 28.561	+3.1252	+0.0494	+ 2 13 16.59	-20.285	-0.275
Groombridge 1830 . . .	6.5	G5	11 48 18.943	3.4665	+0.3400	+38 18 0.49	25.803	-5.784
γ Ursæ Majoris . . .	2.5	A0	11 49 34.690	3.1683	+0.0115	+54 8 42.43	20.020	+0.004
π Virginis . . .	4.6	A3	11 56 43.329	3.0742	-.0009	+ 7 3 57.57	20.075	-0.032
σ Virginis . . .	4.2	G5	12 1 5.021	3.0569	-.0148	+ 9 10 57.92	20.013	+0.032
δ Centauri . . .	2.9	B3p	12 4 9.180	+3.0968	-.0050	-50 16 17.34	-20.072	-0.030
ε Corvi . . .	3.2	K0	12 5 57.370	3.0818	-.0051	-22 10 9.67	20.036	+0.003
4 H. Draconis . . .	5.1	A5	12 8 25.338	2.8430	+0.0026	+78 3 58.69	20.012	+0.019
δ Crucis . . .	3.1	B3	12 10 50.417	3.1771	+0.0021	-58 17 55.45	20.061	-0.038
δ Ursæ Majoris . . .	3.4	A2	12 11 25.585	2.9832	+0.0150	+57 28 57.47	20.015	+0.005
γ Corvi . . .	2.8	B8	12 11 38.269	+3.0821	-.0114	-17 5 31.84	-20.003	+0.017
2 Canum Venaticorum . . .	†	K5	12 12 4.386	+3.0151	+0.0038	+41 6 39.14	-20.063	-0.046

γ Argus, var. irreg., 1^m.6-0^m.6
μ Argus, comp. 7^m, 2ⁿ.2 n. l.

δ² Cham., star 5^m.5 pr. 32ⁿ. 256ⁿ n.
54 Leonis, comp. 6^m.3, 6ⁿ.4 s. l.

ι Leonis, comp. 6^m.8, 2ⁿ.6 n. l.
2 Can. Ven., star 8^m, 11ⁿ.8 s. p.

224 MEAN PLACES OF TEN-DAY STARS, 1919.

FOR JANUARY 04.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spec- trum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h m s	s	s	° ' "	"	"
β Chamæleontis . . .	4.4	B5	12 13 33.732	+3.4553	-.0188	-78 51 44.92	-19.993	+0.017
η Virginis . . .	4.0	A0	12 15 45.707	3.0695	-.0036	- 0 13 0.36	20.025	-0.027
α^1 Crucis . . .	1.6	B1	12 22 4.810	3.3148	-.0064	-62 39 1.41	19.992	-0.039
α^2 Crucis . . .	2.1		$\Delta\alpha + 0.625$	....	....	$\Delta\delta - 1.84$	....	....
20 Comæ . . .	5.7	A2	12 25 39.253	3.0180	+.0036	+21 20 40.27	19.956	-0.036
δ Corvi . . .	3.1	A0	12 25 40.268	+3.1017	-.0140	-16 3 52.62	-20.068	-0.149
γ Crucis . . .	1.6	Mb	12 26 39.638	3.3057	-.0028	-56 39 34.58	20.170	-0.261
8 Canum Venaticorum . . .	4.3	G0	12 29 54.050	2.8556	-.0617	+41 47 50.62	19.596	+0.279
κ Draconis . . .	3.9	B5p	12 30 2.077	2.5755	-.0112	+70 14 4.53	19.863	+0.010
β Corvi . . .	2.8	G5	12 30 7.697	3.1461	-.0008	-22 56 56.27	19.934	-0.061
24 Comæ seq. . .	5.2	K0	12 31 4.052	+3.0104	-.0007	+18 49 21.81	-19.848	+0.013
α Muscæ . . .	2.9	B3	12 32 20.162	3.5456	-.0088	-68 41 21.93	19.875	-0.029
χ Virginis . . .	4.8	K0	12 35 3.824	3.0940	-.0056	- 7 33 0.02	19.842	-0.031
γ Centauri . . .	2.4	A0	12 37 2.544	3.2963	-.0196	-48 30 54.69	19.803	-0.020
γ Virginis (mean) . . .	2.9	F0	12 37 33.369	3.0400	-.0365	- 1 0 19.17	19.773	+0.004
ρ Virginis . . .	5.0	A0	12 37 47.123	+3.0372	+.0058	+10 40 54.12	-19.880	-0.107
76 Ursæ Majoris . . .	5.9	A0	12 38 1.913	2.6299	-.0065	+63 9 27.31	19.788	-0.018
β Crucis . . .	1.5	B1	12 42 58.614	3.4849	-.0064	-59 14 46.59	19.727	-0.033
31 Comæ . . .	5.1	G0	12 47 45.254	2.9236	-.0022	+27 58 52.25	19.636	-0.024
n Centauri . . .	4.3	A5	12 48 56.689	3.3141	+.0060	-39 44 19.02	19.625	-0.035
ϵ Ursæ Majoris (Alioth) . . .	1.7	A0p	12 50 28.231	+2.6471	+.0138	+56 23 57.31	-19.574	-0.013
δ Virginis . . .	3.7	Ma	12 51 31.350	3.0209	-.0318	+ 3 50 14.59	19.601	-0.060
α Canum Venat. seq. . .	2.9	A0p	12 52 14.477	2.8100	-.0203	+38 45 20.03	19.478	+0.049
δ Muscæ . . .	3.6	K2	12 56 40.410	4.0784	+.0497	-71 6 44.10	19.466	-0.031
ϵ Virginis . . .	3.0	K0	12 58 8.687	2.9865	-.0186	+11 23 39.18	19.389	+0.015
θ Virginis . . .	4.4	A0	13 5 45.242	+3.1035	-.0029	- 5 6 24.79	-19.266	-0.040
43 Comæ . . .	4.3	G0	13 8 5.723	2.8022	-.0599	+28 17 18.47	18.288	+0.879
20 Canum Venaticorum . . .	4.7	F0	13 13 54.838	2.6951	-.0094	+40 59 55.61	18.997	+0.015
γ Hydræ . . .	3.3	G5	13 14 30.850	3.2562	+.0046	-22 44 40.30	19.048	-0.053
ι Centauri . . .	2.9	A2	13 16 2.190	3.3629	-.0294	-36 17 7.50	19.049	-0.097
ζ^1 Ursæ Maj. (Mizar) . . .	2.4	A0p	13 20 40.092	+2.4214	+.0153	+55 20 52.99	-18.845	-0.030
ζ^2 Ursæ Majoris . . .	4.0	A0	$\Delta\alpha + 0.917$	....	....	$\Delta\delta - 12.41$	....	....
α Virginis (Spica) . . .	1.2	B2	13 20 55.405	3.1575	-.0028	-10 44 19.88	18.841	-0.032
Groombridge 2001 . . .	6.1	K5	13 24 3.964	1.5246	+.0012	+72 48 42.44	18.730	-0.019
70 Virginis . . .	5.2	G5	13 24 28.095	2.9340	-.0168	+14 12 39.66	19.283	-0.584
ζ Virginis . . .	3.4	A2	13 30 33.844	+3.0548	-.0195	- 0 10 55.69	-18.461	+0.040
17 H. Canum Venaticorum . . .	5.0	F0	13 31 10.935	2.6813	+.0073	+37 35 49.58	18.484	-0.004
ϵ Centauri . . .	2.6	B1	13 34 44.693	3.7826	-.0039	-53 3 18.70	18.396	-0.039
m Virginis . . .	5.2	Ma	13 37 21.492	3.1456	-.0073	- 8 17 41.03	18.231	+0.032
τ Boötis . . .	4.5	F5	13 43 24.772	2.8508	-.0341	+17 51 35.76	18.013	+0.026
η Ursæ Majoris (Alkaid) . . .	1.9	B3	13 44 21.076	+2.3676	-.0118	+49 43 1.52	-18.026	-0.022
89 Virginis . . .	5.1	K0	13 45 27.996	3.2547	-.0077	-17 43 52.12	18.000	-0.040
ζ Centauri . . .	3.1	B2p	13 50 28.678	3.7275	-.0070	-46 53 25.05	17.825	-0.064
η Boötis . . .	2.8	G0	13 50 49.681	2.8567	-.0044	+18 48 11.75	18.110	-0.363
θ Apodis . . .	var.	Mb	13 57 23.197	5.7520	-.0293	-76 24 23.83	17.502	-0.029
11 Boötis . . .	6.1	A3	13 57 30.172	+2.7214	-.0060	+27 46 38.10	-17.463	+0.005
τ Virginis . . .	4.3	A2	13 57 31.371	3.0516	+.0010	+ 1 56 9.56	17.496	-0.029
β Centauri . . .	0.9	B1	13 58 5.649	4.2092	-.0033	-59 58 58.48	17.475	-0.033
π Hydræ . . .	3.5	K0	14 1 45.264	3.4103	+.0031	-26 17 34.04	17.429	-0.146
θ Centauri . . .	2.3	K0	14 1 54.559	3.5209	-.0437	-35 58 19.44	17.800	-0.525
α Draconis . . .	3.6	A0	14 2 11.802	+1.6246	-.0071	+64 45 45.51	-17.252	+0.011
d Boötis . . .	4.8	F5	14 6 42.338	2.7370	-.0014	+25 28 29.02	17.137	-0.078
κ Virginis . . .	4.3	K0	14 8 34.350	+3.1973	+.0006	- 9 53 50.27	16.840	+0.132
4 Ursæ Minoris . . .	5.0	K0	14 9 8.497	-0.2736	-.0108	+77 55 41.04	16.921	+0.026
ι Virginis . . .	4.2	F5	14 11 45.878	+3.1429	-.0013	- 5 36 52.32	17.250	-0.427
α Boötis (Arcturus) . . .	0.2	K0	14 11 57.972	+2.7356	-.0779	+19 36 12.75	-18.816	-2.004
λ Boötis . . .	4.3	A0	14 13 18.371	+2.2829	-.0172	+46 27 35.07	-16.598	+0.151

δ Corvi, star 8^m, 24".4 s. pr.
 γ Crucis, star 6^m.8, 85" n. f.
24 Comæ, star 6^m.7, 20".6 pr.
 γ Cent., dup., 3^m.1, 3^m.1, 1".7

γ Virginis, binary, 3^m.7, 3^m.7, 6".4,
P=324"
 α Can. Ven., star 5^m, 19".8 s. pr.
 θ Virginis, comp. 9^m, 7".1 n. pr.

ζ^1 Urs. Maj., star Alcor 4^m.0, f. 79^m.0,
222" n.
 θ Apodis, var. irreg., 5^m.5-6^m.6

MEAN PLACES OF TEN-DAY STARS, 1919. 225

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spectro- trum.	Right Ascension.	Annual Variation.	Annual P. M.	Declination.	Annual Variation.	Annual P. M.
			h m s	s	s	" ' "	"	"
ginis	4.6	A2	14 14 43.394	+3.2414	-.0024	-12 59 56.03	-16.660	+0.021
ræ	6.3	K0	14 19 3.926	3.2242	-.0014	-11 20 40.97	16.533	-0.067
itis	4.1	F8	14 22 26.416	2.0433	-.0254	+52 13 28.79	16.702	-0.405
itis	5.4	A5	14 22 41.283	2.7902	-.0052	+19 35 25.57	16.270	+0.015
ginis	5.0	K0	14 24 1.637	+3.0893	-.0090	-1 51 55.59	16.220	-0.004
æ Minoris	4.4	K2	14 27 40.660	-0.1581	+0.0022	+76 3 22.13	-16.004	+0.021
itis	3.8	K0	14 28 20.381	+2.5864	-.0073	+30 43 34.97	15.877	+0.113
itis	3.0	F0	14 28 49.034	2.4171	-.0091	+38 39 43.26	15.821	+0.145
tauri	2.6	B3p	14 30 21.420	3.7984	-.0032	-41 48 9.76	15.916	-0.032
itis	4.5	F0	14 31 9.262	2.6131	+0.0150	+30 5 47.16	15.716	+0.125
tauri	0.1	G0	14 34 5.166	+4.0576	-.4863	-60 30 6.63	-14.980	+0.722
itis	5.4	A0	14 35 49.437	2.2341	-.0056	+44 45 12.27	15.631	-0.043
odis	3.8	K5	14 37 43.585	7.3126	-.0088	-78 42 8.50	15.506	-0.024
ginis	4.0	F5	14 38 47.368	3.1501	+0.0071	-5 18 24.29	15.745	-0.322
itis	2.7	K0p	14 41 26.975	2.6203	-.0035	+27 24 54.04	15.264	+0.009
ginis	3.8	A0	14 42 9.149	+3.0314	-.0074	+2 14 0.63	-15.269	-0.035
ræ	5.3	F5	14 46 12.189	3.3139	-.0073	-15 39 40.19	15.075	-0.074
ræ	2.9	A2	14 46 23.636	3.3144	-.0078	-15 42 21.34	15.067	-0.077
ombridge 2164	5.7	K2	14 49 22.965	+1.5205	-.0165	+59 37 21.82	14.698	+0.118
æ Minoris	2.2	K5	14 50 55.657	-0.2007	-.0065	+74 29 11.37	14.721	+0.003
ræ	5.6	K0	14 52 22.182	+3.2510	-.0006	-11 5 0.81	-14.639	-0.001
zzi 221	5.8	A0	14 52 23.753	2.8299	-.0021	+14 46 22.53	14.647	-0.011
pi	2.8	B2p	14 53 13.008	3.9147	-.0070	-42 48 31.36	14.649	-0.062
ræ	var.	A0	14 56 38.497	3.2017	-.0051	-8 11 53.93	14.962	-0.015
itis	3.6	G5	14 58 53.702	2.2600	-.0036	+40 42 33.88	14.286	-0.040
rprii	3.4	Ma	14 59 19.523	+3.5067	-.0056	-24 57 51.73	-14.263	-0.048
itis	4.7	K0	15 0 58.475	2.5704	-.0133	+27 15 45.97	14.127	-0.014
itis	5.0	F0	15 3 44.596	2.6348	+0.0136	+25 11 1.84	14.125	-0.184
pi	3.5	K0	15 6 27.405	4.2839	-.0126	-51 47 30.31	13.835	-0.066
ræ	4.7	A0p	15 7 36.022	3.4148	-.0031	-19 29 10.09	13.750	-0.053
pentis	5.4	K0	15 11 9.668	+2.9802	-.0017	+5 14 21.45	-13.472	-0.005
anguli Australis	3.1	A0	15 11 19.475	5.5583	-.0137	-68 22 54.18	13.498	-0.042
itis	3.5	K0	15 12 14.245	2.4193	+0.0075	+33 36 58.54	13.523	-0.125
ræ	2.7	B8	15 12 38.743	+3.2253	-.0066	-9 5 5.52	13.395	-0.024
æ Minoris	3.1	A2	15 20 50.833	-0.1128	-.0020	+72 7 19.86	12.815	+0.013
itis pr.	4.5	F0	15 21 25.828	+2.2664	-.0121	+37 39 38.09	-12.708	+0.081
pentis	5.5	Ma	15 22 1.883	2.7802	-.0024	+15 42 43.20	12.772	-0.024
iconis	3.5	K0	15 23 7.660	1.3339	+0.0014	+59 14 57.64	12.665	+0.010
ræ	5.9	K0	15 23 41.112	3.3793	+0.0006	-16 26 6.06	12.680	-0.043
onæ Borealis	3.7	Fp	15 24 29.370	2.4739	-.0130	+29 23 3.08	12.503	+0.078
itis	5.2	K5	15 28 1.192	+2.1553	+0.0016	+41 6 30.63	-12.354	-0.014
pi (mean)	3.0	B3	15 29 44.205	3.9882	-.0020	-40 53 44.58	12.270	-0.049
ræ	4.0	K0	15 30 59.562	3.3529	+0.0047	-14 31 12.57	12.127	+0.006
onæ Borealis	2.3	A0	15 31 15.471	2.5395	+0.0090	+26 59 11.37	12.215	-0.100
onæ Borealis seq.	5.1	B8	15 36 19.671	2.2597	-.0005	+36 53 53.18	11.771	-0.012
pentis	2.8	K0	15 40 16.608	+2.9533	+0.0089	+6 40 46.62	-11.435	+0.042
pentis	3.7	A2	15 42 26.951	2.7687	+0.0054	+15 40 27.91	11.377	-0.055
pentis	4.3	K5	15 45 5.563	2.0997	-.0035	+18 23 26.88	11.229	-0.099
pentis	3.6	A0	15 45 23.463	3.1287	-.0058	-3 10 59.66	11.136	-0.028
Draconis	5.1	A2	15 45 25.684	0.9081	+0.0047	+62 50 58.31	11.174	-0.068
pentis	3.8	A0	15 46 46.602	+2.9886	+0.0081	+4 43 14.98	-10.937	+0.070
æ Minoris	4.3	A2	15 46 55.296	-2.1957	+0.0082	+78 2 39.38	11.000	-0.004
anguli Australis	3.0	F0	15 47 59.525	+5.2607	-.0290	-63 10 55.58	11.326	-0.408
ræ	5.1	B3	15 48 37.706	3.4780	-.0017	-19 55 33.86	10.918	-0.046
pentis	3.9	F8	15 52 42.646	2.7699	+0.0212	+15 55 30.52	11.858	-1.289
rprii	3.0	B2p	15 53 56.891	+3.6245	-.0010	-25 52 55.16	-10.526	-0.048
onæ Borealis	4.2	K0	15 54 13.973	+2.4824	-.0065	+27 6 41.85	-10.523	-0.067

is, comp. 9^m, 4^m.5 s. f. | δ I. Ibræ, var., 24.33, 4^m.8-6^m.2 | γ I. Iupl. binary, 3^m.7, 3^m.9, 0^m.4
, comp. 5^m.1, 2^m.8 n. pr. | μ Boötis, star 6^m.7, 10^m.8 s. | } Cor. Bor., comp. 6^m.0, 6^m.2 n. pr.
tauri, dup., 0^m.3, 1^m.7: companion s. pr. The position given is that of the center of gravity of the system.
is given on page x remain to be applied to reduce to the position of α Centauri.

226 MEAN PLACES OF TEN-DAY STARS, 1919.

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spec- trum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.
			h m s	s	s	° ' "	"
δ Scorpii	2.5	B1p	15 55 32.417	+3.5429	-.0011	-22 23 31.98	-10.393
θ Draconis	4.1	F8	16 0 22.222	1.1222	-.0392	+58 46 52.48	9.656
β Scorpii	2.9	B1	16 0 43.408	3.4841	-.0011	-19 35 5.00	9.996
κ Herculis	5.3	G5	16 4 25.048	2.7053	-.0039	+17 15 42.02	9.709
Groombridge 2320	5.4	A0	16 6 5.780	0.1544	-.0074	+68 1 23.98	9.506
φ Herculis	4.3	A0	16 6 13.044	+1.8899	-.0017	+45 8 48.10	-9.512
δ ¹ Apodis	4.8	Mb	16 8 11.449	8.8669	-.0050	-78 29 39.35	9.451
δ Ophiuchi	3.0	Ma	16 10 5.940	3.1418	-.0031	-3 29 12.00	9.392
σ Coronæ Bor. seq.	5.8	G0	16 11 38.680	+2.2460	-.0223	+34 3 47.99	9.200
19 Ursæ Minoris	5.5	B8	16 13 6.928	-1.7433	+0.0007	+76 4 55.08	9.006
γ ² Normæ	4.1	K0	16 13 46.140	+4.4735	-.0216	-49 57 29.34	-9.026
ε Ophiuchi	3.3	K0	16 14 2.014	3.1722	+0.0054	-4 29 45.65	8.904
σ Scorpii	3.1	B1	16 16 15.705	3.6422	-.0011	-25 23 58.44	8.805
τ Herculis	3.9	B5	16 17 18.362	1.8033	+0.0001	+46 30 20.14	8.655
γ Herculis	3.8	F0	16 18 20.767	+2.6456	-.0034	+19 20 32.74	8.566
η Ursæ Minoris	5.0	F0	16 19 51.167	-1.7859	-.0231	+75 56 33.09	-8.231
γ Apodis	3.9	K0	16 20 58.848	+9.1150	-.0408	-78 43 4.41	8.476
ω Herculis	4.5	Ap	16 21 40.369	2.7620	-.0028	+14 13 7.98	8.398
η Draconis	2.9	G5	16 22 53.507	0.8086	-.0020	+61 41 50.09	8.184
α Scorpii (Antares)	1.2	Map	16 24 26.272	3.6747	-.0006	-26 15 12.06	8.147
β Herculis	2.8	K0	16 26 44.186	+2.5776	-.0076	+21 39 54.58	-7.959
λ Ophiuchi	3.8	A0	16 26 49.602	+3.0242	-.0022	+2 9 36.92	8.005
A Draconis	5.0	B8p	16 28 8.068	-0.1280	-.0049	+68 56 36.27	7.786
τ Scorpii	2.9	B0	16 30 50.202	+3.7302	-.0013	-28 2 56.93	7.638
σ Herculis	4.2	A0	16 31 29.483	1.9336	-.0006	+42 36 11.75	7.524
ζ Ophiuchi	2.7	B0	16 32 41.797	+3.3012	+0.0007	-10 24 14.54	-7.430
24 Scorpii	5.0	K0	16 36 53.153	3.4670	-.0017	-17 35 11.04	7.115
ζ Herculis	3.0	G0	16 38 13.941	2.2615	-.0364	+31 44 55.66	6.611
α Trianguli Australis	1.9	K2	16 40 4.408	6.3271	+0.0028	-68 52 51.28	6.899
η Herculis	3.6	K0	16 40 7.096	2.0559	+0.0031	+39 4 31.88	6.939
Groombridge 2377	4.9	F0	16 43 45.621	+1.1377	+0.0046	+56 55 34.54	-6.484
ε Scorpii	2.4	K0	16 44 54.788	3.8804	-.0505	-34 8 51.15	6.715
49 Herculis	6.4	A0	16 48 23.544	2.7304	+0.0010	+15 6 32.73	6.176
ε ¹ Aræ	4.2	K2	16 53 7.292	4.7724	-.0011	-53 2 15.54	5.783
κ Ophiuchi	3.4	K0	16 53 49.991	2.8384	-.0199	+9 29 59.96	5.718
30 Ophiuchi	5.0	K0	16 56 47.325	+3.1632	-.0018	-4 6 7.65	-5.534
ε Herculis	3.9	A0	16 57 11.394	2.2947	-.0036	+31 2 41.50	5.402
d Herculis	5.3	A2	16 58 36.841	2.2122	-.0016	+33 41 4.85	5.314
η Ophiuchi	2.6	A0	17 5 43.825	3.4377	+0.0017	-15 37 32.47	4.611
η Scorpii	3.4	F2	17 6 20.905	4.2929	+0.0023	-43 8 2.07	4.956
ζ Draconis	3.2	B5	17 8 32.982	+0.1697	-.0021	+65 48 51.38	-4.445
α Herculis	var.	Mb	17 10 57.199	2.7346	-.0008	+14 28 54.00	4.228
δ Herculis	3.2	A0	17 11 42.222	2.4633	-.0019	+24 56 1.90	4.351
π Herculis	3.4	K2	17 12 13.493	2.0886	-.0025	+36 53 58.84	4.149
θ Ophiuchi	3.4	B3	17 17 1.984	3.6821	-.0006	-24 55 11.69	3.772
w Herculis	5.4	G0	17 17 37.652	+2.2431	+0.0096	+32 34 15.81	-4.732
β Aræ	2.8	K2	17 18 33.787	4.9818	-.0004	-55 27 17.07	3.632
b Ophiuchi	4.3	F0	17 21 25.270	3.6611	-.0009	-24 6 7.68	3.496
σ Ophiuchi	4.4	K0	17 22 29.704	2.9758	+0.0002	+4 12 35.37	3.258
δ Aræ	3.8	B8	17 23 46.851	5.4068	-.0098	-60 37 5.61	3.275
α Aræ	3.0	B3p	17 25 34.640	+4.6334	-.0036	-49 48 48.39	-3.083
λ Herculis	4.5	K0	17 27 27.870	2.4242	+0.0016	+26 10 15.12	2.818
λ Scorpii	1.7	B2	17 28 6.375	4.0713	-.0004	-37 2 45.23	2.809
β Draconis	3.0	G0	17 28 36.101	1.3544	-.0017	+52 21 39.00	2.729
α Ophiuchi	2.1	A5	17 31 10.425	2.7839	+0.0080	+12 37 4.63	2.749
ε Serpentis	3.6	A5	17 32 56.808	+3.4331	-.0038	-15 20 54.85	-2.421
ε Herculis	3.8	B3	17 37 10.714	+1.6937	+0.0003	+46 2 55.83	-1.990

β Scorpii, comp. 5^m.1, 13^m.3 n. f.
 κ Herculis, star 6^m.5, 29^m.7 n. f.
 σ Cor. Bor., comp. 6^m.7, 4^m.6 s. pr.
 α Scorpii, star 8^m, 21^m pr.
 γ Draconis, comp. 8^m, 8^m.4 s. f.

α Scorpii, comp. 7^m.3, 3^m.2 pr.
 λ Ophiuchi, comp. 6^m.1, 2^m.2 n. f.
 ζ Herculis, binary, 3^m.0, 6^m.0, 1^m.
 η Oph., binary, 3^m.2, 3^m.7, 0^m.5

α Herculis, var. irreg., 3^m
 dup., comp. 6^m, 4^m.6 s. f.
 δ Herculis, binary, comp. 8^m
 s. pr.

MEAN PLACES OF TEN-DAY STARS, 1919. 227

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spectr. trum.	Right Ascension.	Annual Variation.	Annual P. M.	Declination.	Annual Variation.	Annual P. M.
			h m s	s	s	° ' "	"	"
ω Draconis	4.9	F5	17 37 25.432	-0.3538	+0.0014	+68 47 43.71	-1.653	+0.318
η Pavonis	3.6	K0	17 37 46.683	+5.8821	-0.0028	-64 41 13.12	2.020	-0.080
β Ophiuchi	2.9	K0	17 39 28.239	2.9630	-0.0026	+ 4 36 0.53	1.636	+0.158
α ¹ Scorpii	3.1	F5p	17 41 55.142	4.1949	+0.0006	-40 5 48.91	1.588	-0.008
μ Herculis	3.5	G5	17 43 17.267	+2.3472	-0.0238	+27 46 2.00	2.210	-0.749
ψ Draconis	4.9	F5	17 43 22.511	-1.0734	+0.0024	+72 11 20.25	-1.721	-0.268
γ Ophiuchi	3.7	A0	17 43 49.827	+3.0073	-0.0016	+ 2 44 12.40	1.486	-0.073
ξ Draconis	3.9	K0	17 52 7.760	1.0382	+0.0130	+56 53 6.02	0.611	+0.077
89 Herculis	5.5	F2	17 52 9.152	+2.4208	+0.0013	+26 3 43.38	0.680	+0.006
35 Draconis	5.0	F5	17 53 4.420	-2.6898	+0.0115	+76 58 27.99	0.363	+0.243
θ Herculis	4.0	K0	17 53 28.491	+2.0571	+0.0006	+37 15 37.78	-0.566	+0.004
ρ Ophiuchi	3.5	K0	17 54 33.998	3.3020	-0.0006	- 9 45 53.13	0.595	-0.120
ξ Herculis	3.8	K0	17 54 37.040	2.3315	+0.0072	+29 15 20.91	0.488	-0.018
γ Draconis	2.4	K5	17 54 43.502	1.3926	-0.0006	+51 29 52.38	0.485	-0.024
67 Ophiuchi	3.9	B5p	17 56 35.312	3.0050	+0.0008	+ 2 56 4.02	0.311	-0.013
θ Aræ	3.9	B1	18 0 19.506	+4.6699	-0.0010	-50 5 54.85	-0.022	-0.050
γ Sagittarii	3.1	K0	18 0 36.186	3.8520	-0.0055	-30 25 34.86	0.145	-0.198
70 Ophiuchi	4.1	K0	18 1 21.623	3.0317	+0.0178	+ 2 31 1.86	-1.003	-1.122
72 Ophiuchi	3.7	A2	18 3 30.534	2.8433	-0.0045	+ 9 33 5.20	+0.394	+0.087
o Herculis	3.8	A0	18 4 22.938	2.3395	-0.0002	+28 45 1.71	0.385	+0.002
μ Sagittarii	4.0	B8p	18 8 55.117	+3.5870	-0.0004	-21 4 52.30	+0.778	-0.002
η Sagittarii	3.2	Mb	18 12 8.815	4.0597	-0.0109	-36 47 13.33	0.909	-0.153
Groombridge 2533	5.4	B5	18 13 7.580	1.8653	-0.0006	+42 7 51.81	1.146	-0.001
36 Draconis	5.0	F5	18 13 25.842	0.3456	+0.0535	+64 22 10.70	1.200	+0.026
δ Sagittarii	2.8	K0	18 15 48.504	3.8405	+0.0023	-29 51 49.65	1.348	-0.034
η Serpentis	3.4	K0	18 17 7.053	+3.1028	-0.0378	- 2 55 14.85	+0.804	-0.692
ε Sagittarii	2.0	A0	18 18 47.718	3.9814	-0.0041	-34 25 26.53	1.520	-0.122
109 Herculis	3.9	K0	18 20 14.753	2.5560	+0.0139	+21 43 54.57	1.507	-0.261
α Telescopii	3.8	B3	18 20 58.065	+4.4498	-0.0017	-46 0 52.17	1.763	-0.068
x Draconis	3.7	F8	18 22 31.194	-1.0789	+0.1177	+72 41 52.60	1.595	-0.372
λ Sagittarii	2.9	K0	18 22 58.317	+3.7027	-0.0033	-25 28 4.03	+1.807	-0.199
c Serpentis	5.4	G5	18 25 28.038	3.1215	+0.0015	- 2 2 19.41	2.188	-0.035
1 Aquilæ	4.1	K0	18 30 47.949	3.2646	-0.0013	- 8 18 6.32	2.370	-0.315
† Pavonis	4.1	K0	18 33 34.472	7.0181	-0.0057	-71 29 58.69	2.762	-0.165
α Lyrae (Vega)	0.1	A0	18 34 11.758	2.0314	+0.0177	+38 42 27.12	3.260	+0.280
2 Aquilæ	4.7	F0	18 37 50.390	+3.2865	+0.0020	- 9 7 52.09	+3.289	-0.006
φ Sagittarii	3.3	B8	18 40 35.761	3.7485	+0.0034	-27 4 30.76	3.526	-0.006
110 Herculis	4.3	F5	18 42 10.482	2.5804	-0.0019	+20 28 4.16	3.324	-0.344
6 Aquilæ	4.5	G0	18 42 52.597	3.1828	-0.0009	- 4 50 8.17	3.705	-0.023
λ Pavonis	4.4	B2	18 44 42.917	5.5649	-0.0030	-62 16 55.33	3.864	-0.022
β Lyrae	var.	B2p	18 47 5.348	+2.2148	+0.0004	+33 16 4.27	+4.085	-0.005
50 Draconis	5.4	A0	18 48 59.741	-1.9221	-0.0031	+75 20 19.72	4.304	+0.051
o Draconis	4.8	K0	18 50 0.506	+0.8879	+0.0116	+59 17 20.47	4.363	+0.023
σ Sagittarii	2.1	B3	18 50 14.554	3.7198	-0.0003	-26 23 55.10	4.285	-0.075
θ Serpentis pr.	4.5	A5	18 52 11.546	2.9821	+0.0027	+ 4 5 49.86	4.553	+0.028
R Lyrae	var.	Mb	18 52 52.240	+1.8260	+0.0026	+43 50 19.51	+4.662	+0.078
γ Lyrae	3.3	A0	18 55 54.785	2.2435	-0.0006	+32 34 39.40	4.837	-0.006
ε Aquilæ	4.2	K0	18 55 56.746	2.7221	-0.0042	+14 57 26.25	4.763	-0.081
† Sagittarii	2.7	A2	18 57 27.519	3.8176	-0.0024	-29 59 50.36	4.954	-0.019
† Aquilæ	3.0	A0	19 1 41.211	2.7569	-0.0008	+13 44 31.58	5.231	-0.099
λ Aquilæ	3.6	A0	19 1 57.018	+3.1835	-0.0020	- 5 0 17.67	+5.270	-0.083
α Coronæ Australis	4.1	A2	19 3 57.723	4.0827	+0.0051	-38 1 55.54	5.404	-0.118
ε Lyrae	5.1	B5	19 4 24.702	2.1413	+0.0005	+35 58 20.67	5.553	-0.006
π Sagittarii	3.0	F2	19 4 56.850	3.5686	-0.0005	-21 9 12.49	5.569	-0.036
ψ Sagittarii	4.9	F5	19 10 34.489	3.6798	+0.0025	-25 23 50.89	6.040	-0.035
δ Draconis	3.2	K0	19 12 32.458	+0.0214	+0.0175	+67 31 8.50	+6.327	+0.088
d Sagittarii	5.0	K0	19 12 53.780	+3.5107	-0.0015	-19 5 53.38	+6.252	-0.017

φ Draconis, star 0^d.1, 30^m.4 n. f.
70 Ophiuchi, comp. 6^m, 5^s.3 s. f.

β Lyrae, var., 12^d.9, 3^m.4-4^m.1, star
7^m, 46^s. s. f.
o Draco, star 7^m.6, 32^s.1 n. pr.

θ Serpentis, star 5^m.4, 22^s.2 s. f.
R Lyrae, var., 46^d.4, 4^m.0-4^m.7
† Sag., binary, 3^m.4, 3^s.8, 0^s.5

228 MEAN PLACES OF TEN-DAY STARS, 1919.

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spec- trum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h m s	s	s	" ' "	" "	" "
θ Lyrae	4.5	K0	19 13 33.349	+2.0808	-.0015	+37 59 19.84	+ 6.330	+0.006
ω Aquilae	5.1	A5	19 14 0.868	2.8158	-.0002	+11 26 54.23	6.376	+0.014
κ Cygni	4.0	K0	19 15 13.906	+1.3877	+.0071	+53 13 6.67	6.584	+0.121
τ Draconis	4.6	K0	19 17 7.262	-1.1380	-.0312	+73 12 19.82	6.728	+0.109
δ Aquilae	3.4	F0	19 21 24.869	+3.0249	+.0168	+ 2 57 8.31	7.053	+0.081
β Cygni	3.2	K0p	19 27 27.264	+2.4189	-.0002	+27 47 19.31	+ 7.455	-0.010
ϵ Cygni	3.9	A2	19 27 39.862	1.5132	+.0023	+51 33 24.13	7.610	+0.129
μ Aquilae	4.6	K0	19 30 7.976	2.9311	+.0145	+ 7 12 22.16	7.536	-0.146
h Sagittarii	4.7	B9	19 31 46.764	3.6526	+.0045	-25 3 48.62	7.788	-0.027
κ Aquilae	5.0	B0	19 32 32.095	3.2286	+.0005	- 7 12 30.39	7.877	+0.002
θ Cygni	4.6	F5	19 34 16.181	+1.0088	-.0024	+50 1 58.58	+ 8.265	+0.250
54 Sagittarii	5.4	K0	19 36 5.044	3.4384	+.0046	-16 28 48.10	8.113	-0.047
β Sagittae	4.4	K0	19 37 24.631	2.6939	+.0001	+17 17 15.13	8.234	-0.032
15 Cygni	5.0	K0	19 41 21.362	2.1641	+.0068	+37 9 29.24	8.619	+0.040
f Sagittarii	5.1	K0	19 41 38.298	3.5011	-.0099	-19 57 24.54	8.513	-0.088
γ Aquilae	2.8	K2	19 42 24.521	+2.8519	+.0007	+10 24 53.79	+ 8.659	-0.003
δ Cygni	3.0	A0	19 42 26.649	1.8760	+.0055	+44 55 56.65	8.709	+0.044
δ Sagittae	3.8	Map	19 43 46.564	2.6748	+.0004	+18 20 1.18	8.787	+0.017
α Aquilae (<i>Altair</i>)	0.9	A5	19 46 49.878	2.9270	+.0360	+ 8 39 12.36	9.388	+0.379
η Aquilae	var.	G0	19 48 20.833	+3.0566	+.0005	+ 0 47 48.58	9.119	-0.008
ϵ Draconis	4.0	K0	19 48 27.372	-0.1894	+.0170	+70 3 41.73	+ 9.163	+0.027
ϵ Sagittarii	4.2	K0	19 49 40.496	+4.1422	-.0017	-42 4 56.15	9.275	+0.045
ϵ Pavonis	4.1	A0	19 51 14.672	6.9806	+.0112	-73 7 33.22	9.232	-0.120
β Aquilae	3.9	K0	19 51 20.069	2.9467	+.0025	+ 6 12 12.83	8.879	-0.481
γ Sagittae	3.7	K5	19 55 9.266	2.6673	+.0041	+19 16 16.80	9.678	+0.025
c Sagittarii	4.6	Mb	19 57 40.791	+3.6923	+.0023	-27 56 9.93	+ 9.860	+0.013
τ Aquilae	5.6	K0	20 0 10.997	2.9307	+.0010	+ 7 2 55.49	10.066	+0.029
θ Aquilae	3.4	A0	20 7 7.563	3.0958	+.0020	- 1 3 45.36	10.563	+0.006
\circ Cygni <i>seq.</i>	4.0	K0p	20 11 4.912	+1.8901	+.0014	+46 29 42.42	10.855	+0.005
κ Cephei	4.4	B9	20 11 38.590	-1.9721	+.0024	+77 28 5.02	10.917	+0.026
24 Vulpeculae	5.4	K0	20 13 19.143	+2.5674	+.0017	+24 25 15.00	+11.002	-0.012
α^2 Capricorni	3.8	K0	20 13 33.706	3.3301	+.0040	-12 47 48.47	11.040	+0.008
β Capricorni	3.2	G0p	20 16 27.746	3.3730	+.0030	-15 2 17.00	11.249	+0.007
α Pavonis	2.1	B3	20 19 14.863	4.7619	.0000	-56 59 45.18	11.351	-0.092
γ Cygni	2.3	F8p	20 19 19.253	2.1527	+.0004	+39 59 48.36	11.449	+0.001
π Capricorni	5.2	B8	20 22 41.186	+3.4358	+.0004	-18 28 40.92	+11.687	-0.002
ρ Capricorni	5.0	F0	20 24 14.539	3.4241	-.0013	-18 4 56.46	11.779	-0.020
41 Cygni	4.1	F5	20 26 5.201	2.4516	+.0014	+30 5 51.33	11.928	-0.002
θ Cephei	4.3	A5	20 28 13.538	1.0111	+.0066	+62 43 17.36	12.062	-0.018
ϵ Delphini	4.0	B5	20 29 20.610	+2.8663	+.0007	+11 1 37.66	12.132	-0.025
Groombridge 3241	6.4	K2	20 30 22.041	-0.2414	-.0047	+72 15 26.42	+12.210	-0.018
α Indi	3.2	K0	20 31 52.417	+4.2281	+.0027	-47 34 30.48	12.386	+0.053
β Delphini	3.7	F5	20 33 45.081	2.8138	+.0082	+14 18 45.29	12.426	-0.035
ν Capricorni	5.3	Ma	20 35 26.440	3.4176	-.0018	-18 25 28.32	12.570	-0.007
α Delphini	3.9	B8	20 35 52.561	2.7868	+.0047	+15 37 32.85	12.623	+0.017
β Pavonis	3.6	A5	20 37 40.560	+5.4385	-.0079	-66 29 44.46	+12.725	-0.003
α Cygni (<i>Deneb</i>)	1.3	A2p	20 38 40.208	2.0448	+.0004	+44 59 24.97	12.793	-0.002
δ Delphini	4.5	A2	20 39 40.646	2.8008	-.0014	+14 46 59.21	12.813	-0.050
ψ Capricorni	4.3	F8	20 41 18.163	3.5560	-.0041	-25 33 45.55	12.824	-0.148
γ Delphini <i>seq.</i>	4.5	G5	20 42 54.014	2.7832	-.0023	+15 49 53.95	12.882	-0.196
ϵ Cygni	2.6	K0	20 42 56.024	+2.4276	+.0294	+33 39 58.29	+13.407	+0.327
ϵ Aquarii	3.8	A0	20 43 17.552	3.2490	+.0017	- 9 47 35.03	13.074	-0.030
η Cephei	3.6	K0	20 43 38.675	1.2240	+.0132	+61 31 25.92	13.947	+0.820
μ Aquarii	4.8	A3	20 48 17.181	3.2374	+.0025	- 9 17 17.40	13.393	-0.039
β Indi	3.7	K0	20 48 29.396	4.7086	+.0018	-58 45 38.12	13.436	-0.008
32 Vulpeculae	5.2	K2	20 51 6.450	+2.5564	-.0003	+27 44 56.14	+13.618	+0.004

β Cygni, star 5^m.4, 34^m.7 n. f.
 δ Cygni, comp. 8^m, 1^m.6 n. pr.
 γ Aquilae, var., 7^m.18, 3^m.7-4^m.4
 ϵ Draconis, comp. 7^m.6, 3^m.1 n.

\circ Cygni, star 5^m.0 pr. 19^m, 270^m n.,
star 7^m.8 f. 1^m.96^m s.
 κ Cephei, comp. 8^m, 7^m.5 s. f.
 α^2 Capricorn., α^1 Capricorn. 4^m.6 pr. 24^m,
137^m n.

β Capricorn., star 6^m.2 pr. 14^m, 10^m s.
 π Capricorn., comp. 9^m, 3^m.4 s. f.
 ρ Capricorn., comp. 7^m.6, 2^m.8 s.
 γ Delphini, binary, 4^m.1, 5^m.4, 0^m.5
 γ Delphini, comp. 5^m.5, 11^m.2 pr.

MEAN PLACES OF TEN-DAY STARS, 1919. 229

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spect- rum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h m s	s	s	" ' "	"	"
220 H ¹ . Draconis . . .	5.6	K0	20 51 18.445	-2.6412	-.0105	+80 14 57.55	+13.601	-0.025
α Cygni . . .	4.0	A0	20 54 9.161	+2.2357	+0.0008	+40 51 16.75	13.790	-0.018
α Octantis . . .	5.2	F2	20 54 57.160	7.3685	-0.0006	-77 20 4.53	13.469	-0.389
γ Microscopii . . .	4.7	G5	20 56 19.631	3.6856	-0.0004	-32 34 30.68	13.941	-0.004
θ Capricorni . . .	4.2	A0	21 1 23.751	3.3749	+0.0051	-17 33 20.16	14.194	-0.066
ξ Cygni . . .	3.9	K5	21 1 59.037	+2.1814	+0.0009	+43 36 15.27	+14.305	+0.008
61 Cygni pr. . .	5.6	K5	21 3 15.836	2.6854	+0.3496	+38 21 1.37	17.624	+3.249
61 Cygni seq. . .	6.3	K5	Δα + 1.494	....	....	Δδ -15.96	....	....
ν Aquarii . . .	4.5	K0	21 5 10.986	+3.2696	+0.0057	-11 42 1.06	14.485	-0.006
Bradley 2777 . . .	5.9	A	21 7 8.907	-1.1486	+0.0102	+77 47 53.39	14.639	+0.029
3 Piscis Australis . . .	5.6	K5	21 8 29.333	+3.5627	+0.0075	-27 57 1.69	+14.583	-0.106
ζ Cygni . . .	3.4	K0	21 9 29.280	2.5522	-0.0002	+29 53 38.40	14.687	-0.061
τ Cygni . . .	3.8	F0	21 11 33.424	2.3942	+0.0141	+37 41 56.72	15.304	+0.434
α Equulei . . .	4.1	F8p	21 11 46.504	2.0991	+0.0034	+ 4 54 44.19	14.798	-0.085
σ Cygni . . .	4.3	A0p	21 14 14.011	2.3550	-0.0001	+39 3 17.18	15.029	+0.003
θ ¹ Microscopii . . .	4.9	A2p	21 15 34.975	+3.8433	+0.0028	-41 9 9.83	+15.109	+0.005
α Cephei . . .	2.6	A5	21 16 38.892	1.4347	+0.0224	+62 14 31.36	15.215	+0.050
ι Capricorni . . .	4.3	K0	21 17 44.339	3.3436	+0.0022	-17 10 48.86	15.231	+0.004
1 Pegasi . . .	4.2	K0	21 18 20.412	2.7741	+0.0075	+19 27 26.34	15.326	+0.064
γ Pavonis . . .	4.3	F8	21 19 45.864	4.9959	+0.0154	-65 44 2.02	16.126	+0.784
ζ Capricorni . . .	3.9	G5p	21 22 2.752	+3.4297	+0.0004	-22 45 46.43	+15.490	+0.020
g Cygni . . .	5.3	K0	21 26 27.567	2.2129	+0.0050	+46 10 58.76	15.818	+0.105
β Aquarii . . .	3.1	G0	21 27 17.762	3.1896	+0.0012	- 5 55 41.62	15.747	-0.011
β Cephei . . .	3.3	B1	21 27 37.302	0.7846	+0.0026	+70 12 17.78	15.781	+0.005
ξ Aquarii . . .	4.8	A5	21 33 26.480	3.1954	+0.0075	- 8 13 5.17	16.061	-0.023
74 Cygni . . .	5.1	A5	21 33 42.098	+2.4036	+0.0003	+40 2 56.72	+16.107	+0.009
γ Capricorni . . .	3.8	F0p	21 35 36.330	3.3267	+0.0129	-17 1 43.54	16.179	-0.017
ε Pegasi . . .	2.5	K0	21 40 12.445	2.9461	+0.0016	+ 9 30 10.84	16.430	0.000
11 Cephei . . .	4.8	K0	21 40 44.390	0.8868	+0.0221	+70 56 17.60	16.550	+0.093
δ Capricorni . . .	3.0	A5	21 42 34.325	3.3136	+0.0176	-16 29 43.77	16.251	-0.297
π ² Cygni . . .	4.3	B3	21 43 47.969	+2.2149	+0.0009	+48 56 3.65	+16.607	-0.001
μ Capricorni . . .	5.2	F0	21 48 52.886	3.2726	+0.0204	-13 56 1.72	16.854	+0.001
γ Gruis . . .	3.2	B8	21 49 1.695	3.6400	+0.0077	-37 44 47.51	16.839	-0.021
16 Pegasi . . .	5.0	B3	21 49 22.539	2.7286	+0.0005	+25 32 36.97	16.882	+0.006
79 Draconis . . .	6.6	A0	21 51 50.682	0.7169	+0.0100	+73 19 8.01	17.008	+0.016
20 Pegasi . . .	5.7	F2	21 57 8.560	+2.9222	+0.0038	+12 43 52.90	+17.180	-0.054
ε Indi . . .	4.7	K5	21 57 10.319	4.6066	+0.4783	-57 7 10.29	14.663	-2.571
α Aquarii . . .	3.2	G0	22 1 37.459	3.0819	+0.0010	- 0 42 49.76	17.428	-0.002
ι Aquarii . . .	4.4	B8	22 2 3.847	3.2421	+0.0022	-14 15 47.63	17.388	-0.062
20 Cephei . . .	5.4	K5	22 2 32.767	1.8230	+0.0032	+62 23 24.23	17.521	+0.051
α Gruis . . .	2.2	B5	22 3 8.061	+3.7919	+0.0110	-47 21 14.79	+17.321	-0.174
ι Pegasi . . .	4.0	F5	22 3 14.360	2.7917	+0.0222	+24 56 56.23	17.520	+0.021
θ Pegasi . . .	3.7	A0	22 6 6.859	3.0267	+0.0187	+ 5 47 56.15	17.657	+0.036
π Pegasi . . .	4.4	F5	22 6 23.322	2.6630	-0.0003	+32 46 49.08	17.614	-0.018
ζ Cephei . . .	3.6	K0	22 8 2.522	2.0785	+0.0018	+57 48 6.07	17.711	+0.010
24 Cephei . . .	5.0	G5	22 8 15.199	+1.1368	+0.0044	+71 56 31.04	+17.713	+0.004
θ Aquarii . . .	4.3	K0	22 12 33.629	3.1669	+0.0074	- 8 11 13.41	17.864	-0.019
α Tucanæ . . .	2.9	K2	22 12 57.760	4.1315	-0.0115	-60 39 49.32	17.864	-0.035
γ Aquarii . . .	4.0	A0	22 17 28.383	3.0989	+0.0081	- 1 47 45.05	18.088	+0.015
31 Pegasi . . .	4.9	B3p	22 17 31.866	2.9530	+0.0010	+11 47 47.67	18.082	+0.007
3 Lacertæ . . .	4.6	K0	22 20 22.348	+2.3562	-0.0007	+51 49 22.35	+17.992	-0.188
π Aquarii . . .	4.6	B1	22 21 8.418	3.0637	+0.0004	+ 0 57 57.11	18.208	-0.001
σ Aquarii . . .	4.9	A0	22 26 21.744	3.1768	0.0000	-11 5 34.13	18.370	-0.026
α Lacertæ . . .	3.8	A0	22 27 57.137	2.4687	+0.0157	+49 51 56.36	18.464	+0.014
ν Aquarii . . .	5.3	F5	22 30 15.869	3.2845	+0.0148	-21 7 25.34	18.374	-0.154
226 B. Cephei . . .	5.7	A0	22 30 51.359	+1.0634	-0.0052	+75 48 32.11	+18.548	0.000

γ Cygni, comp. 7^m, 0^s.8

g Cygni, star 6^m.7 f. 10^s, 420^s. s.

β Cephei, star 8^m, 13^s.3 s. pr.

230 MEAN PLACES OF TEN-DAY STARS, 1919.

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spect- rum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h m s	s	s	" ' "	"	"
η Aquarii	4.1	B8	22 31 11.670	+3.0831	+0.0057	- 0 32 7.29	+18.506	-0.053
10 Lacertæ	4.9	Oe5	22 35 37.482	2.6895	+0.0011	+38 37 41.82	18.691	-0.011
ϵ Piscis Australis	4.2	B8	22 36 10.690	3.3219	+0.0008	-27 28 0.09	18.708	-0.011
ζ Pegasi	3.6	B8	22 37 25.309	2.9915	+0.0054	+10 24 29.16	18.744	-0.014
β Gauri	2.2	Mb	22 37 50.229	3.5943	+0.0133	-47 18 31.48	18.744	-0.026
η Pegasi	3.1	G0	22 39 12.185	+2.8096	+0.0011	+29 47 49.60	+18.775	-0.037
λ Pegasi	4.1	K0	22 42 37.657	2.8873	+0.0037	+23 8 20.58	18.905	-0.009
ϵ Gruis	3.7	A2	22 43 40.108	3.6361	+0.0093	-51 44 35.00	18.885	-0.059
τ Aquarii	4.2	K5	22 45 18.314	3.1787	-0.0008	-14 1 13.51	18.957	-0.033
μ Pegasi	3.7	K0	22 46 5.536	2.8936	+0.0110	+24 10 24.76	18.970	-0.042
ι Cephei	3.7	K0	22 46 47.566	+2.1290	-0.0111	+65 46 26.79	+18.905	-0.126
λ Aquarii	3.8	Ma	22 48 23.374	3.1307	+0.0002	- 8 0 39.48	19.110	+0.085
ρ Indi	6.1	G5	22 49 2.372	4.2097	-0.0133	-70 30 24.74	19.146	+0.053
δ Aquarii	3.5	A2	22 50 21.179	3.1858	-0.0034	-16 15 6.91	19.101	-0.026
α Pisc. Aust. (<i>Fomalhaut</i>)	1.3	A3	22 53 10.690	3.3201	+0.0252	-30 3 6.93	19.028	-0.171
σ Andromedæ	3.6	B5p	22 58 11.426	+2.7553	+0.0020	+41 53 25.32	+19.311	-0.010
β Pegasi	† var.	Ma	22 59 50.719	2.9057	+0.0146	+27 38 35.22	19.494	+0.135
α Pegasi (<i>Markab</i>)	2.6	A0	23 0 43.476	2.9866	+0.0040	+14 46 9.09	19.339	-0.039
55 Pegasi	4.7	Ma	23 2 55.384	3.0210	+0.0003	+ 8 58 17.79	19.415	-0.012
ϵ^2 Aquarii	3.8	K0	23 5 7.779	3.2015	+0.0032	-21 36 44.62	19.515	+0.041
π Cephei	† 4.6	G5	23 5 19.035	+1.9004	+0.0023	+74 56 57.96	+19.445	-0.032
ι Gruis	4.1	K0	23 5 46.734	3.4056	+0.0121	-45 41 8.78	19.456	-0.031
59 Pegasi	5.2	A3	23 7 38.776	3.0279	-0.0007	+ 8 16 48.23	19.529	+0.004
5 H ¹ . Cassiopeiæ	5.6	K2	23 9 22.656	2.8802	+0.2536	+56 43 15.70	19.857	+0.299
ϕ Aquarii	4.4	Ma	23 10 7.664	3.1070	+0.0015	- 6 29 9.31	19.378	-0.194
ψ Aquarii	† 4.5	K0	23 11 38.956	+3.1446	+0.0250	- 9 31 44.80	+19.596	-0.005
γ Tucanæ	4.1	F2	23 12 42.587	3.5170	-0.0057	-58 40 49.40	19.680	+0.060
γ Piscium	3.8	K0	23 12 57.950	3.1093	+0.0502	+ 2 50 22.23	19.645	+0.021
γ Sculptoris	4.5	K0	23 14 27.173	3.2440	+0.0002	-32 58 24.71	19.585	-0.066
σ Cephei	† 4.9	G5	23 15 17.576	2.4534	+0.0113	+67 40 5.43	19.683	+0.018
τ Pegasi	4.6	A5	23 16 37.518	+2.9662	+0.0018	+23 17 48.21	+19.676	-0.012
δ^1 Aquarii	4.2	K0	23 18 43.066	3.1526	-0.0099	-20 32 34.81	19.631	-0.089
4 Cassiopeiæ	5.2	K5	23 21 13.896	2.6520	-0.0004	+61 50 16.69	19.749	-0.010
ν Pegasi	4.6	G0	23 21 20.049	2.9910	+0.0134	+22 57 28.51	19.791	+0.030
κ Piscium	4.9	A2p	23 22 46.809	3.0752	+0.0056	+ 0 48 43.44	19.689	-0.093
θ Piscium	4.4	G5	23 23 51.502	+3.0421	-0.0088	+ 5 56 2.26	+19.756	-0.041
70 Pegasi	4.7	K0	23 25 3.403	3.0324	+0.0040	+12 18 48.80	19.848	+0.035
β Sculptoris	4.5	B9	23 28 37.903	3.2236	+0.0071	-38 15 59.68	19.863	+0.006
72 Pegasi (<i>mean</i>)	† 5.2	K2	23 29 55.872	2.9716	+0.0035	+30 52 41.59	19.863	-0.009
λ Andromedæ	4.0	K0	23 33 35.687	2.9293	+0.0158	+46 1 9.20	19.492	-0.420
ι Andromedæ	4.3	B8	23 34 9.538	+2.9358	+0.0025	+42 49 10.40	+19.918	0.000
ι Piscium	4.3	G0	23 35 46.994	3.0845	+0.0246	+ 5 11 13.77	19.497	-0.436
γ Cephei	3.4	K0	23 36 0.740	2.4418	-0.0173	+77 10 49.01	20.093	+0.157
κ Andromedæ	4.3	A0	23 36 24.830	2.9485	+0.0078	+43 53 6.96	19.915	-0.024
ω^2 Aquarii	4.6	A0	23 38 31.368	3.1124	+0.0063	-14 59 33.97	19.895	-0.063
ι^1 Aquarii	5.3	B8	23 40 0.125	+3.1141	+0.0019	-18 43 35.99	+19.963	-0.006
ψ Andromedæ	5.1	K0	23 42 0.896	2.9649	+0.0005	+45 58 13.55	19.976	-0.008
41 H. Cephei	5.0	A0	23 44 1.674	2.8520	+0.0024	+67 21 23.86	19.987	-0.010
δ Sculptoris	4.6	A0	23 44 42.495	3.1271	+0.0059	-28 34 43.15	19.868	-0.133
ϕ Pegasi	5.2	Ma	23 48 21.877	3.0485	-0.0013	+18 40 13.36	19.980	-0.039
ρ Cassiopeiæ	4.8	F8p	23 50 19.677	+2.9835	-0.0022	+57 2 55.54	+20.029	+0.002
Groombridge 4163	6.6	B9	23 50 52.230	2.8836	-0.0040	+73 57 34.27	20.025	-0.005
ω Piscium	4.0	F5	23 55 9.057	3.0797	+0.0102	+ 6 24 53.79	19.933	-0.108
ϵ Tucanæ	4.7	B9	23 55 43.016	3.1364	+0.0076	-66 1 38.95	20.035	-0.007
30 Piscium	4.7	Mb	23 57 48.368	3.0771	+0.0030	- 6 27 51.19	20.007	-0.037
2 Ceti	4.6	A0	23 59 35.489	+3.0749	+0.0015	-17 47 13.16	+20.032	-0.013

β Pegasi, var. irreg., 2^m 2-2^m 7
 π Cephei, comp. 7^m, 0^m.9 f.

ψ Aquarii, star 8^m 5, 49^m.4 n. pr.
 σ Cephei, comp. 8^m, 2^m.9 s. pr.

72 Pegasi, binary, 0^m.0, 0^m.0, 0^m.4

MEAN PLACES OF CIRCUMPOLAR STARS, 1919. 231

FOR JANUARY 0^d.701, WASHINGTON MEAN TIME.

Name of Star.	Magni- tude.	Spec- trum.	Right Ascension.	Annual Vari- ation.	Annual P. M.	Declination.	Annual Vari- ation.	Annual P. M.
			h m s	s	s	° ' "	"	"
43 H. Cephei	4.5	K0	0 57 24.633	+ 7.6822	+ .0732	+85 49 24.14	+19.415	-0.004
α Ursa Min. (<i>Polaris</i>) . . †	2.1	F8	1 31 11.709	+29.5294	+ .1486	+88 52 20.55	+18.481	+0.002
4 G. Octantis	5.6	K0	1 41 54.846	- 3.7349	+ .0086	-85 10 45.22	+18.124	+0.028
Groombridge 750	6.7	F8	4 10 37.831	+17.6528	+ .0129	+85 20 28.88	+ 9.249	+0.042
Groombridge 944	6.4	K0	5 35 50.330	+18.7787	+ .0130	+85 9 34.51	+ 2.105	-0.004
31 G. Mensæ	6.2	A0	5 45 51.396	-11.6781	- .0122	-84 49 44.27	+ 1.323	+0.067
γ Mensæ	5.6	A2	6 46 48.653	- 4.9478	- .0036	-80 43 46.14	- 3.984	+0.082
51 H. Cephei	5.3	M ₂	7 8 2.335	+29.1137	- .0579	+87 10 43.86	- 5.479	-0.035
25 H. Camelopardalis	5.1	Mb	7 14 7.912	+12.8037	+ .0132	+82 34 17.32	- 6.418	-0.047
7 G. Octantis	6.4	F5	7 15 39.691	-20.3258	- .0146	-86 54 19.75	- 6.493	+0.005
Groombridge 1119	7.0	A0	8 17 47.546	+59.2588	- .0397	+88 52 37.80	-11.321	+0.017
γ Octantis	5.4	A3	9 8 41.594	- 8.1888	- .1147	-85 20 26.78	-14.658	+0.043
1 H. Draconis	4.6	K0	9 25 39.275	+ 8.7704	- .0059	+81 41 10.13	-15.696	-0.027
γ Chamaeleontis	5.2	B3	9 36 19.026	- 1.6637	- .0121	-80 34 39.26	-16.214	+0.019
30 H. Camelopardalis	5.3	F5	10 21 19.949	+ 7.5502	- .0462	+82 58 17.67	-18.207	+0.009
π Octantis	6.3	A0	10 59 54.546	- 0.3703	- .0575	-84 9 29.33	-19.365	-0.005
Bradley 1672	6.3	F0	12 14 29.190	+ 0.3895	- .0713	+88 8 56.19	-19.947	+0.053
ε Octantis	5.4	K0	12 46 19.119	+ 5.9921	+ .0366	-84 41 1.57	-19.613	+0.024
32 H. Camelop. seq. . . . †	5.3	A2	12 48 31.308	+ 0.4468	- .0184	+83 51 11.30	-19.582	+0.016
κ Octantis	5.6	A2	13 27 32.891	+ 9.1502	- .0765	-85 22 19.48	-18.624	-0.024
δ Octantis	4.1	K2	14 13 46.350	+ 9.2894	- .0512	-83 17 54.52	-16.741	-0.014
Groombridge 2283	7.2	K0	15 3 2.510	-19.2662	- .0068	+87 32 42.66	-13.954	+0.031
ρ Octantis	5.7	A2	15 24 23.351	+13.3929	+ .0842	-84 11 55.43	-12.508	+0.080
ε Ursa Minoris	4.4	G5	16 54 12.991	- 6.2449	+ .0057	+82 10 21.42	- 5.675	-0.001
59 G. Apodis	5.9	Mb	17 16 17.234	+11.1713	+ .0086	-80 47 14.27	- 3.839	-0.039
δ Ursa Minoris	4.4	A0	17 58 22.311	-19.4972	+ .0173	+86 36 51.04	- 0.095	+0.048
χ Octantis	5.2	K0	18 7 23.343	+35.7206	- .0957	-87 39 50.89	+ 0.519	-0.127
λ Ursa Minoris	6.6	Mb	19 0 15.079	-72.4933	- .1109	+89 1 12.80	+ 5.215	+0.006
σ Octantis	5.5	F0	19 30 50.769	+93.7899	+ .1079	-89 13 13.35	+ 7.739	-0.001
76 Draconis	5.7	A0	20 48 32.146	- 4.1793	+ .0131	+82 13 56.82	+13.473	+0.025
λ Octantis †	5.4	G0p	21 38 38.548	+ 9.4923	+ .0389	-83 5 34.33	+16.339	-0.012
ν Octantis	5.7	K0	22 16 33.212	+12.2485	- .0400	-86 22 50.92	+18.112	+0.074
β Octantis	4.3	F0	22 37 51.624	+ 6.2962	- .0302	-81 48 24.80	+18.773	+0.002
39 H. Cephei	5.6	F0	23 27 43.571	- 0.2831	+ .0641	+86 51 38.62	+19.867	+0.020
γ ¹ Octantis	5.1	G5	23 47 23.637	+ 3.6038	- .0247	-82 28 8.42	+20.003	-0.012

α Ursa Min., star 9^m, 18^s s. pr. | 32 H. Camelop., star 5^m.8, 21^s.6 n. pr. | λ Octantis, binary, 5^m.5, 8^m.0, 3^s.2 nf.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Jan.	h m 0 57	° ' " +85 49	Jan.	h m 1 31	° ' " +88 52	Jan.	h m 1 41	° ' " -85 10	Jan.	h m 4 10	° ' " +85 20	Jan.	h m 5 36	° ' " +85 9
	s "	"		s "	"		s "	"		s "	"		s "	"
0.3	32.06	49.91	0.3	49.26	45.14	0.3	55.81	60.28	0.4	58.57	40.77	0.5	12.48	36.32
1.3	31.79	50.03	1.3	48.29	45.30	1.3	55.53	60.28	1.4	58.48	41.08	1.5	12.50	37.21
2.3	31.50	50.14	2.3	47.24	45.46	2.3	55.28	60.27	2.4	58.38	41.40	2.5	12.51	37.57
3.3	31.19	50.24	3.3	46.14	45.61	3.3	55.03	60.26	3.4	58.26	41.72	3.4	12.50	37.32
4.3	30.87	50.31	4.3	44.99	45.76	4.3	54.78	60.26	4.4	58.13	42.04	4.4	12.46	38.27
5.3	30.56	50.36	5.3	43.83	45.87	5.3	54.54	60.26	5.4	57.98	42.32	5.4	12.42	38.61
6.2	30.24	50.39	6.3	42.67	45.95	6.3	54.27	60.27	6.4	57.82	42.59	6.4	12.36	38.94
7.2	29.95	50.39	7.3	41.55	46.01	7.3	54.01	60.28	7.4	57.65	42.83	7.4	12.28	39.24
8.2	29.65	50.39	8.3	40.50	46.05	8.3	53.74	60.31	8.4	57.49	43.07	8.4	12.20	39.53
9.2	29.40	50.39	9.3	39.51	46.10	9.3	53.45	60.34	9.4	57.34	43.27	9.4	12.14	39.79
10.2	29.15	50.39	10.3	38.57	46.15	10.3	53.13	60.34	10.4	57.20	43.48	10.4	12.07	40.06
11.2	28.91	50.40	11.3	37.68	46.21	11.3	52.82	60.31	11.4	57.07	43.69	11.4	12.03	40.31
12.2	28.67	50.44	12.3	36.76	46.30	12.3	52.53	60.26	12.4	56.97	43.92	12.4	12.00	40.57
13.2	28.40	50.48	13.3	35.80	46.39	13.3	52.23	60.18	13.4	56.84	44.17	13.4	11.97	40.85
14.2	28.13	50.52	14.2	34.76	46.49	14.3	51.94	60.09	14.4	56.71	44.43	14.4	11.93	41.17
15.2	27.84	50.54	15.2	33.66	46.57	15.3	51.68	60.00	15.4	56.57	44.68	15.4	11.88	41.49
16.2	27.52	50.55	16.2	32.50	46.63	16.3	51.43	59.89	16.4	56.40	44.95	16.4	11.79	41.81
17.2	27.21	50.55	17.2	31.28	46.68	17.2	51.19	59.80	17.4	56.20	45.20	17.4	11.70	42.13
18.2	26.88	50.50	18.2	30.07	46.71	18.2	50.94	59.75	18.3	55.99	45.43	18.4	11.58	42.43
19.2	26.57	50.44	19.2	28.89	46.71	19.2	50.69	59.68	19.3	55.78	45.64	19.4	11.45	42.72
20.2	26.28	50.35	20.2	27.74	46.67	20.2	50.42	59.61	20.3	55.56	45.84	20.4	11.31	42.99
21.2	25.99	50.27	21.2	26.63	46.63	21.2	50.15	59.56	21.3	55.34	46.01	21.4	11.17	43.24
22.2	25.71	50.18	22.2	25.58	46.59	22.2	49.87	59.49	22.3	55.13	46.16	22.4	11.03	43.48
23.2	25.45	50.08	23.2	24.55	46.55	23.2	49.58	59.42	23.3	54.93	46.32	23.4	10.89	43.71
24.2	25.20	49.99	24.2	23.57	46.50	24.2	49.29	59.33	24.3	54.74	46.46	24.4	10.77	43.93
25.2	24.96	49.91	25.2	22.59	46.46	25.2	49.00	59.24	25.3	54.54	46.62	25.4	10.64	44.16
26.2	24.71	49.83	26.2	21.61	46.42	26.2	48.71	59.10	26.3	54.36	46.77	26.4	10.54	44.39
27.2	24.46	49.77	27.2	20.63	46.41	27.2	48.43	58.97	27.3	54.17	46.93	27.4	10.42	44.63
28.2	24.19	49.69	28.2	19.60	46.40	28.2	48.15	58.82	28.3	53.98	47.10	28.4	10.31	44.87
29.2	23.93	49.61	29.2	18.54	46.38	29.2	47.88	58.64	29.3	53.79	47.28	29.4	10.19	45.14
30.2	23.65	49.53	30.2	17.42	46.37	30.2	47.64	58.46	30.3	53.57	47.47	30.4	10.06	45.42
31.2	23.34	49.44	31.2	16.26	46.33	31.2	47.39	58.28	31.3	53.35	47.66	31.4	9.92	45.69
13.76	+13.72		51.14	+51.13		11.91	-11.87		12.32	+12.28		11.86	+11.81	
0 ^h 57 ^m 24 ^s .633			1 ^h 31 ^m 11 ^s .709			1 ^h 41 ^m 54 ^s .846			4 ^h 10 ^m 37 ^s .831			5 ^h 35 ^m 50 ^s .320		
+85° 49' 24".14			+88° 52' 20".55			-85° 10' 45".22			+85° 20' 28".88			+85° 9' 34".51		

APPARENT PLACES OF STARS, 1919.

233

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensse. Mag. 6.2			† Mensse. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Jan.	h m 5 45	° ' -84 49	Jan.	h m 6 46	° ' -80 43	Jan.	h m 7 3	° ' +87 10	Jan.	h m 7 14	° ' +82 34	Jan.	h m 7 15	° ' -86 54
	s	"		s	"		s	"		s	"		s	"
0.5	62.10	51.80	0.5	55.72	50.12	0.5	38.28	36.22	0.5	22.01	8.37	0.5	59.12	21.71
1.5	61.97	52.12	1.5	55.70	50.49	1.5	38.46	36.53	1.5	22.10	8.66	1.5	59.07	22.08
2.5	61.87	52.41	2.5	55.68	50.83	2.5	38.64	36.84	2.5	22.19	8.98	2.5	59.01	22.43
3.5	61.74	52.70	3.5	55.65	51.17	3.5	38.79	37.18	3.5	22.27	9.30	3.5	58.95	22.77
4.5	61.63	52.98	4.5	55.62	51.50	4.5	38.92	37.52	4.5	22.33	9.63	4.5	58.89	23.09
5.4	61.51	53.26	5.5	55.59	51.82	5.5	39.02	37.87	5.5	22.38	9.97	5.5	58.85	23.41
6.4	61.40	53.57	6.5	55.58	52.16	6.5	39.08	38.21	6.5	22.42	10.29	6.5	58.82	23.74
7.4	61.29	53.88	7.5	55.56	52.52	7.5	39.12	38.54	7.5	22.43	10.59	7.5	58.79	24.10
8.4	61.18	54.21	8.5	55.53	52.89	8.5	39.13	38.83	8.5	22.45	10.88	8.5	58.76	24.47
9.4	61.05	54.55	9.5	55.50	53.27	9.5	39.16	39.12	9.5	22.48	11.16	9.5	58.72	24.86
10.4	60.91	54.92	10.5	55.46	53.68	10.5	39.21	39.39	10.5	22.51	11.40	10.5	58.66	25.26
11.4	60.76	55.29	11.5	55.42	54.09	11.5	39.27	39.66	11.5	22.55	11.65	11.5	58.57	25.67
12.4	60.58	55.62	12.5	55.38	54.48	12.5	39.35	39.94	12.5	22.59	11.91	12.5	58.44	26.06
13.4	60.39	55.92	13.5	55.32	54.85	13.5	39.43	40.25	13.5	22.64	12.19	13.5	58.29	26.45
14.4	60.21	56.21	14.5	55.25	55.19	14.5	39.53	40.56	14.5	22.70	12.48	14.5	58.13	26.81
15.4	60.03	56.48	15.5	55.19	55.52	15.5	39.60	40.89	15.5	22.75	12.79	15.5	57.96	27.14
16.4	59.86	56.72	16.5	55.12	55.85	16.5	39.64	41.22	16.5	22.76	13.13	16.5	57.80	27.46
17.4	59.69	56.96	17.5	55.06	56.16	17.5	39.65	41.59	17.5	22.78	13.47	17.5	57.65	27.78
18.4	59.53	57.20	18.5	55.01	56.46	18.5	39.61	41.93	18.5	22.78	13.82	18.5	57.51	28.11
19.4	59.38	57.48	19.5	54.96	56.77	19.5	39.55	42.28	19.5	22.77	14.15	19.5	57.38	28.43
20.4	59.21	57.75	20.5	54.90	57.10	20.5	39.46	42.61	20.5	22.76	14.47	20.5	57.26	28.76
21.4	59.04	58.03	21.4	54.85	57.44	21.5	39.38	42.92	21.5	22.73	14.76	21.5	57.14	29.10
22.4	58.87	58.32	22.4	54.79	57.80	22.5	39.28	43.21	22.5	22.70	15.05	22.5	57.01	29.47
23.4	58.69	58.61	23.4	54.73	58.16	23.5	39.18	43.50	23.5	22.67	15.32	23.5	56.84	29.83
24.4	58.51	58.90	24.4	54.64	58.50	24.5	39.08	43.78	24.5	22.66	15.59	24.5	56.67	30.20
25.4	58.30	59.19	25.4	54.57	58.86	25.4	39.02	44.05	25.5	22.64	15.86	25.5	56.48	30.60
26.4	58.08	59.46	26.4	54.49	59.21	26.4	38.95	44.32	26.5	22.62	16.13	26.5	56.27	30.93
27.4	57.86	59.72	27.4	54.41	59.55	27.4	38.89	44.60	27.5	22.61	16.40	27.5	56.04	31.30
28.4	57.63	59.96	28.4	54.32	59.88	28.4	38.83	44.92	28.4	22.61	16.68	28.4	55.80	31.64
29.4	57.40	60.18	29.4	54.22	60.17	29.4	38.77	45.24	29.4	22.61	16.99	29.4	55.53	31.97
30.4	57.18	60.38	30.4	54.13	60.46	30.4	38.69	45.56	30.4	22.60	17.30	30.4	55.27	32.28
31.4	56.96	60.57	31.4	54.04	60.73	31.4	38.58	45.89	31.4	22.56	17.62	31.4	55.00	32.57
11.10	-11.06		6.21	-6.13		20.31	+20.29		7.73	+7.67		18.54	-18.51	
5 ^h 45 ^m	51°.396		6 ^h 46 ^m	48°.653		7 ^h 3 ^m	2°.335		7 ^h 14 ^m	7°.912		7 ^h 15 ^m	39°.691	
-84° 49'	44".27		-80° 43'	46".14		+87° 10'	43".86		+82° 34'	17".32		-86° 54'	19".75	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamæleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Jan.	h m 8 19 s	° ' " +88 52 "	Jan.	h m 9 8 s	° ' " -85 20 "	Jan.	h m 9 25 s	° ' " +81 40 "	Jan.	h m 9 36 s	° ' " -80 34 "	Jan.	h m 10 21 s	° ' " +82 57 "
0.6	3.23	22.31	0.6	54.14	21.59	0.6	47.94	48.92	0.6	25.48	32.71	0.7	26.98	53.12
1.6	4.00	22.56	1.6	54.25	21.93	1.6	48.09	49.07	1.6	25.56	33.05	1.7	27.18	53.20
2.6	4.77	22.83	2.6	54.36	22.27	2.6	48.24	49.25	2.6	25.62	33.38	2.6	27.37	53.31
3.6	5.51	23.11	3.6	54.46	22.60	3.6	48.38	49.45	3.6	25.69	33.70	3.6	27.56	53.43
4.6	6.19	23.42	4.6	54.56	22.93	4.6	48.52	49.66	4.6	25.76	34.03	4.6	27.75	53.58
5.6	6.78	23.73	5.6	54.65	23.24	5.6	48.65	49.89	5.6	25.83	34.33	5.6	27.94	53.75
6.6	7.29	24.04	6.6	54.75	23.55	6.6	48.75	50.13	6.6	25.90	34.62	6.6	28.09	53.93
7.5	7.72	24.35	7.6	54.88	23.88	7.6	48.86	50.36	7.6	25.98	34.94	7.6	28.23	54.11
8.5	8.10	24.64	8.6	55.01	24.22	8.6	48.95	50.59	8.6	26.06	35.27	8.6	28.37	54.28
9.5	8.48	24.92	9.6	55.14	24.58	9.6	49.04	50.78	9.6	26.14	35.63	9.6	28.50	54.44
10.5	8.88	25.16	10.6	55.25	24.96	10.6	49.13	50.98	10.6	26.23	35.99	10.6	28.64	54.59
11.5	9.31	25.41	11.6	55.36	25.37	11.6	49.23	51.16	11.6	26.31	36.38	11.6	28.78	54.72
12.5	9.79	25.67	12.6	55.44	25.78	12.6	49.35	51.35	12.6	26.37	36.79	12.6	28.93	54.84
13.5	10.32	25.94	13.6	55.50	26.17	13.6	49.46	51.53	13.6	26.43	37.19	13.6	29.10	54.98
14.5	10.86	26.21	14.6	55.55	26.56	14.6	49.59	51.74	14.6	26.48	37.58	14.6	29.27	55.13
15.5	11.39	26.52	15.6	55.59	26.94	15.6	49.72	51.97	15.6	26.53	37.95	15.6	29.44	55.31
16.5	11.85	26.84	16.6	55.62	27.28	16.6	49.82	52.22	16.6	26.57	38.31	16.6	29.59	55.50
17.5	12.24	27.19	17.6	55.66	27.62	17.6	49.92	52.49	17.6	26.61	38.65	17.6	29.75	55.72
18.5	12.55	27.52	18.6	55.70	27.97	18.6	50.02	52.78	18.6	26.65	39.00	18.6	29.90	55.96
19.5	12.76	27.86	19.6	55.75	28.31	19.6	50.10	53.07	19.6	26.69	39.33	19.6	30.03	56.18
20.5	12.92	28.18	20.6	55.80	28.67	20.6	50.17	53.36	20.6	26.74	39.67	20.6	30.14	56.43
21.5	13.04	28.51	21.6	55.86	29.03	21.6	50.23	53.63	21.6	26.79	40.04	21.6	30.25	56.68
22.5	13.13	28.82	22.6	55.92	29.40	22.6	50.29	53.90	22.6	26.84	40.41	22.6	30.35	56.91
23.5	13.21	29.11	23.6	55.98	29.79	23.6	50.34	54.15	23.6	26.89	40.80	23.6	30.45	57.15
24.5	13.31	29.39	24.6	56.03	30.18	24.6	50.39	54.40	24.6	26.93	41.19	24.6	30.55	57.38
25.5	13.42	29.68	25.6	56.06	30.59	25.6	50.45	54.65	25.6	26.97	41.60	25.6	30.65	57.60
26.5	13.56	29.98	26.6	56.07	31.00	26.6	50.52	54.90	26.6	27.01	42.01	26.6	30.77	57.81
27.5	13.73	30.28	27.6	56.08	31.41	27.6	50.59	55.15	27.6	27.04	42.43	27.6	30.88	58.03
28.5	13.91	30.59	28.6	56.08	31.82	28.6	50.67	55.42	28.6	27.05	42.84	28.6	31.01	58.26
29.5	14.10	30.91	29.6	56.05	32.22	29.6	50.75	55.69	29.6	27.06	43.25	29.6	31.13	58.48
30.5	14.25	31.24	30.6	56.01	32.60	30.6	50.83	55.97	30.6	27.07	43.63	30.6	31.25	58.73
31.5	14.37	31.58	31.6	55.97	32.97	31.6	50.89	56.27	31.6	27.08	44.01	31.6	31.36	59.00
50.89 +50.88			12.31 -12.27			6.91 +6.84			6.11 -6.03			8.16 +8.10		
8 ^h 17 ^m 47 ^s .546			9 ^h 8 ^m 41 ^s .594			9 ^h 25 ^m 39 ^s .275			9 ^h 36 ^m 19 ^s .026			10 ^h 21 ^m 19 ^s .949		
+88° 52' 37".80			-85° 20' 26".78			+81° 41' 10".13			-80° 34' 39".26			+82° 58' 17".67		

APPARENT PLACES OF STARS, 1919.

235

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3			Bradley 1679. Mag. 6.3			ϵ Octantis. Mag. 5.4			32 H. Camelop. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
h m s	° ' "		h m s	° ' "		h m s	° ' "		h m s	° ' "		h m s	° ' "	
Jan. 11 0	-84 9		Jan. 12 14	+88 8		Jan. 12 46	-84 40		Jan. 12 48	+83 50		Jan. 13 27	-85 22	
0.7 2.08	18.31	0.7	26.35	29.34	0.8	22.92	47.30	0.8	28.74	45.00	0.8	34.92	4.70	
0.7 2.26	18.56	1.7	27.05	29.28	1.8	23.19	47.41	1.8	28.96	44.89	1.8	35.24	4.76	
0.7 2.44	18.81	2.7	27.80	29.22	2.7	23.44	47.52	2.8	29.19	44.78	2.8	35.53	4.81	
0.7 2.61	19.07	3.7	28.56	29.18	3.7	23.68	47.63	3.7	29.42	44.69	3.8	35.81	4.87	
0.7 2.77	19.32	4.7	29.32	29.16	4.7	23.91	47.74	4.7	29.66	44.62	4.8	36.07	4.91	
0.7 2.94	19.55	5.7	30.07	29.19	5.7	24.14	47.83	5.7	29.89	44.56	5.8	36.35	4.95	
0.7 3.11	19.76	6.7	30.78	29.22	6.7	24.37	47.92	6.7	30.11	44.52	6.8	36.63	4.96	
0.7 3.30	19.98	7.7	31.45	29.27	7.7	24.61	48.00	7.7	30.31	44.52	7.8	36.91	4.97	
0.7 3.49	20.22	8.7	32.08	29.32	8.7	24.88	48.08	8.7	30.51	44.51	8.8	37.23	5.01	
0.7 3.68	20.49	9.7	32.67	29.37	9.7	25.16	48.20	9.7	30.70	44.51	9.8	37.56	5.05	
0.7 3.89	20.77	10.7	33.25	29.39	10.7	25.45	48.33	10.7	30.88	44.48	10.8	37.89	5.10	
0.7 4.09	21.08	11.7	33.84	29.40	11.7	25.74	48.48	11.7	31.07	44.45	11.8	38.24	5.19	
2.6 4.27	21.41	12.7	34.44	29.41	12.7	26.03	48.66	12.7	31.26	44.41	12.7	38.58	5.32	
3.6 4.45	21.75	13.7	35.09	29.41	13.7	26.30	48.86	13.7	31.46	44.35	13.7	38.92	5.45	
4.6 4.59	22.08	14.7	35.79	29.42	14.7	26.54	49.06	14.7	31.69	44.30	14.7	39.22	5.59	
5.6 4.73	22.40	15.7	36.52	29.46	15.7	26.78	49.26	15.7	31.92	44.28	15.7	39.51	5.73	
6.6 4.87	22.70	16.7	37.25	29.52	16.7	27.01	49.45	16.7	32.16	44.27	16.7	39.79	5.86	
7.6 4.99	22.99	17.7	37.98	29.61	17.7	27.22	49.63	17.7	32.38	44.30	17.7	40.06	5.98	
8.6 5.12	23.27	18.7	38.69	29.72	18.7	27.44	49.80	18.7	32.61	44.33	18.7	40.33	6.09	
9.6 5.26	23.54	19.7	39.36	29.85	19.7	27.67	49.95	19.7	32.83	44.39	19.7	40.60	6.18	
10.6 5.41	23.82	20.7	39.98	29.97	20.7	27.89	50.10	20.7	33.03	44.48	20.7	40.88	6.27	
11.6 5.56	24.11	21.7	40.58	30.10	21.7	28.13	50.27	21.7	33.22	44.55	21.7	41.17	6.38	
12.6 5.71	24.43	22.7	41.15	30.23	22.7	28.38	50.44	22.7	33.41	44.64	22.7	41.49	6.49	
13.6 5.87	24.74	23.7	41.71	30.36	23.7	28.63	50.63	23.7	33.60	44.72	23.7	41.80	6.62	
14.6 6.02	25.07	24.7	42.26	30.49	24.7	28.89	50.83	24.7	33.78	44.80	24.7	42.11	6.75	
15.6 6.17	25.43	25.7	42.81	30.59	25.7	29.14	51.06	25.7	33.96	44.86	25.7	42.42	6.89	
16.6 6.31	25.79	26.7	43.37	30.71	26.7	29.39	51.29	26.7	34.15	44.93	26.7	42.74	7.08	
17.6 6.45	26.16	27.7	43.96	30.82	27.7	29.63	51.55	27.7	34.34	44.99	27.7	43.05	7.28	
18.6 6.56	26.53	28.7	44.55	30.93	28.7	29.87	51.82	28.7	34.54	45.05	28.7	43.34	7.49	
19.6 6.66	26.90	29.7	45.19	31.06	29.7	30.09	52.09	29.7	34.75	45.11	29.7	43.63	7.70	
20.6 6.76	27.27	30.6	45.83	31.20	30.7	30.29	52.35	30.7	34.97	45.19	30.7	43.89	7.91	
21.6 6.85	27.61	31.6	46.48	31.35	31.7	30.49	52.62	31.7	35.19	45.28	31.7	44.14	8.12	
9.82	-9.77		30.83	+30.82		10.79	-10.74		9.33	+9.27		12.38	-12.34	
10 ^h 59 ^m 54 ^s .546			12 ^h 14 ^m 29 ^s .190			12 ^h 46 ^m 19 ^s .119			12 ^h 48 ^m 31 ^s .308			13 ^h 27 ^m 32 ^s .891		
34° 9' 29".33			+88° 8' 56".19			-84° 41' 1".57			+83° 51' 11".30			-85° 22' 19".48		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2933. Mag. 7.2			ρ Octantis. Mag. 5.7			ϵ Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Jan.	h m	° ' "	Jan.	h m	° ' "	Jan.	h m	° ' "	Jan.	h m	° ' "	Jan.	h m	° ' "
	14 13	-83 17		15 2	+87 32		15 24	-84 11		16 54	+82 10		17 16	-80 46
	s	"		s	"		s	"		s	"		s	"
0.8	46.34	39.91	0.8	33.48	23.92	0.9	20.27	42.02	0.9	1.43	13.83	0.9	13.29	65.42
1.8	46.56	39.90	1.8	33.83	23.65	1.9	20.51	41.89	1.9	1.48	13.46	1.9	13.40	65.17
2.8	46.76	39.89	2.8	34.20	23.39	2.9	20.73	41.76	2.9	1.52	13.08	2.9	13.50	64.93
3.8	46.96	39.88	3.8	34.61	23.12	3.9	20.93	41.64	3.9	1.58	12.69	3.9	13.60	64.70
4.8	47.16	39.87	4.8	35.03	22.87	4.9	21.13	41.52	4.9	1.67	12.34	4.9	13.70	64.48
5.8	47.35	39.86	5.8	35.47	22.64	5.9	21.34	41.40	5.9	1.74	12.00	5.9	13.79	64.24
6.8	47.54	39.82	6.8	35.91	22.44	6.8	21.54	41.27	6.9	1.82	11.67	6.9	13.87	64.00
7.8	47.74	39.78	7.8	36.35	22.26	7.8	21.74	41.13	7.9	1.91	11.37	7.9	13.96	63.73
8.8	47.96	39.73	8.8	36.76	22.09	8.8	21.97	40.98	8.9	1.99	11.09	8.9	14.05	63.45
9.8	48.18	39.69	9.8	37.14	21.92	9.8	22.20	40.83	9.9	2.07	10.83	9.9	14.15	63.17
10.8	48.42	39.67	10.8	37.50	21.75	10.8	22.47	40.68	10.9	2.13	10.57	10.9	14.28	62.89
11.8	48.67	39.67	11.8	37.85	21.58	11.8	22.74	40.56	11.9	2.20	10.31	11.9	14.40	62.61
12.8	48.92	39.72	12.8	38.22	21.39	12.8	23.02	40.47	12.9	2.28	10.02	12.9	14.54	62.37
13.8	49.15	39.77	13.8	38.61	21.19	13.8	23.29	40.41	13.9	2.36	9.71	13.9	14.69	62.14
14.8	49.38	39.85	14.8	39.03	20.97	14.8	23.54	40.36	14.9	2.44	9.40	14.9	14.83	61.95
15.8	49.60	39.94	15.8	39.49	20.76	15.8	23.79	40.32	15.9	2.52	9.07	15.9	14.97	61.76
16.8	49.80	40.00	16.8	39.96	20.56	16.8	24.03	40.28	16.9	2.63	8.75	16.9	15.09	61.57
17.8	50.00	40.05	17.8	40.46	20.37	17.8	24.26	40.23	17.9	2.74	8.43	17.9	15.20	61.40
18.8	50.20	40.10	18.8	40.98	20.23	18.8	24.48	40.18	18.9	2.85	8.14	18.9	15.31	61.21
19.8	50.39	40.14	19.8	41.49	20.09	19.8	24.70	40.12	19.9	2.96	7.86	19.9	15.42	61.01
20.8	50.59	40.18	20.8	41.97	19.99	20.8	24.93	40.04	20.9	3.09	7.61	20.9	15.53	60.79
21.8	50.81	40.21	21.8	42.45	19.89	21.8	25.16	39.96	21.9	3.20	7.38	21.9	15.64	60.57
22.8	51.03	40.26	22.8	42.92	19.80	22.8	25.40	39.88	22.9	3.31	7.15	22.9	15.77	60.34
23.8	51.26	40.30	23.8	43.37	19.72	23.8	25.67	39.82	23.9	3.42	6.93	23.9	15.91	60.12
24.7	51.48	40.38	24.8	43.82	19.63	24.8	25.94	39.76	24.9	3.53	6.73	24.9	16.05	59.90
25.7	51.72	40.46	25.8	44.26	19.53	25.8	26.20	39.72	25.9	3.65	6.52	25.9	16.19	59.69
26.7	51.96	40.56	26.8	44.70	19.44	26.8	26.48	39.70	26.9	3.76	6.30	26.9	16.34	59.49
27.7	52.20	40.69	27.8	45.16	19.35	27.8	26.75	39.70	27.9	3.87	6.06	27.9	16.49	59.31
28.7	52.42	40.83	28.8	45.63	19.24	28.8	27.03	39.72	28.8	3.99	5.81	28.9	16.66	59.17
29.7	52.64	40.97	29.8	46.11	19.12	29.8	27.31	39.75	29.8	4.11	5.56	29.9	16.81	59.02
30.7	52.84	41.12	30.8	46.62	19.01	30.8	27.54	39.79	30.8	4.24	5.29	30.9	16.97	58.89
31.7	53.04	41.26	31.8	47.15	18.91	31.8	27.79	39.83	31.8	4.37	5.04	31.9	17.12	58.77
8.56	-8.50		23.29	+23.27		9.89	-9.84		7.34	+7.27		6.24	-6.16	
14 ^h 13 ^m 46 ^s .350			15 ^h 3 ^m 2 ^s .510			15 ^h 24 ^m 23 ^s .351			16 ^h 54 ^m 12 ^s .991			17 ^h 16 ^m 17 ^s .234		
-83° 17' 54'' .52			+87° 32' 42'' .66			-84° 11' 55'' .43			+82° 10' 21'' .42			-80° 47' 14'' .27		

APPARENT PLACES OF STARS, 1919.

237

CIRCUMPOLAR STARS.

/ FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Jan.	h m	° '	Jan.	h m	° '	Jan.	h m	° '	Jan.	h m	° '	Jan.	h m	° '
	17 57	+86 36		18 7	-87 39		18 58	+89 1		19 29	-89 13		20 48	+82 14
	"	"		"	"		"	"		"	"		"	"
0.9	53.00	50.84	0.9	2.14	44.60	1.0	34.74	19.75	1.0	38.48	12.28	1.1	23.38	14.61
1.9	52.99	50.48	1.9	2.42	44.29	2.0	34.29	19.43	2.0	38.68	11.92	2.1	23.27	14.34
2.9	52.98	50.12	2.9	2.68	43.99	3.0	33.88	19.09	3.0	38.91	11.57	3.1	23.16	14.08
3.9	52.99	49.73	3.9	2.93	43.70	4.0	33.53	18.72	4.0	39.11	11.24	4.1	23.04	13.79
4.9	53.03	49.35	4.9	3.18	43.42	5.0	33.27	18.36	5.0	39.27	10.92	5.1	22.94	13.48
5.9	53.10	49.00	5.9	3.41	43.13	5.9	33.11	18.02	6.0	39.37	10.59	6.1	22.86	13.16
6.9	53.19	48.67	6.9	3.61	42.81	6.9	33.04	17.68	7.0	39.40	10.26	7.1	22.77	12.86
7.9	53.27	48.34	7.9	3.82	42.50	7.9	33.00	17.36	8.0	39.41	9.90	8.1	22.71	12.57
8.9	53.36	48.05	8.9	4.05	42.17	8.9	33.00	17.05	9.0	39.47	9.53	9.1	22.65	12.29
9.9	53.45	47.76	9.9	4.33	41.82	9.9	32.97	16.76	10.0	39.61	9.13	10.1	22.59	12.02
10.9	53.52	47.48	10.9	4.65	41.47	10.9	32.90	16.47	11.0	39.85	8.72	11.1	22.53	11.77
11.9	53.58	47.19	11.9	5.00	41.12	11.9	32.77	16.19	12.0	40.24	8.32	12.1	22.46	11.53
12.9	53.63	46.88	12.9	5.40	40.79	12.9	32.60	15.88	13.0	40.78	7.94	13.1	22.38	11.28
13.9	53.68	46.55	13.9	5.81	40.50	13.9	32.42	15.56	13.9	41.38	7.57	14.1	22.30	11.00
14.9	53.75	46.22	14.9	6.23	40.21	14.9	32.27	15.22	14.9	42.03	7.20	15.0	22.23	10.72
15.9	53.84	45.87	15.9	6.63	39.94	15.9	32.18	14.88	15.9	42.66	6.86	16.0	22.15	10.41
16.9	53.96	45.52	16.9	7.01	39.70	16.9	32.19	14.51	16.9	43.24	6.54	17.0	22.08	10.09
17.9	54.09	45.17	17.9	7.35	39.46	17.9	32.28	14.16	17.9	43.77	6.22	18.0	22.02	9.74
18.9	54.24	44.84	18.9	7.68	39.20	18.9	32.47	13.82	18.9	44.23	5.92	19.0	21.97	9.39
19.9	54.42	44.53	19.9	8.00	38.93	19.9	32.74	13.48	19.9	44.64	5.59	20.0	21.93	9.05
20.9	54.60	44.24	20.9	8.32	38.64	20.9	33.04	13.15	20.9	45.04	5.26	21.0	21.89	8.72
21.9	54.78	43.96	21.9	8.66	38.35	21.9	33.36	12.84	21.9	45.47	4.92	22.0	21.86	8.39
22.9	54.97	43.68	22.9	9.03	38.06	22.9	33.69	12.55	22.9	45.96	4.55	23.0	21.83	8.07
23.9	55.16	43.41	23.9	9.43	37.74	23.9	34.02	12.25	23.9	46.52	4.18	24.0	21.80	7.78
24.9	55.33	43.14	24.9	9.85	37.43	24.9	34.31	11.96	24.9	47.16	3.81	25.0	21.79	7.48
25.9	55.50	42.88	25.9	10.30	37.14	25.9	34.60	11.68	25.9	47.90	3.45	26.0	21.77	7.19
26.9	55.65	42.62	26.9	10.77	36.86	26.9	34.86	11.40	26.9	48.74	3.10	27.0	21.74	6.89
27.9	55.82	42.35	27.9	11.28	36.60	27.9	35.09	11.11	27.9	49.65	2.75	28.0	21.71	6.58
28.9	55.99	42.07	28.9	11.79	36.36	28.9	35.33	10.80	28.9	50.63	2.42	29.0	21.68	6.26
29.9	56.18	41.78	29.9	12.30	36.13	29.9	35.60	10.48	29.9	51.65	2.09	30.0	21.65	5.93
30.9	56.37	41.48	30.9	12.81	35.93	30.9	35.92	10.15	30.9	52.65	1.78	31.0	21.62	5.60
31.9	56.58	41.18	31.9	13.29	35.73	31.9	36.31	9.81	31.9	53.62	1.47	32.0	21.61	5.23
16.93	+16.90		24.50	-24.48		58.52	+58.51		73.32	-73.32		7.40	+7.34	
17 ^h 58 ^m	22 ^s .311		18 ^h 7 ^m	23 ^s .343		19 ^h 0 ^m	15 ^s .079		19 ^h 30 ^m	50 ^s .769		20 ^h 48 ^m	32 ^s .146	
+86° 36'	51'''.04		-87° 39'	50'''.89		+89° 1'	12'''.80		-89° 13'	13'''.35		+82° 13'	56'''.82	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Jan.	h m 21 38	° ' " -83 5	Jan.	h m 22 16	° ' " -86 22	Jan.	h m 22 37	° ' " -81 48	Jan.	h m 23 27	° ' " +86 52	Jan.	h m 23 47	° ' " -82 28
	s "	"		s "	"		s "	"		s "	"		s "	"
1.1	32.20	41.36	1.1	21.59	60.03	1.2	47.50	34.96	1.2	40.04	5.16	1.2	20.84	21.41
2.1	32.14	41.08	2.1	21.40	59.77	2.2	47.40	34.71	2.2	39.62	5.13	2.2	20.70	21.24
3.1	32.08	40.80	3.1	21.21	59.50	3.2	47.30	34.46	3.2	39.20	5.09	3.2	20.57	21.08
4.1	32.00	40.52	4.1	21.02	59.26	4.2	47.21	34.23	4.2	38.78	5.04	4.2	20.44	20.93
5.1	31.93	40.25	5.1	20.83	59.02	5.2	47.13	34.02	5.2	38.35	4.95	5.2	20.31	20.79
6.1	31.86	39.99	6.1	20.62	58.76	6.2	47.03	33.81	6.2	37.94	4.85	6.2	20.17	20.66
7.1	31.77	39.71	7.1	20.39	58.50	7.1	46.92	33.60	7.2	37.56	4.72	7.2	20.02	20.52
8.1	31.67	39.42	8.1	20.15	58.24	8.1	46.79	33.37	8.2	37.21	4.60	8.2	19.87	20.38
9.1	31.57	39.11	9.1	19.91	57.96	9.1	46.68	33.12	9.2	36.88	4.48	9.2	19.70	20.22
10.1	31.48	38.79	10.1	19.66	57.65	10.1	46.57	32.85	10.2	36.56	4.37	10.2	19.53	20.04
11.1	31.39	38.44	11.1	19.42	57.33	11.1	46.46	32.56	11.2	36.25	4.27	11.2	19.37	19.88
12.1	31.32	38.07	12.1	19.22	56.99	12.1	46.36	32.24	12.2	35.94	4.19	12.2	19.22	19.61
13.1	31.27	37.69	13.1	19.05	56.63	13.1	46.28	31.92	13.2	35.59	4.12	13.2	19.08	19.37
14.1	31.23	37.34	14.1	18.91	56.29	14.1	46.20	31.60	14.2	35.23	4.04	14.2	18.95	19.13
15.1	31.20	37.00	15.1	18.77	55.96	15.1	46.14	31.30	15.2	34.86	3.95	15.2	18.85	18.88
16.1	31.18	36.66	16.1	18.65	55.64	16.1	46.09	31.01	16.2	34.45	3.81	16.2	18.74	18.63
17.1	31.15	36.34	17.1	18.53	55.33	17.1	46.03	30.73	17.2	34.06	3.65	17.2	18.64	18.41
18.1	31.11	36.04	18.1	18.40	55.02	18.1	45.95	30.45	18.2	33.68	3.48	18.2	18.51	18.19
19.1	31.07	35.73	19.1	18.26	54.73	19.1	45.87	30.19	19.1	33.32	3.29	19.2	18.39	18.00
20.1	31.02	35.44	20.1	18.09	54.43	20.1	45.78	29.93	20.1	32.98	3.09	20.2	18.26	17.79
21.1	30.96	35.13	21.1	17.92	54.14	21.1	45.70	29.66	21.1	32.66	2.89	21.2	18.13	17.59
22.1	30.90	34.80	22.1	17.74	53.83	22.1	45.61	29.37	22.1	32.37	2.69	22.2	17.99	17.37
23.1	30.85	34.45	23.1	17.57	53.50	23.1	45.52	29.08	23.1	32.08	2.50	23.2	17.85	17.14
24.1	30.80	34.09	24.1	17.40	53.15	24.1	45.44	28.76	24.1	31.80	2.31	24.1	17.71	16.90
25.1	30.76	33.73	25.1	17.26	52.79	25.1	45.37	28.43	25.1	31.53	2.14	25.1	17.57	16.63
26.1	30.72	33.35	26.1	17.13	52.41	26.1	45.29	28.07	26.1	31.26	1.96	26.1	17.45	16.36
27.1	30.69	32.97	27.1	17.03	52.03	27.1	45.24	27.70	27.1	30.98	1.79	27.1	17.32	16.07
28.0	30.71	32.58	28.1	16.93	51.65	28.1	45.20	27.34	28.1	30.69	1.62	28.1	17.23	15.76
29.0	30.72	32.20	29.1	16.87	51.26	29.1	45.15	26.99	29.1	30.38	1.43	29.1	17.13	15.45
30.0	30.73	31.84	30.1	16.82	50.89	30.1	45.12	26.65	30.1	30.06	1.24	30.1	17.04	15.14
31.0	30.74	31.50	31.1	16.78	50.53	31.1	45.09	26.31	31.1	29.74	1.02	31.1	16.96	14.85
32.0	30.75	31.16	32.1	16.74	50.20	32.1	45.06	25.99	32.1	29.41	0.79	32.1	16.87	14.56
8.32	-8.26		15.85	-15.82		7.02	-6.95		18.30	+18.27		7.63	-7.57	
21 ^h 38 ^m	38° 54'		22 ^h 16 ^m	33° 21'		22 ^h 37 ^m	51° 62'		23 ^h 27 ^m	43° 57'		23 ^h 47 ^m	23° 63'	
-83° 5'	34'' 33		-86° 22'	50'' 92		-81° 48'	24'' 80		+86° 51'	38'' 62		-82° 28'	8'' 42	

APPARENT PLACES OF STARS, 1919.

239

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
abh. con no.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
ab.	h m ° ' "		Feb.	h m ° ' "		Feb.	h m ° ' "		Feb.	h m ° ' "		Feb.	h m ° ' "	
	0 57 +85 49			1 30 +88 52			1 41 -85 10			4 10 +85 20			5 36 +85 9	
	s "			s "			s "			s "			s "	
0.2	23.34	49.44	0.2	76.26	46.33	0.2	47.39	58.28	0.3	53.35	47.66	0.4	9.92	45.69
1.2	23.04	49.32	1.2	75.09	46.27	1.2	47.16	58.11	1.3	53.11	47.84	1.4	9.74	45.94
2.2	22.75	49.18	2.2	73.91	46.18	2.2	46.93	57.95	2.3	52.86	47.98	2.4	9.56	46.18
3.2	22.47	49.03	3.2	72.77	46.08	3.2	46.69	57.80	3.3	52.59	48.09	3.4	9.36	46.42
4.2	22.20	48.85	4.2	71.70	45.95	4.2	46.45	57.66	4.3	52.34	48.19	4.4	9.15	46.62
5.2	21.96	48.67	5.2	70.71	45.82	5.2	46.17	57.53	5.3	52.09	48.28	5.4	8.96	46.80
6.2	21.73	48.49	6.2	69.80	45.69	6.2	45.88	57.39	6.3	51.85	48.34	6.4	8.77	46.95
7.2	21.53	48.34	7.2	68.93	45.57	7.2	45.60	57.20	7.3	51.64	48.40	7.4	8.60	47.12
8.2	21.32	48.19	8.2	68.08	45.47	8.2	45.32	57.01	8.3	51.44	48.48	8.3	8.45	47.29
9.2	21.12	48.06	9.2	67.21	45.38	9.2	45.04	56.78	9.3	51.23	48.56	9.3	8.30	47.47
10.2	20.89	47.92	10.2	66.29	45.29	10.2	44.79	56.55	10.3	51.03	48.66	10.3	8.15	47.66
11.1	20.65	47.77	11.2	65.30	45.20	11.2	44.55	56.30	11.3	50.81	48.77	11.3	7.98	47.86
12.1	20.38	47.62	12.2	64.25	45.10	12.2	44.33	56.05	12.3	50.57	48.88	12.3	7.80	48.09
13.1	20.12	47.45	13.2	63.18	44.96	13.2	44.13	55.81	13.3	50.31	49.00	13.3	7.61	48.31
14.1	19.85	47.26	14.2	62.09	44.84	14.2	43.91	55.58	14.3	50.03	49.08	14.3	7.38	48.51
15.1	19.60	47.04	15.2	61.03	44.67	15.2	43.69	55.38	15.3	49.75	49.16	15.3	7.14	48.70
16.1	19.36	46.81	16.2	60.02	44.48	16.2	43.48	55.17	16.3	49.47	49.20	16.3	6.91	48.85
17.1	19.12	46.58	17.2	59.06	44.26	17.2	43.26	54.97	17.3	49.19	49.21	17.3	6.67	49.00
18.1	18.93	46.33	18.2	58.15	44.04	18.2	43.02	54.76	18.3	48.92	49.21	18.3	6.42	49.14
19.1	18.73	46.08	19.2	57.30	43.84	19.2	42.78	54.55	19.3	48.64	49.21	19.3	6.18	49.24
20.1	18.54	45.84	20.1	56.50	43.63	20.2	42.54	54.32	20.3	48.40	49.20	20.3	5.95	49.35
21.1	18.37	45.60	21.1	55.73	43.43	21.2	42.29	54.08	21.3	48.15	49.19	21.3	5.73	49.44
22.1	18.20	45.38	22.1	54.97	43.24	22.1	42.05	53.82	22.3	47.92	49.18	22.3	5.53	49.54
23.1	18.03	45.16	23.1	54.22	43.05	23.1	41.81	53.55	23.3	47.69	49.17	23.3	5.33	49.64
24.1	17.86	44.93	24.1	53.45	42.86	24.1	41.59	53.27	24.2	47.46	49.17	24.3	5.12	49.74
25.1	17.68	44.72	25.1	52.66	42.67	25.1	41.39	52.96	25.2	47.22	49.18	25.3	4.92	49.87
26.1	17.49	44.50	26.1	51.81	42.48	26.1	41.19	52.65	26.2	46.99	49.20	26.3	4.70	49.99
27.1	17.29	44.27	27.1	50.93	42.29	27.1	41.00	52.34	27.2	46.72	49.21	27.3	4.48	50.12
28.1	17.09	44.04	28.1	50.05	42.08	28.1	40.83	52.05	28.2	46.46	49.22	28.3	4.25	50.25
29.1	16.88	43.78	29.1	49.16	41.85	29.1	40.65	51.76	29.2	46.17	49.22	29.3	3.98	50.36
30.1	16.69	43.50	30.1	48.31	41.61	30.1	40.47	51.47	30.2	45.89	49.18	30.3	3.72	50.45
31.1	16.51	43.18	31.1	47.53	41.34	31.1	40.30	51.19	31.2	45.60	49.13	31.3	3.45	50.50
13.75	+13.72		51.12	+51.11		11.91	-11.86		12.33	+12.29		11.86	+11.82	
0 ^h 57 ^m 24 ^s .633			1 ^h 31 ^m 11 ^s .709			1 ^h 41 ^m 54 ^s .846			4 ^h 10 ^m 37 ^s .831			5 ^h 35 ^m 50 ^s .330		
85° 49' 24".14			+88° 52' 20".55			-85° 10' 45".22			+85° 20' 28".88			+85° 9' 34".51		

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensae. Mag. 6.2			5 Mensae. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelopardalis. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Feb.	h m	° '	Feb.	h m	° '	Feb.	h m	° '	Feb.	h m	° '	Feb.	h m	° '
	5 45	-84 50		6 46	-80 44		7 3	+87 10		7 14	+82 34		7 15	-86 54
	s	"		s	"		s	"		s	"		s	"
0.4	56.96	0.57	0.4	54.04	0.73	0.4	38.58	45.89	0.4	22.56	17.62	0.4	55.00	32.57
1.4	56.74	0.76	1.4	53.95	1.00	1.4	38.44	46.22	1.4	22.52	17.95	1.4	54.76	32.85
2.4	56.54	0.96	2.4	53.85	1.27	2.4	38.28	46.54	2.4	22.47	18.28	2.4	54.52	33.14
3.4	56.33	1.16	3.4	53.76	1.55	3.4	38.09	46.85	3.4	22.41	18.59	3.4	54.29	33.45
4.4	56.12	1.39	4.4	53.67	1.86	4.4	37.86	47.14	4.4	22.34	18.88	4.4	54.07	33.76
5.4	55.90	1.63	5.4	53.58	2.17	5.4	37.64	47.39	5.4	22.27	19.13	5.4	53.84	34.09
6.4	55.68	1.87	6.4	53.49	2.49	6.4	37.44	47.63	6.4	22.20	19.36	6.4	53.58	34.44
7.4	55.43	2.11	7.4	53.39	2.83	7.4	37.25	47.87	7.4	22.13	19.59	7.4	53.31	34.79
8.4	55.16	2.35	8.4	53.28	3.15	8.4	37.10	48.10	8.4	22.06	19.82	8.4	53.01	35.13
9.4	54.90	2.55	9.4	53.16	3.45	9.4	36.95	48.36	9.4	22.04	20.05	9.4	52.69	35.46
10.4	54.63	2.73	10.4	53.05	3.73	10.4	36.80	48.62	10.4	22.00	20.31	10.4	52.35	35.76
11.3	54.36	2.89	11.4	52.92	3.97	11.4	36.63	48.89	11.4	21.96	20.59	11.4	52.01	36.05
12.3	54.11	3.03	12.4	52.79	4.20	12.4	36.46	49.17	12.4	21.90	20.88	12.4	51.66	36.32
13.3	53.86	3.16	13.4	52.67	4.42	13.4	36.24	49.47	13.4	21.83	21.18	13.4	51.33	36.56
14.3	53.62	3.29	14.4	52.56	4.64	14.4	35.99	49.77	14.4	21.74	21.47	14.4	51.00	36.81
15.3	53.38	3.43	15.4	52.46	4.86	15.4	35.71	50.05	15.4	21.64	21.75	15.4	50.69	37.06
16.3	53.15	3.57	16.4	52.35	5.08	16.4	35.40	50.32	16.4	21.54	22.02	16.4	50.40	37.33
17.3	52.91	3.72	17.4	52.24	5.32	17.4	35.09	50.56	17.4	21.43	22.27	17.4	50.11	37.60
18.3	52.67	3.90	18.4	52.12	5.57	18.4	34.76	50.80	18.4	21.31	22.50	18.4	49.80	37.89
19.3	52.41	4.05	19.4	51.99	5.84	19.4	34.45	51.01	19.4	21.20	22.72	19.4	49.49	38.17
20.3	52.16	4.21	20.4	51.88	6.10	20.4	34.14	51.21	20.4	21.09	22.92	20.4	49.17	38.45
21.3	51.89	4.37	21.4	51.75	6.37	21.4	33.84	51.41	21.4	20.98	23.12	21.4	48.81	38.74
22.3	51.61	4.52	22.4	51.62	6.61	22.4	33.55	51.60	22.4	20.88	23.31	22.4	48.45	39.02
23.3	51.33	4.67	23.4	51.49	6.83	23.4	33.27	51.80	23.4	20.79	23.52	23.4	48.07	39.29
24.3	51.04	4.79	24.4	51.35	7.05	24.4	33.00	52.01	24.4	20.69	23.74	24.4	47.68	39.54
25.3	50.75	4.89	25.4	51.21	7.25	25.4	32.74	52.23	25.4	20.60	23.96	25.4	47.27	39.78
26.3	50.47	4.98	26.3	51.08	7.43	26.4	32.46	52.46	26.4	20.51	24.19	26.4	46.85	40.01
27.3	50.18	5.04	27.3	50.93	7.59	27.4	32.18	52.69	27.4	20.42	24.42	27.4	46.44	40.21
28.3	49.91	5.08	28.3	50.79	7.74	28.4	31.86	52.93	28.4	20.31	24.65	28.4	46.06	40.41
29.3	49.64	5.13	29.3	50.65	7.90	29.4	31.50	53.15	29.4	20.18	24.90	29.4	45.67	40.69
30.3	49.37	5.22	30.3	50.52	8.05	30.3	31.13	53.36	30.4	20.04	25.11	30.4	45.29	40.78
31.3	49.13	5.30	31.3	50.39	8.23	31.3	30.73	53.55	31.4	19.89	25.31	31.4	44.93	41.00
11.11	-11.06		6.21	-6.13		20.33	+20.31		7.74	+7.67		18.55	-18.53	
5 ^h 45 ^m	51 ^s .396		6 ^h 46 ^m	48 ^s .653		7 ^h 3 ^m	2 ^s .335		7 ^h 14 ^m	7 ^s .912		7 ^h 15 ^m	39 ^s .691	
-84° 49'	44'' .27		-80° 43'	46'' .14		+87° 10'	43'' .86		+82° 34'	17'' .32		-86° 54'	19'' .75	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamaleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Feb.	h m	° ' "	Feb.	h m	° ' "	Feb.	h m	° ' "	Feb.	h m	° ' "	Feb.	h m	° ' "
	8 19	+88 52		9 8	-85 20		9 25	+81 40		9 36	-80 34		10 21	+82 57
	s	"		s	"		s	"		s	"		s	"
0.5	14.37	31.58	0.5	55.97	32.97	0.5	50.89	56.27	0.5	27.08	44.01	0.6	31.36	59.00
1.5	14.40	31.94	1.5	55.94	33.31	1.5	50.95	56.60	1.5	27.09	44.36	1.6	31.47	59.28
2.5	14.37	32.30	2.5	55.92	33.66	2.5	50.99	56.93	2.5	27.09	44.70	2.6	31.57	59.57
3.5	14.23	32.64	3.5	55.91	34.02	3.5	51.03	57.26	3.5	27.10	45.07	3.6	31.65	59.87
4.5	14.03	32.97	4.5	55.90	34.38	4.5	51.04	57.56	4.5	27.12	45.44	4.6	31.71	60.16
5.5	13.80	33.26	5.5	55.89	34.75	5.5	51.05	57.85	5.5	27.14	45.84	5.6	31.77	60.44
6.5	13.57	33.55	6.5	55.88	35.17	6.5	51.07	58.13	6.5	27.15	46.25	6.6	31.83	60.72
7.5	13.37	33.82	7.5	55.87	35.59	7.5	51.09	58.39	7.5	27.17	46.67	7.6	31.88	60.97
8.5	13.22	34.08	8.5	55.82	36.03	8.5	51.12	58.65	8.5	27.18	47.11	8.5	31.94	61.21
9.5	13.13	34.36	9.5	55.77	36.45	9.5	51.16	58.91	9.5	27.18	47.55	9.5	32.02	61.45
10.5	13.06	34.65	10.5	55.68	36.86	10.5	51.20	59.18	10.5	27.17	47.97	10.5	32.11	61.71
11.5	12.98	34.97	11.5	55.59	37.24	11.5	51.24	59.46	11.5	27.15	48.37	11.5	32.20	61.98
12.5	12.86	35.29	12.5	55.49	37.61	12.5	51.27	59.78	12.5	27.13	48.74	12.5	32.28	62.26
13.4	12.67	35.63	13.5	55.39	37.94	13.5	51.31	60.10	13.5	27.10	49.11	13.5	32.34	62.57
14.4	12.40	35.97	14.5	55.31	38.28	14.5	51.32	60.44	14.5	27.07	49.47	14.5	32.41	62.89
15.4	12.04	36.31	15.5	55.22	38.62	15.5	51.31	60.78	15.5	27.04	49.83	15.5	32.46	63.23
16.4	11.60	36.64	16.5	55.15	38.98	16.5	51.30	61.11	16.5	27.03	50.19	16.5	32.49	63.56
17.4	11.13	36.93	17.5	55.09	39.34	17.5	51.28	61.44	17.5	27.02	50.57	17.5	32.50	63.89
18.4	10.62	37.22	18.5	55.02	39.70	18.5	51.25	61.75	18.5	27.01	50.95	18.5	32.52	64.21
19.4	10.10	37.51	19.5	54.94	40.07	19.5	51.22	62.04	19.5	26.99	51.32	19.5	32.53	64.52
20.4	9.58	37.79	20.5	54.86	40.45	20.5	51.19	62.33	20.5	26.97	51.72	20.5	32.54	64.83
21.4	9.10	38.06	21.5	54.77	40.84	21.5	51.18	62.62	21.5	26.95	52.13	21.5	32.55	65.12
22.4	8.62	38.31	22.5	54.67	41.24	22.5	51.17	62.89	22.5	26.92	52.53	22.5	32.57	65.40
23.4	8.18	38.57	23.5	54.56	41.63	23.5	51.15	63.16	23.5	26.89	52.92	23.5	32.59	65.68
24.4	7.75	38.84	24.5	54.43	42.02	24.5	51.13	63.44	24.5	26.85	53.31	24.5	32.60	65.96
25.4	7.35	39.11	25.5	54.29	42.40	25.5	51.13	63.73	25.5	26.80	53.71	25.5	32.64	66.25
26.4	6.94	39.40	26.4	54.13	42.74	26.5	51.12	64.02	26.5	26.75	54.10	26.5	32.67	66.56
27.4	6.49	39.69	27.4	53.97	43.08	27.5	51.11	64.34	27.5	26.69	54.47	27.5	32.70	66.88
28.4	5.97	39.99	28.4	53.82	43.42	28.5	51.08	64.67	28.5	26.64	54.81	28.5	32.71	67.20
29.4	5.38	40.29	29.4	53.67	43.74	29.5	51.05	64.99	29.5	26.58	55.15	29.5	32.72	67.54
30.4	4.71	40.58	30.4	53.52	44.06	30.4	51.00	65.31	30.5	26.52	55.48	30.5	32.71	67.89
31.4	3.98	40.86	31.4	53.39	44.37	31.4	50.95	65.63	31.5	26.47	55.82	31.5	32.67	68.23
51.01	+51.00	12.32	-12.28	6.91	+6.84	6.11	-6.03	8.17	+8.11					
8 ^h 17 ^m	47 ^s .546	9 ^h 8 ^m	41 ^s .594	9 ^h 25 ^m	39 ^s .275	9 ^h 36 ^m	19 ^s .026	10 ^h 21 ^m	19 ^s .949					
+88° 52'	37''.80	-85° 20'	26''.78	+81° 41'	10''.13	-80° 34'	39''.26	+82° 58'	17''.67					

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			33 H. Camelopard. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Feb.	h m	° '	Feb.	h m	° '	Feb.	h m	° '	Feb.	h m	° '	Feb.	h m	° '
	11 0	-84 9		12 14	+88 8		12 46	-84 40		12 48	+83 50		13 27	-85 22
	s	"		s	"		s	"		s	"		s	"
0.6	6.85	27.61	0.6	46.48	31.35	0.7	30.49	52.62	0.7	35.19	45.28	0.7	44.14	8.12
1.6	6.93	27.95	1.6	47.11	31.53	1.7	30.67	52.86	1.7	35.39	45.40	1.7	44.38	8.32
2.6	7.01	28.28	2.6	47.73	31.72	2.7	30.86	53.10	2.7	35.59	45.53	2.7	44.63	8.51
3.6	7.10	28.61	3.6	48.29	31.92	3.7	31.06	53.33	3.7	35.78	45.70	3.7	44.90	8.68
4.6	7.21	28.94	4.6	48.80	32.13	4.7	31.28	53.55	4.7	35.96	45.87	4.7	45.16	8.86
5.6	7.34	29.30	5.6	49.26	32.34	5.7	31.50	53.79	5.7	36.11	46.04	5.7	45.44	9.02
6.6	7.46	29.67	6.6	49.68	32.55	6.7	31.72	54.06	6.7	36.26	46.19	6.7	45.75	9.22
7.6	7.57	30.05	7.6	50.11	32.74	7.7	31.96	54.35	7.7	36.42	46.35	7.7	46.06	9.44
8.6	7.67	30.47	8.6	50.56	32.90	8.6	32.19	54.67	8.6	36.59	46.49	8.7	46.36	9.68
9.6	7.76	30.88	9.6	51.02	33.07	9.6	32.41	54.99	9.6	36.76	46.61	9.7	46.65	9.96
10.6	7.82	31.30	10.6	51.53	33.25	10.6	32.61	55.32	10.6	36.93	46.74	10.7	46.93	10.25
11.6	7.88	31.71	11.6	52.07	33.44	11.6	32.80	55.64	11.6	37.11	46.87	11.7	47.17	10.54
12.6	7.93	32.09	12.6	52.62	33.64	12.6	32.97	55.97	12.6	37.29	47.03	12.7	47.40	10.81
13.6	7.97	32.47	13.6	53.17	33.86	13.6	33.12	56.28	13.6	37.49	47.21	13.7	47.62	11.07
14.6	8.01	32.84	14.6	53.69	34.10	14.6	33.27	56.57	14.6	37.67	47.40	14.7	47.84	11.34
15.6	8.06	33.18	15.6	54.17	34.37	15.6	33.42	56.86	15.6	37.84	47.62	15.7	48.06	11.58
16.6	8.10	33.54	16.6	54.60	34.65	16.6	33.60	57.14	16.6	37.99	47.85	16.7	48.28	11.80
17.5	8.16	33.90	17.6	55.00	34.93	17.6	33.76	57.42	17.6	38.15	48.09	17.7	48.51	12.03
18.5	8.22	34.26	18.6	55.36	35.21	18.6	33.94	57.70	18.6	38.28	48.33	18.6	48.76	12.26
19.5	8.28	34.64	19.6	55.69	35.49	19.6	34.12	57.99	19.6	38.41	48.57	19.6	49.00	12.53
20.5	8.34	35.03	20.6	56.02	35.77	20.6	34.31	58.30	20.6	38.53	48.82	20.6	49.25	12.79
21.5	8.40	35.44	21.6	56.34	36.02	21.6	34.49	58.62	21.6	38.65	49.06	21.6	49.50	13.07
22.5	8.46	35.85	22.6	56.66	36.27	22.6	34.67	58.97	22.6	38.78	49.28	22.6	49.76	13.36
23.5	8.50	36.26	23.6	56.98	36.51	23.6	34.84	59.33	23.6	38.91	49.48	23.6	50.00	13.67
24.5	8.52	36.67	24.6	57.32	36.75	24.6	35.00	59.70	24.6	39.04	49.68	24.6	50.23	13.99
25.5	8.53	37.09	25.6	57.69	36.99	25.6	35.15	60.06	25.6	39.18	49.89	25.6	50.46	14.32
26.5	8.53	37.50	26.6	58.06	37.25	26.6	35.28	60.43	26.6	39.32	50.11	26.6	50.65	14.65
27.5	8.53	37.88	27.6	58.44	37.52	27.6	35.41	60.79	27.6	39.47	50.34	27.6	50.84	14.98
28.5	8.53	38.27	28.6	58.82	37.80	28.6	35.51	61.14	28.6	39.61	50.58	28.6	51.02	15.31
29.5	8.52	38.64	29.6	59.17	38.11	29.6	35.61	61.48	29.6	39.74	50.86	29.6	51.19	15.62
30.5	8.52	39.00	30.6	59.48	38.43	30.6	35.74	61.81	30.6	39.85	51.14	30.6	51.37	15.92
31.5	8.52	39.36	31.6	59.72	38.76	31.6	35.86	62.14	31.6	39.96	51.45	31.6	51.56	16.21
9.83	-9.78		30.86	+30.84		10.79	-10.74		9.33	+9.28		12.39	-12.35	
10 ^h 59 ^m	54 ^s .546		12 ^h 14 ^m	29 ^s .190		12 ^h 46 ^m	19 ^s .119		12 ^h 48 ^m	31 ^s .308		13 ^h 27 ^m	32 ^s .891	
-84° 9'	29''.33		+88° 8'	56''.19		-84° 41'	1''.57		+83° 51'	11''.30		-85° 22'	19''.48	

APPARENT PLACES OF STARS, 1919.

243

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2263. Mag. 7.2			ρ Octantis. Mag. 5.7			ϵ Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Feb.	h m	° '	Feb.	h m	° '	Feb.	h m	° '	Feb.	h m	° '	Feb.	h m	° '
	14 13	-83 17		15 2	+87 32		15 24	-84 11		16 54	+82 10		17 16	-80 46
	s	"		s	"		s	"		s	"		s	"
0.7	53.04	41.26	0.8	47.15	18.91	0.8	27.79	39.83	0.8	4.37	5.04	0.9	17.12	58.77
1.7	53.24	41.40	1.8	47.70	18.84	1.8	28.03	39.88	1.8	4.51	4.80	1.9	17.25	58.64
2.7	53.42	41.53	2.8	48.26	18.79	2.8	28.26	39.90	2.8	4.66	4.60	2.9	17.39	58.51
3.7	53.61	41.64	3.8	48.79	18.78	3.8	28.50	39.91	3.8	4.80	4.40	3.8	17.52	58.36
4.7	53.81	41.75	4.8	49.30	18.77	4.8	28.74	39.91	4.8	4.95	4.23	4.8	17.65	58.20
5.7	54.04	41.88	5.7	49.78	18.77	5.8	29.01	39.91	5.8	5.10	4.10	5.8	17.80	58.03
6.7	54.26	42.00	6.7	50.25	18.78	6.8	29.28	39.91	6.8	5.23	3.96	6.8	17.95	57.86
7.7	54.50	42.15	7.7	50.68	18.79	7.8	29.55	39.94	7.8	5.36	3.82	7.8	18.12	57.69
8.7	54.74	42.33	8.7	51.11	18.78	8.8	29.85	39.99	8.8	5.50	3.68	8.8	18.30	57.54
9.7	54.97	42.53	9.7	51.57	18.74	9.8	30.14	40.06	9.8	5.63	3.50	9.8	18.48	57.42
10.7	55.18	42.75	10.7	52.04	18.70	10.8	30.43	40.15	10.8	5.77	3.32	10.8	18.66	57.33
11.7	55.39	42.97	11.7	52.55	18.67	11.7	30.70	40.28	11.8	5.90	3.14	11.8	18.84	57.26
12.7	55.59	43.20	12.7	53.07	18.65	12.7	30.95	40.39	12.8	6.05	2.95	12.8	19.00	57.20
13.7	55.77	43.40	13.7	53.63	18.65	13.7	31.18	40.50	13.8	6.20	2.77	13.8	19.15	57.14
14.7	55.94	43.60	14.7	54.18	18.66	14.7	31.41	40.59	14.8	6.38	2.62	14.8	19.30	57.06
15.7	56.11	43.79	15.7	54.72	18.70	15.7	31.64	40.69	15.8	6.54	2.49	15.8	19.44	56.98
16.7	56.29	43.96	16.7	55.25	18.75	16.7	31.87	40.75	16.8	6.71	2.38	16.8	19.58	56.89
17.7	56.48	44.13	17.7	55.77	18.85	17.7	32.11	40.82	17.8	6.88	2.29	17.8	19.72	56.80
18.7	56.66	44.31	18.7	56.26	18.94	18.7	32.35	40.89	18.8	7.03	2.22	18.8	19.88	56.70
19.7	56.86	44.51	19.7	56.74	19.03	19.7	32.60	40.97	19.8	7.19	2.16	19.8	20.03	56.60
20.7	57.06	44.71	20.7	57.21	19.11	20.7	32.87	41.05	20.8	7.34	2.10	20.8	20.21	56.50
21.7	57.26	44.93	21.7	57.66	19.20	21.7	33.13	41.15	21.8	7.49	2.05	21.8	20.37	56.40
22.7	57.47	45.15	22.7	58.10	19.29	22.7	33.40	41.26	22.8	7.64	1.99	22.8	20.55	56.33
23.7	57.68	45.39	23.7	58.55	19.37	23.7	33.67	41.39	23.8	7.79	1.91	23.8	20.72	56.27
24.7	57.87	45.66	24.7	59.00	19.44	24.7	33.94	41.55	24.8	7.94	1.83	24.8	20.91	56.23
25.7	58.06	45.94	25.7	59.46	19.50	25.7	34.21	41.72	25.8	8.09	1.75	25.8	21.10	56.21
26.7	58.24	46.21	26.7	59.94	19.56	26.7	34.45	41.89	26.8	8.25	1.66	26.8	21.27	56.21
27.7	58.41	46.49	27.7	60.45	19.64	27.7	34.69	42.07	27.8	8.42	1.58	27.8	21.44	56.21
28.7	58.56	46.76	28.7	60.96	19.73	28.7	34.92	42.25	28.8	8.59	1.51	28.8	21.59	56.22
29.7	58.71	47.03	29.7	61.47	19.85	29.7	35.13	42.42	29.8	8.77	1.45	29.8	21.75	56.21
30.6	58.86	47.27	30.7	61.98	19.98	30.7	35.35	42.57	30.8	8.94	1.42	30.8	21.89	56.20
31.6	59.03	47.49	31.7	62.46	20.15	31.7	35.57	42.72	31.8	9.11	1.42	31.8	22.04	56.17
8.57	-8.51		23.28	+23.26		9.89	-9.84		7.34	+7.27		6.24	-6.16	
14 ^h 13 ^m	46°.350		15 ^h 3 ^m	2°.510		15 ^h 24 ^m	23°.351		16 ^h 54 ^m	12°.991		17 ^h 16 ^m	17°.234	
-83° 17'	54''.52		+87° 32'	42''.66		-84° 11'	55''.43		+82° 10'	21''.42		-80° 47'	14''.21	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursa Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursa Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Feb.	h m ° ' "		Feb.	h m ° ' "		Feb.	h m ° ' "		Feb.	h m ° ' "		Feb.	h m ° ' "	
	17 57 +86 36			18 7 -87 39			18 58 +89 1			19 29 -89 12			20 48 +82 13	
	s " "			s " "			s " "			s " "			s " "	
0.9	56.58 41.18	0.9	13.29 35.73	0.9	36.31 9.81	0.9	53.62 61.47	1.0	21.61 65.23					
1.9	56.81 40.89	1.9	13.75 35.51	1.9	36.80 9.48	1.9	54.54 61.16	2.0	21.59 64.86					
2.9	57.08 40.61	2.9	14.18 35.29	2.9	37.37 9.15	2.9	55.39 60.86	2.9	21.58 64.50					
3.9	57.35 40.36	3.9	14.61 35.06	3.9	38.00 8.85	3.9	56.19 60.55	3.9	21.58 64.16					
4.9	57.62 40.12	4.9	15.06 34.82	4.9	38.67 8.56	4.9	56.99 60.23	4.9	21.59 63.83					
5.9	57.87 39.91	5.9	15.52 34.57	5.9	39.34 8.31	5.9	57.84 59.89	5.9	21.63 63.51					
6.9	58.12 39.71	6.9	16.03 34.31	6.9	39.97 8.07	6.9	58.79 59.54	6.9	21.66 63.21					
7.9	58.37 39.52	7.9	16.59 34.06	7.9	40.55 7.83	7.9	59.86 59.19	7.9	21.67 62.92					
8.9	58.60 39.33	8.9	17.18 33.81	8.9	41.07 7.60	8.9	61.07 58.84	8.9	21.68 62.64					
9.9	58.83 39.11	9.9	17.78 33.61	9.9	41.57 7.34	9.9	62.37 58.52	9.9	21.70 62.36					
10.9	59.06 38.88	10.9	18.39 33.41	10.9	42.07 7.06	10.9	63.73 58.21	10.9	21.71 62.04					
11.9	59.30 38.64	11.9	18.99 33.24	11.9	42.61 6.76	11.9	65.09 57.92	11.9	21.71 61.71					
12.9	59.57 38.39	12.9	19.56 33.08	12.9	43.23 6.46	12.9	66.40 57.63	12.9	21.72 61.37					
13.9	59.85 38.14	13.9	20.10 32.93	13.9	43.95 6.17	13.9	67.64 57.37	13.9	21.74 61.01					
14.8	60.17 37.91	14.9	20.62 32.78	14.9	44.75 5.87	14.9	68.81 57.11	14.9	21.77 60.64					
15.8	60.49 37.70	15.9	21.13 32.62	15.9	45.63 5.58	15.9	69.92 56.84	15.9	21.81 60.30					
16.8	60.83 37.50	16.8	21.63 32.45	16.9	46.56 5.33	16.9	71.01 56.57	16.9	21.86 59.96					
17.8	61.16 37.33	17.8	22.14 32.27	17.9	47.49 5.08	17.9	72.11 56.30	17.9	21.91 59.62					
18.8	61.50 37.18	18.8	22.66 32.08	18.9	48.44 4.87	18.9	73.23 56.01	18.9	21.97 59.30					
19.8	61.83 37.03	19.8	23.21 31.89	19.9	49.39 4.67	19.9	74.42 55.70	19.9	22.03 59.01					
20.8	62.15 36.89	20.8	23.78 31.70	20.9	50.29 4.46	20.9	75.67 55.39	20.9	22.09 58.72					
21.8	62.46 36.76	21.8	24.37 31.51	21.9	51.19 4.26	21.9	77.01 55.10	21.9	22.16 58.43					
22.8	62.78 36.63	22.8	24.99 31.34	22.9	52.05 4.06	22.9	78.43 54.81	22.9	22.21 58.15					
23.8	63.09 36.48	23.8	25.64 31.19	23.9	52.89 3.86	23.9	79.94 54.54	23.9	22.27 57.88					
24.8	63.38 36.32	24.8	26.29 31.05	24.9	53.71 3.64	24.9	81.50 54.27	24.9	22.33 57.60					
25.8	63.68 36.17	25.8	26.94 30.94	25.9	54.54 3.44	25.9	83.10 54.03	25.9	22.39 57.29					
26.8	63.99 36.01	26.8	27.58 30.84	26.9	55.40 3.21	26.9	84.70 53.79	26.9	22.44 56.96					
27.8	64.32 35.86	27.8	28.21 30.74	27.9	56.31 2.98	27.9	86.27 53.56	27.9	22.49 56.66					
28.8	64.66 35.70	28.8	28.81 30.66	28.9	57.30 2.75	28.9	87.79 53.37	28.9	22.55 56.34					
29.8	65.03 35.55	29.8	29.37 30.57	29.8	58.36 2.53	29.9	89.23 53.17	29.9	22.64 56.01					
30.8	65.41 35.44	30.8	29.94 30.47	30.8	59.50 2.33	30.9	90.60 52.94	30.9	22.72 55.69					
31.8	65.78 35.34	31.8	30.50 30.34	31.8	60.67 2.15	31.9	91.96 52.71	31.9	22.81 55.40					
16.91	+16.88	24.48	-24.46	58.36	+58.35	73.06	-73.06	7.40	+7.33					
17 ^h 58 ^m 22 ^s .311		18 ^h 7 ^m 23 ^s .343		19 ^h 0 ^m 15 ^s .079		19 ^h 30 ^m 50 ^s .769		20 ^h 48 ^m 32 ^s .146						
+86° 36' 51".04		-87° 39' 50".89		+89° 1' 12".80		-89° 13' 13".35		+82° 13' 56".82						

APPARENT PLACES OF STARS, 1919.

245

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Feb.	h m 21 38	° ' -83 5	Feb.	h m 22 16	° ' -86 22	Feb.	h m 22 37	° ' -81 48	Feb.	h m 23 27	° ' +86 51	Feb.	h m 23 47	° ' -82 28
	s "	"		s "	"		s "	"		s "	"		s "	"
1.0	30.75	31.16	1.1	16.74	50.20	1.1	45.06	25.99	1.1	29.41	60.79	1.1	16.87	14.56
2.0	30.76	30.83	2.1	16.68	49.86	2.1	45.03	25.68	2.1	29.11	60.55	2.1	16.78	14.28
3.0	30.75	30.49	3.1	16.60	49.53	3.1	44.98	25.36	3.1	28.83	60.28	3.1	16.69	14.01
4.0	30.75	30.16	4.1	16.52	49.20	4.1	44.93	25.04	4.1	28.58	60.00	4.1	16.58	13.75
5.0	30.74	29.79	5.1	16.42	48.83	5.1	44.87	24.71	5.1	28.35	59.73	5.1	16.47	13.47
6.0	30.72	29.43	6.1	16.31	48.47	6.1	44.82	24.35	6.1	28.16	59.47	6.1	16.35	13.16
7.0	30.71	29.03	7.0	16.22	48.07	7.1	44.77	23.98	7.1	27.97	59.23	7.1	16.24	12.83
8.0	30.72	28.62	8.0	16.16	47.66	8.1	44.73	23.61	8.1	27.79	59.00	8.1	16.13	12.49
9.0	30.76	28.20	9.0	16.11	47.24	9.1	44.70	23.19	9.1	27.59	58.79	9.1	16.03	12.14
10.0	30.79	27.79	10.0	16.11	46.81	10.1	44.69	22.77	10.1	27.37	58.57	10.1	15.96	11.77
11.0	30.83	27.40	11.0	16.14	46.41	11.1	44.68	22.40	11.1	27.13	58.33	11.1	15.90	11.40
12.0	30.89	27.02	12.0	16.17	46.03	12.0	44.68	22.02	12.1	26.88	58.08	12.1	15.84	11.04
13.0	30.95	26.68	13.0	16.20	45.67	13.0	44.68	21.68	13.1	26.63	57.81	13.1	15.79	10.71
14.0	31.00	26.34	14.0	16.21	45.31	14.0	44.68	21.34	14.1	26.39	57.52	14.1	15.73	10.39
14.9	31.03	25.99	15.0	16.22	44.97	15.0	44.67	21.00	15.1	26.16	57.20	15.1	15.67	10.07
15.9	31.07	25.66	16.0	16.22	44.63	16.0	44.66	20.64	16.1	25.97	56.87	16.1	15.59	9.77
16.9	31.10	25.32	17.0	16.21	44.27	17.0	44.63	20.31	17.1	25.80	56.56	17.1	15.51	9.46
17.9	31.12	24.96	18.0	16.19	43.92	18.0	44.60	19.97	18.1	25.66	56.24	18.1	15.43	9.14
18.9	31.14	24.60	19.0	16.17	43.54	19.0	44.58	19.61	19.1	25.53	55.93	19.1	15.35	8.82
19.9	31.17	24.24	20.0	16.16	43.15	20.0	44.57	19.23	20.1	25.41	55.63	20.1	15.27	8.49
20.9	31.21	23.85	21.0	16.15	42.75	21.0	44.56	18.85	21.1	25.31	55.33	21.1	15.20	8.13
21.9	31.25	23.47	22.0	16.16	42.34	22.0	44.55	18.46	22.1	25.21	55.05	22.1	15.12	7.77
22.9	31.31	23.09	23.0	16.20	41.92	23.0	44.54	18.05	23.1	25.11	54.77	23.1	15.07	7.39
23.9	31.39	22.71	24.0	16.25	41.52	24.0	44.56	17.66	24.1	24.98	54.50	24.1	15.02	6.98
24.9	31.47	22.33	24.9	16.33	41.12	25.0	44.58	17.27	25.0	24.85	54.23	25.1	14.98	6.58
25.9	31.56	21.95	25.9	16.43	40.73	26.0	44.61	16.87	26.0	24.72	53.96	26.1	14.95	6.20
26.9	31.66	21.57	26.9	16.53	40.34	27.0	44.65	16.48	27.0	24.58	53.65	27.1	14.94	5.82
27.9	31.75	21.23	27.9	16.65	39.96	28.0	44.69	16.11	28.0	24.43	53.35	28.1	14.92	5.45
28.9	31.84	20.89	28.9	16.76	39.60	29.0	44.72	15.75	29.0	24.29	53.03	29.1	14.89	5.09
29.9	31.93	20.56	29.9	16.85	39.26	30.0	44.75	15.39	30.0	24.19	52.68	30.0	14.86	4.73
30.9	31.99	20.23	30.9	16.91	38.91	30.9	44.76	15.05	31.0	24.12	52.33	31.0	14.81	4.40
31.9	32.05	19.89	31.9	16.97	38.56	31.9	44.77	14.69	32.0	24.06	51.98	32.0	14.77	4.05
8.31	-8.25		15.83	-15.80		7.02	-6.94		18.29	+18.26		7.63	-7.56	
21 ^h 38 ^m	38 ^s .548		22 ^h 16 ^m	33 ^s .212		22 ^h 37 ^m	51 ^s .624		23 ^h 27 ^m	43 ^s .571		23 ^h 47 ^m	23 ^s .637	
-83° 5'	34''.83		-86° 22'	50''.92		-81° 48'	24''.80		+86° 51'	38''.62		-82° 28'	8''.52	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris). Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
Mar.	h m 0 57 s	° ' " +85 49 "	Mar.	h m 1 30 s	° ' " +88 52 "	Mar.	h m 1 41 s	° ' " -85 10 "	Mar.	h m 4 10 s	° ' " +85 20 "	Mar.	h m 5 35 s	° ' " +85 9 "
0.1	17.09	44.04	0.1	50.05	42.08	0.1	40.83	52.05	0.2	46.46	49.22	0.3	64.25	50.25
1.1	16.88	43.78	1.1	49.16	41.85	1.1	40.65	51.76	1.2	46.17	49.22	1.3	63.98	50.36
2.1	16.69	43.50	2.1	48.31	41.61	2.1	40.47	51.47	2.2	45.89	49.18	2.3	63.72	50.45
3.1	16.51	43.18	3.1	47.53	41.34	3.1	40.30	51.19	3.2	45.60	49.13	3.3	63.45	50.50
4.1	16.36	42.89	4.1	46.84	41.06	4.1	40.10	50.94	4.2	45.33	49.06	4.3	63.18	50.55
5.1	16.24	42.59	5.1	46.23	40.79	5.1	39.88	50.67	5.2	45.08	48.95	5.3	62.93	50.57
6.1	16.14	42.30	6.1	45.69	40.52	6.1	39.66	50.39	6.2	44.84	48.85	6.3	62.69	50.57
7.1	16.05	42.03	7.1	45.19	40.28	7.1	39.46	50.08	7.2	44.62	48.75	7.3	62.47	50.57
8.1	15.96	41.76	8.1	44.69	40.05	8.1	39.25	49.76	8.2	44.42	48.68	8.3	62.27	50.61
9.1	15.86	41.51	9.1	44.17	39.83	9.1	39.06	49.42	9.2	44.22	48.61	9.3	62.07	50.63
10.1	15.74	41.26	10.1	43.59	39.61	10.1	38.89	49.05	10.2	43.99	48.54	10.3	61.84	50.68
11.1	15.61	41.00	11.1	42.95	39.37	11.1	38.74	48.68	11.2	43.76	48.48	11.3	61.62	50.73
12.1	15.47	40.73	12.1	42.28	39.13	12.1	38.60	48.33	12.2	43.52	48.42	12.3	61.38	50.80
13.1	15.32	40.45	13.1	41.60	38.87	13.1	38.47	47.99	13.2	43.25	48.34	13.3	61.11	50.85
14.1	15.18	40.14	14.1	40.93	38.58	14.1	38.34	47.67	14.2	42.98	48.25	14.3	60.86	50.87
15.1	15.05	39.82	15.1	40.31	38.27	15.1	38.20	47.36	15.2	42.70	48.14	15.3	60.58	50.88
16.1	14.95	39.47	16.1	39.76	37.96	16.1	38.06	47.07	16.2	42.43	47.99	16.3	60.29	50.87
17.1	14.87	39.13	17.1	39.27	37.64	17.1	37.91	46.76	17.2	42.18	47.82	17.2	60.02	50.94
18.1	14.81	38.79	18.1	38.85	37.30	18.1	37.76	46.45	18.2	41.93	47.65	18.2	59.75	50.77
19.1	14.74	38.46	19.1	38.48	36.97	19.1	37.60	46.14	19.2	41.70	47.48	19.2	59.50	50.73
20.0	14.70	38.13	20.1	38.16	36.66	20.1	37.44	45.82	20.2	41.48	47.30	20.2	59.25	50.67
21.0	14.67	37.83	21.1	37.87	36.36	21.1	37.28	45.48	21.2	41.26	47.13	21.2	59.00	50.61
22.0	14.63	37.52	22.1	37.58	36.07	22.1	37.13	45.12	22.2	41.07	46.96	22.2	58.78	50.55
23.0	14.60	37.23	23.1	37.27	35.80	23.1	36.98	44.75	23.2	40.88	46.81	23.2	58.56	50.49
24.0	14.56	36.94	24.1	36.98	35.53	24.1	36.85	44.38	24.2	40.68	46.66	24.2	58.34	50.44
25.0	14.53	36.67	25.1	36.67	35.25	25.1	36.75	43.99	25.2	40.49	46.51	25.2	58.12	50.39
26.0	14.48	36.39	26.1	36.30	34.97	26.1	36.65	43.61	26.2	40.26	46.37	26.2	57.90	50.35
27.0	14.41	36.08	27.1	35.92	34.68	27.1	36.56	43.24	27.2	40.05	46.22	27.2	57.66	50.32
28.0	14.35	35.76	28.0	35.53	34.37	28.1	36.48	42.87	28.2	39.83	46.07	28.2	57.41	50.27
29.0	14.30	35.43	29.0	35.19	34.05	29.1	36.41	42.52	29.2	39.59	45.89	29.2	57.14	50.22
30.0	14.26	35.09	30.0	34.89	33.72	30.1	36.32	42.18	30.2	39.36	45.67	30.2	56.88	50.18
31.0	14.25	34.75	31.0	34.67	33.38	31.0	36.22	41.84	31.2	39.15	45.45	31.2	56.63	50.01
13.74 +13.71 0 ^h 57 ^m 24 ^s .633			51.04 +51.03 1 ^h 31 ^m 11 ^s .709			11.90 -11.86 1 ^h 41 ^m 54 ^s .846			12.33 +12.29 4 ^h 10 ^m 37 ^s .831			11.86 +11.82 5 ^h 35 ^m 50 ^s .330		
+85° 49' 24".14			+88° 52' 20".55			-85° 10' 45".22			+85° 20' 28".88			+85° 9' 34".51		

APPARENT PLACES OF STARS, 1919.

247

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Menesee. Mag. 6.2			5 Menesee. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Mar.	h m 5 45	° ' " -84 50	Mar.	h m 6 46	° ' " -80 44	Mar.	h m 7 3	° ' " +87 10	Mar.	h m 7 14	° ' " +82 34	Mar.	h m 7 15	° ' " -86 54
	s "	"		s "	"		s "	"		s "	"		s "	"
0.3	49.91	5.08	0.3	50.79	7.74	0.4	31.86	52.93	0.4	20.31	24.65	0.4	46.06	40.41
1.3	49.64	5.13	1.3	50.65	7.90	1.4	31.50	53.15	1.4	20.18	24.90	1.4	45.67	40.59
2.3	49.37	5.22	2.3	50.52	8.05	2.3	31.13	53.36	2.4	20.04	25.11	2.4	45.29	40.78
3.3	49.13	5.30	3.3	50.39	8.23	3.3	30.73	53.55	3.4	19.89	25.31	3.4	44.93	41.00
4.3	48.86	5.39	4.3	50.26	8.41	4.3	30.32	53.71	4.4	19.75	25.49	4.4	44.56	41.23
5.3	48.59	5.49	5.3	50.12	8.61	5.3	29.93	53.85	5.3	19.60	25.64	5.4	44.19	41.46
6.3	48.31	5.60	6.3	49.99	8.82	6.3	29.55	53.96	6.3	19.46	25.76	6.3	43.79	41.71
7.3	48.02	5.70	7.3	49.85	9.02	7.3	29.21	54.07	7.3	19.34	25.89	7.3	43.38	41.96
8.3	47.71	5.77	8.3	49.70	9.21	8.3	28.88	54.20	8.3	19.23	26.00	8.3	42.93	42.21
9.3	47.40	5.82	9.3	49.54	9.36	9.3	28.56	54.34	9.3	19.12	26.15	9.3	42.47	42.41
10.3	47.10	5.84	10.3	49.39	9.49	10.3	28.24	54.49	10.3	19.01	26.33	10.3	42.01	42.59
11.3	46.81	5.83	11.3	49.23	9.60	11.3	27.92	54.64	11.3	18.88	26.50	11.3	41.55	42.74
12.3	46.52	5.82	12.3	49.08	9.71	12.3	27.55	54.82	12.3	18.75	26.67	12.3	41.10	42.89
13.3	46.24	5.81	13.3	48.93	9.80	13.3	27.17	54.99	13.3	18.62	26.85	13.3	40.67	43.02
14.3	45.97	5.80	14.3	48.79	9.88	14.3	26.75	55.14	14.3	18.47	27.03	14.3	40.25	43.15
15.3	45.71	5.81	15.3	48.64	9.98	15.3	26.29	55.29	15.3	18.29	27.18	15.3	39.84	43.28
16.3	45.45	5.82	16.3	48.50	10.08	16.3	25.84	55.40	16.3	18.13	27.30	16.3	39.44	43.43
17.3	45.18	5.83	17.3	48.36	10.19	17.3	25.39	55.49	17.3	17.95	27.40	17.3	39.04	43.61
18.3	44.91	5.85	18.3	48.22	10.32	18.3	24.94	55.58	18.3	17.78	27.50	18.3	38.64	43.76
19.2	44.64	5.87	19.3	48.08	10.43	19.3	24.50	55.64	19.3	17.63	27.58	19.3	38.23	43.92
20.2	44.35	5.89	20.3	47.93	10.55	20.3	24.07	55.70	20.3	17.47	27.64	20.3	37.81	44.08
21.2	44.07	5.91	21.3	47.78	10.68	21.3	23.66	55.75	21.3	17.32	27.71	21.3	37.35	44.26
22.2	43.78	5.93	22.3	47.63	10.78	22.3	23.27	55.80	22.3	17.17	27.77	22.3	36.90	44.41
23.2	43.49	5.91	23.3	47.48	10.87	23.3	22.88	55.85	23.3	17.03	27.85	23.3	36.43	44.55
24.2	43.19	5.87	24.3	47.30	10.93	24.3	22.50	55.92	24.3	16.90	27.93	24.3	35.95	44.67
25.2	42.90	5.82	25.3	47.15	10.99	25.3	22.12	55.99	25.3	16.76	28.02	25.3	35.46	44.77
26.2	42.61	5.74	26.3	46.99	11.03	26.3	21.74	56.07	26.3	16.62	28.11	26.3	34.98	44.86
27.2	42.32	5.65	27.3	46.84	11.04	27.3	21.34	56.15	27.3	16.48	28.21	27.3	34.50	44.93
28.2	42.05	5.57	28.3	46.67	11.06	28.3	20.92	56.22	28.3	16.31	28.30	28.3	34.04	44.99
29.2	41.79	5.49	29.3	46.53	11.07	29.3	20.46	56.28	29.3	16.14	28.39	29.3	33.60	45.04
30.2	41.53	5.42	30.3	46.39	11.11	30.3	19.99	56.33	30.3	15.97	28.44	30.3	33.17	45.12
31.2	41.27	5.37	31.3	46.24	11.14	31.3	19.51	56.33	31.3	15.79	28.48	31.3	32.74	45.21
11.11	-11.06		6.21	-6.13		20.34	+20.32		7.74	+7.67		18.56	-18.54	
5 ^h 45 ^m 51 ^s .396			6 ^h 46 ^m 48 ^s .653			7 ^h 3 ^m 2 ^s .335			7 ^h 14 ^m 7 ^s .912			7 ^h 15 ^m 39 ^s .691		
-84° 49' 44".27			-80° 43' 46".14			+87° 10' 43".86			+82° 34' 17".32			-86° 54' 19".75		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamæleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Mar.	h m 8 18	° +88 52	Mar.	h m 9 8	° -85 20	Mar.	h m 9 25	° +81 41	Mar.	h m 9 36	° -80 34	Mar.	h m 10 21	° +82 58
	s "	"		s "	"		s "	"		s "	"		s "	"
0.4	65.97	39.99	0.4	53.82	43.42	0.5	51.08	4.67	0.5	26.64	54.81	0.5	32.71	7.20
1.4	65.38	40.29	1.4	53.67	43.74	1.5	51.05	4.99	1.5	26.58	55.15	1.5	32.72	7.54
2.4	64.71	40.58	2.4	53.52	44.06	2.4	51.00	5.31	2.5	26.52	55.48	2.5	32.71	7.89
3.4	63.98	40.86	3.4	53.39	44.37	3.4	50.95	5.63	3.5	26.47	55.82	3.5	32.67	8.23
4.4	63.20	41.11	4.4	53.26	44.71	4.4	50.88	5.92	4.4	26.43	56.19	4.5	32.64	8.55
5.4	62.41	41.34	5.4	53.14	45.07	5.4	50.81	6.20	5.4	26.39	56.56	5.5	32.59	8.84
6.4	61.65	41.54	6.4	53.01	45.44	6.4	50.75	6.44	6.4	26.34	56.93	6.5	32.55	9.13
7.4	60.94	41.73	7.4	52.86	45.81	7.4	50.69	6.68	7.4	26.29	57.34	7.5	32.52	9.41
8.4	60.29	41.92	8.4	52.70	46.18	8.4	50.64	6.92	8.4	26.24	57.74	8.5	32.50	9.68
9.4	59.68	42.12	9.4	52.51	46.55	9.4	50.59	7.16	9.4	26.18	58.12	9.5	32.49	9.94
10.4	59.07	42.35	10.4	52.32	46.89	10.4	50.55	7.43	10.4	26.09	58.49	10.5	32.47	10.21
11.4	58.45	42.59	11.4	52.11	47.22	11.4	50.52	7.71	11.4	26.02	58.84	11.5	32.47	10.50
12.4	57.77	42.83	12.4	51.90	47.51	12.4	50.47	8.00	12.4	25.93	59.18	12.5	32.44	10.82
13.4	57.01	43.10	13.4	51.70	47.78	13.4	50.41	8.30	13.4	25.85	59.50	13.5	32.40	11.15
14.4	56.19	43.35	14.4	51.51	48.06	14.4	50.33	8.59	14.4	25.76	59.79	14.5	32.36	11.48
15.4	55.29	43.59	15.4	51.33	48.35	15.4	50.25	8.90	15.4	25.69	60.08	15.5	32.30	11.82
16.4	54.33	43.79	16.4	51.15	48.64	16.4	50.15	9.19	16.4	25.61	60.39	16.4	32.24	12.14
17.4	53.35	43.99	17.4	50.98	48.93	17.4	50.05	9.47	17.4	25.55	60.70	17.4	32.15	12.46
18.4	52.37	44.17	18.4	50.81	49.24	18.4	49.95	9.71	18.4	25.48	61.03	18.4	32.07	12.75
19.4	51.39	44.33	19.4	50.63	49.55	19.4	49.85	9.95	19.4	25.41	61.37	19.4	31.99	13.04
20.4	50.43	44.48	20.4	50.45	49.86	20.4	49.75	10.18	20.4	25.34	61.70	20.4	31.90	13.32
21.4	49.49	44.63	21.4	50.26	50.17	21.4	49.65	10.41	21.4	25.26	62.03	21.4	31.82	13.58
22.3	48.60	44.78	22.4	50.05	50.49	22.4	49.56	10.61	22.4	25.18	62.37	22.4	31.74	13.84
23.3	47.74	44.94	23.4	49.83	50.78	23.4	49.48	10.81	23.4	25.09	62.71	23.4	31.68	14.09
24.3	46.90	45.11	24.4	49.60	51.08	24.4	49.39	11.02	24.4	24.99	63.03	24.4	31.61	14.35
25.3	46.06	45.27	25.4	49.36	51.36	25.4	49.31	11.25	25.4	24.89	63.33	25.4	31.55	14.62
26.3	45.22	45.42	26.4	49.11	51.60	26.4	49.23	11.49	26.4	24.79	63.62	26.4	31.49	14.88
27.3	44.34	45.60	27.4	48.86	51.84	27.4	49.15	11.72	27.4	24.69	63.91	27.4	31.41	15.17
28.3	43.41	45.75	28.4	48.62	52.07	28.4	49.06	11.96	28.4	24.58	64.16	28.4	31.33	15.45
29.3	42.40	45.90	29.4	48.39	52.30	29.4	48.95	12.21	29.4	24.48	64.41	29.4	31.24	15.74
30.3	41.32	46.05	30.4	48.17	52.53	30.4	48.82	12.45	30.4	24.38	64.67	30.4	31.14	16.04
31.3	40.20	46.19	31.4	47.95	52.76	31.4	48.70	12.66	31.4	24.29	64.94	31.4	31.01	16.32
51.10	+51.09		12.33	-12.29		6.91	+6.84		6.11	-6.03		8.17	+8.11	
8 ^h 17 ^m	47 ^s .546		9 ^h 8 ^m	41 ^s .594		9 ^h 25 ^m	39 ^s .275		9 ^h 36 ^m	19 ^s .026		10 ^h 21 ^m	19 ^s .949	
+88° 52'	37'''.80		-85° 20'	26'''.78		+81° 41'	10'''.13		-80° 34'	39'''.26		+82° 58'	17'''.67	

APPARENT PLACES OF STARS, 1919.

249

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

γ Octantis. Mag. 6.3			Bradley 1673. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Mar.	h m 11 0	° ' " -84 9	Mar.	h m 12 14	° ' " +88 8	Mar.	h m 12 46	° ' " -84 41	Mar.	h m 12 48	° ' " +83 50	Mar.	h m 13 27	° ' " -85 22
0.5	8.53	38.27	0.6	58.82	37.80	0.6	35.51	1.14	0.6	39.61	50.58	0.6	51.02	15.31
1.5	8.52	38.64	1.6	59.17	38.11	1.6	35.61	1.48	1.6	39.74	50.86	1.6	51.19	15.62
2.5	8.52	39.00	2.6	59.48	38.43	2.6	35.74	1.81	2.6	39.85	51.14	2.6	51.37	15.92
3.5	8.52	39.36	3.6	59.72	38.76	3.6	35.86	2.14	3.6	39.96	51.45	3.6	51.56	16.21
4.5	8.53	39.72	4.6	59.92	39.09	4.6	35.99	2.46	4.6	40.06	51.75	4.6	51.75	16.49
5.5	8.55	40.12	5.6	60.07	39.40	5.6	36.13	2.80	5.6	40.12	52.04	5.6	51.97	16.78
6.5	8.57	40.53	6.6	60.21	39.69	6.6	36.28	3.16	6.6	40.20	52.32	6.6	52.20	17.10
7.5	8.59	40.95	7.6	60.34	39.97	7.6	36.44	3.53	7.6	40.28	52.59	7.6	52.42	17.43
8.5	8.59	41.39	8.5	60.50	40.24	8.6	36.58	3.92	8.6	40.36	52.84	8.6	52.62	17.79
9.5	8.58	41.82	9.5	60.68	40.50	9.6	36.69	4.33	9.6	40.45	53.08	9.6	52.82	18.16
10.5	8.54	42.25	10.5	60.89	40.77	10.6	36.80	4.74	10.6	40.54	53.33	10.6	53.00	18.52
11.5	8.50	42.64	11.5	61.12	41.06	11.6	36.89	5.13	11.6	40.64	53.60	11.6	53.14	18.89
12.5	8.44	43.08	12.5	61.35	41.37	12.6	36.95	5.52	12.6	40.74	53.87	12.6	53.29	19.26
13.5	8.38	43.39	13.5	61.56	41.69	13.6	37.02	5.89	13.6	40.83	54.18	13.6	53.41	19.60
14.5	8.34	43.75	14.5	61.73	42.02	14.6	37.08	6.23	14.6	40.92	54.50	14.6	53.54	19.93
15.5	8.29	44.09	15.5	61.87	42.36	15.6	37.16	6.58	15.6	40.99	54.83	15.6	53.66	20.24
16.5	8.25	44.44	16.5	61.96	42.73	16.5	37.24	6.91	16.6	41.05	55.16	16.6	53.80	20.56
17.5	8.22	44.80	17.5	62.00	43.07	17.5	37.32	7.25	17.5	41.10	55.50	17.6	53.94	20.87
18.5	8.19	45.16	18.5	62.02	43.42	18.5	37.41	7.60	18.5	41.13	55.84	18.6	54.09	21.20
19.5	8.16	45.54	19.5	62.02	43.75	19.5	37.50	7.96	19.5	41.16	56.17	19.6	54.25	21.53
20.5	8.13	45.92	20.5	61.99	44.08	20.5	37.59	8.32	20.5	41.19	56.49	20.6	54.40	21.87
21.5	8.09	46.32	21.5	61.96	44.39	21.5	37.69	8.70	21.5	41.22	56.79	21.6	54.56	22.23
22.5	8.04	46.73	22.5	61.95	44.68	22.5	37.78	9.11	22.5	41.25	57.08	22.6	54.71	22.60
23.5	7.99	47.13	23.5	61.95	44.98	23.5	37.84	9.51	23.5	41.28	57.37	23.6	54.86	22.98
24.5	7.92	47.51	24.5	61.95	45.27	24.5	37.90	9.92	24.5	41.32	57.67	24.6	54.97	23.37
25.5	7.83	47.89	25.5	61.98	45.57	25.5	37.94	10.32	25.5	41.35	57.96	25.6	55.08	23.76
26.4	7.74	48.26	26.5	62.02	45.88	26.5	37.98	10.71	26.5	41.40	58.24	26.6	55.17	24.15
27.4	7.65	48.61	27.5	62.06	46.19	27.5	37.98	11.10	27.5	41.44	58.56	27.5	55.26	24.53
28.4	7.55	48.95	28.5	62.07	46.52	28.5	38.00	11.47	28.5	41.47	58.89	28.5	55.32	24.89
29.4	7.46	49.28	29.5	62.04	46.86	29.5	38.02	11.84	29.5	41.48	59.23	29.5	55.40	25.24
30.4	7.37	49.61	30.5	61.97	47.20	30.5	38.03	12.17	30.5	41.50	59.57	30.5	55.48	25.58
31.4	7.31	49.94	31.5	61.84	47.54	31.5	38.07	12.51	31.5	41.50	59.92	31.5	55.57	25.91
9.83	-9.78		30.89	+30.88		10.80	-10.75		9.33	+9.28		12.39	-12.35	
10 ^h 50 ^m	54 ^s .546		12 ^h 14 ^m	29 ^s .190		12 ^h 46 ^m	19 ^s .119		12 ^h 48 ^m	31 ^s .308		13 ^h 27 ^m	32 ^s .891	
-84° 9'	29'' .33		+88° 8'	56'' .19		-84° 41'	1'' .57		+83° 51'	11'' .30		-85° 22'	19'' .48	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Mar.	h m 14 13 s	° ' " -83 17 " "	Mar.	h m 15 3 s	° ' " +87 32 " "	Mar.	h m 15 24 s	° ' " -84 11 " "	Mar.	h m 16 54 s	° ' " +82 10 " "	Mar.	h m 17 16 s	° ' " -80 46 " "
0.7	58.56	46.76	0.7	0.96	19.73	0.7	34.92	42.25	0.8	8.59	1.51	0.8	21.59	56.22
1.7	58.71	47.03	1.7	1.47	19.85	1.7	35.13	42.42	1.8	8.77	1.45	1.8	21.75	56.21
2.6	58.86	47.27	2.7	1.98	19.98	2.7	35.35	42.57	2.8	8.94	1.42	2.8	21.89	56.20
3.6	59.03	47.49	3.7	2.46	20.15	3.7	35.57	42.72	3.8	9.11	1.42	3.8	22.04	56.17
4.6	59.20	47.72	4.7	2.90	20.33	4.7	35.80	42.85	4.8	9.28	1.45	4.8	22.21	56.13
5.6	59.38	47.97	5.7	3.31	20.52	5.7	36.05	42.98	5.8	9.43	1.48	5.8	22.38	56.10
6.6	59.56	48.23	6.7	3.69	20.70	6.7	36.32	43.13	6.7	9.58	1.52	6.8	22.56	56.05
7.6	59.76	48.51	7.7	4.06	20.88	7.7	36.58	43.30	7.7	9.73	1.56	7.8	22.75	56.03
8.6	59.95	48.81	8.7	4.43	21.02	8.7	36.84	43.49	8.7	9.88	1.57	8.8	22.93	56.02
9.6	60.13	49.13	9.7	4.82	21.16	9.7	37.09	43.72	9.7	10.03	1.58	9.8	23.12	56.05
10.6	60.29	49.46	10.7	5.23	21.29	10.7	37.34	43.96	10.7	10.18	1.57	10.8	23.31	56.03
11.6	60.43	49.80	11.7	5.65	21.43	11.7	37.57	44.20	11.7	10.33	1.56	11.7	23.49	56.14
12.6	60.56	50.13	12.7	6.11	21.59	12.7	37.78	44.44	12.7	10.51	1.56	12.7	23.65	56.21
13.6	60.69	50.43	13.7	6.57	21.77	13.7	37.98	44.67	13.7	10.68	1.56	13.7	23.80	56.23
14.6	60.82	50.72	14.6	7.02	21.96	14.7	38.17	44.88	14.7	10.85	1.61	14.7	23.95	56.32
15.6	60.95	51.01	15.6	7.45	22.18	15.7	38.36	45.07	15.7	11.02	1.67	15.7	24.10	56.37
16.6	61.07	51.28	16.6	7.87	22.42	16.7	38.55	45.27	16.7	11.19	1.76	16.7	24.24	56.40
17.6	61.20	51.55	17.6	8.25	22.66	17.7	38.75	45.45	17.7	11.34	1.86	17.7	24.39	56.42
18.6	61.34	51.82	18.6	8.62	22.91	18.7	38.97	45.65	18.7	11.50	1.99	18.7	24.55	56.43
19.6	61.49	52.11	19.6	8.95	23.15	19.7	39.20	45.85	19.7	11.66	2.11	19.7	24.72	56.46
20.6	61.64	52.42	20.6	9.28	23.40	20.6	39.42	46.06	20.7	11.81	2.23	20.7	24.89	56.49
21.6	61.78	52.73	21.6	9.59	23.65	21.6	39.64	46.29	21.7	11.97	2.36	21.7	25.06	56.53
22.6	61.93	53.05	22.6	9.90	23.88	22.6	39.87	46.52	22.7	12.11	2.46	22.7	25.23	56.60
23.6	62.07	53.39	23.6	10.21	24.11	23.6	40.09	46.78	23.7	12.25	2.56	23.7	25.41	56.68
24.6	62.20	53.74	24.6	10.52	24.31	24.6	40.31	47.05	24.7	12.39	2.66	24.7	25.59	56.78
25.6	62.33	54.10	25.6	10.84	24.52	25.6	40.51	47.34	25.7	12.53	2.75	25.7	25.76	56.90
26.6	62.43	54.46	26.6	11.18	24.74	26.6	40.70	47.63	26.7	12.68	2.85	26.7	25.93	57.03
27.6	62.53	54.80	27.6	11.53	24.98	27.6	40.88	47.91	27.7	12.84	2.95	27.7	26.08	57.16
28.6	62.62	55.14	28.6	11.88	25.22	28.6	41.05	48.19	28.7	12.99	3.07	28.7	26.23	57.29
29.6	62.71	55.45	29.6	12.22	25.48	29.6	41.21	48.46	29.7	13.15	3.20	29.7	26.38	57.39
30.6	62.80	55.76	30.6	12.54	25.76	30.6	41.38	48.71	30.7	13.30	3.37	30.7	26.52	57.49
31.6	62.90	56.06	31.6	12.82	26.08	31.6	41.55	48.95	31.7	13.45	3.55	31.7	26.66	57.58
8.57	-8.51	23.29	+23.27	9.89	-9.84	7.34	+7.27	6.24	-6.16					
14 ^h 13 ^m	46°.350	15 ^h 3 ^m	2°.510	15 ^h 24 ^m	23°.351	16 ^h 54 ^m	12°.991	17 ^h 16 ^m	17°.234					
-83° 17'	54''.52	+87° 32'	42''.66	-84° 11'	55''.43	+82° 10'	21''.42	-80° 47'	14''.27					

CIRCUMPOLAR STARS.
FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursa Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursa Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Mar.	h m ° ' "		Mar.	h m ° ' "		Mar.	h m ° ' "		Mar.	h m ° ' "		Mar.	h m ° ' "	
	17 58 +86 36			18 7 -87 39			18 58 +89 0			19 30 -89 12			20 48 +82 13	
0.8	4.66 35.70	0.8	28.81 30.66	0.9	57.30 62.75	0.9	27.79 53.37	0.9	22.55 56.34					
1.8	5.03 35.55	1.8	29.37 30.57	1.8	58.36 62.53	1.9	29.23 53.17	1.9	22.64 56.01					
2.8	5.41 35.44	2.8	29.94 30.47	2.8	59.50 62.33	2.9	30.60 52.94	2.9	22.72 55.69					
3.8	5.78 35.34	3.8	30.50 30.34	3.8	60.67 62.15	3.9	31.96 52.71	3.9	22.81 55.40					
4.8	6.16 35.27	4.8	31.08 30.22	4.8	61.84 62.01	4.9	33.34 52.46	4.9	22.92 55.13					
5.8	6.52 35.21	5.8	31.68 30.08	5.8	62.97 61.88	5.9	34.77 52.20	5.9	23.03 54.89					
6.8	6.86 35.18	6.8	32.32 29.95	6.8	64.05 61.77	6.9	36.32 51.95	6.9	23.13 54.66					
7.8	7.19 35.15	7.8	33.00 29.85	7.8	65.07 61.66	7.9	37.98 51.70	7.9	23.22 54.45					
8.8	7.50 35.09	8.8	33.70 29.75	8.8	66.04 61.53	8.9	39.75 51.45	8.9	23.31 54.22					
9.8	7.82 35.02	9.8	34.41 29.68	9.8	67.01 61.40	9.8	41.57 51.24	9.9	23.40 53.99					
10.8	8.14 34.94	10.8	35.11 29.63	10.8	67.97 61.25	10.8	43.40 51.04	10.9	23.49 53.75					
11.8	8.48 34.85	11.8	35.77 29.59	11.8	68.99 61.07	11.8	45.19 50.86	11.9	23.57 53.48					
12.8	8.85 34.76	12.8	36.41 29.56	12.8	70.10 60.91	12.8	46.90 50.71	12.9	23.66 53.21					
13.8	9.23 34.70	13.8	37.02 29.54	13.8	71.28 60.76	13.8	48.55 50.55	13.9	23.76 52.93					
14.8	9.62 34.64	14.8	37.59 29.51	14.8	72.53 60.61	14.8	50.12 50.40	14.9	23.87 52.66					
15.8	10.02 34.60	15.8	38.16 29.47	15.8	73.83 60.49	15.8	51.64 50.22	15.9	24.00 52.39					
16.8	10.43 34.59	16.8	38.74 29.42	16.8	75.15 60.38	16.8	53.14 50.04	16.9	24.12 52.15					
17.8	10.81 34.60	17.8	39.32 29.36	17.8	76.47 60.30	17.8	54.66 49.85	17.9	24.25 51.91					
18.8	11.20 34.62	18.8	39.91 29.31	18.8	77.77 60.24	18.8	56.21 49.67	18.9	24.38 51.70					
19.8	11.57 34.65	19.8	40.53 29.25	19.8	79.04 60.18	19.8	57.83 49.49	19.9	24.52 51.51					
20.8	11.94 34.68	20.8	41.18 29.19	20.8	80.26 60.13	20.8	59.51 49.30	20.9	24.65 51.33					
21.8	12.28 34.72	21.8	41.84 29.14	21.8	81.45 60.09	21.8	61.26 49.12	21.9	24.78 51.15					
22.7	12.63 34.75	22.8	42.52 29.12	22.8	82.62 60.04	22.8	63.07 48.95	22.9	24.91 50.98					
23.7	12.97 34.78	23.8	43.21 29.11	23.8	83.74 59.99	23.8	64.94 48.80	23.9	25.04 50.80					
24.7	13.30 34.79	24.8	43.89 29.11	24.8	84.85 59.94	24.8	66.86 48.65	24.9	25.16 50.62					
25.7	13.65 34.79	25.7	44.56 29.13	25.8	85.97 59.87	25.8	68.78 48.53	25.9	25.27 50.43					
26.7	14.01 34.80	26.7	45.23 29.17	26.8	87.12 59.79	26.8	70.68 48.43	26.9	25.39 50.23					
27.7	14.37 34.81	27.7	45.85 29.22	27.8	88.33 59.72	27.8	72.51 48.34	27.9	25.52 50.03					
28.7	14.74 34.85	28.7	46.47 29.27	28.8	89.59 59.66	28.8	74.26 48.25	28.9	25.65 49.83					
29.7	15.12 34.90	29.7	47.04 29.32	29.8	90.91 59.61	29.8	75.96 48.15	29.8	25.79 49.64					
30.7	15.52 34.98	30.7	47.61 29.34	30.8	92.27 59.60	30.8	77.59 48.04	30.8	25.94 49.46					
31.7	15.90 35.07	31.7	48.20 29.35	31.8	93.64 59.60	31.8	79.21 47.92	31.8	26.09 49.32					
16.91	+16.88	24.47	-24.45	58.28	+58.27	72.89	-72.89	7.40	+7.33					
17 ^h 58 ^m	22°.311	18 ^h 7 ^m	23°.343	19 ^h 0 ^m	15°.079	19 ^h 30 ^m	50°.769	20 ^h 48 ^m	32°.146					
+86° 36'	51''.04	-87° 39'	50''.89	+89° 1'	12''.80	-89° 13'	13''.35	+82° 13'	56''.82					

252 APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ ¹ Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Mar.	h m 21 38	° ' " -83 5	Mar.	h m 22 16	° ' " -86 22	Mar.	h m 22 37	° ' " -81 48	Mar.	h m 23 27	° ' " +86 51	Mar.	h m 23 47	° ' " -82 27
	s "			s "			s "			s "			s "	
0.9	31.84	20.89	0.9	16.76	39.60	1.0	44.72	15.75	1.0	24.29	53.03	1.1	14.89	65.09
1.9	31.93	20.56	1.9	16.85	39.26	2.0	44.75	15.39	2.0	24.19	52.63	2.0	14.86	64.73
2.9	31.99	20.23	2.9	16.91	38.91	2.9	44.76	15.05	3.0	24.12	52.33	3.0	14.81	64.40
3.9	32.06	19.89	3.9	16.97	38.56	3.9	44.77	14.69	4.0	24.08	51.98	4.0	14.77	64.05
4.9	32.11	19.53	4.9	17.03	38.19	4.9	44.78	14.34	5.0	24.07	51.65	5.0	14.72	63.69
5.9	32.19	19.16	5.9	17.08	37.79	5.9	44.79	13.95	6.0	24.07	51.33	6.0	14.67	63.31
6.9	32.26	18.77	6.9	17.15	37.38	6.9	44.80	13.54	7.0	24.08	51.04	7.0	14.63	62.91
7.9	32.35	18.38	7.9	17.25	36.96	7.9	44.84	13.13	8.0	24.08	50.76	8.0	14.59	62.50
8.9	32.46	18.00	8.9	17.39	36.54	8.9	44.88	12.69	9.0	24.07	50.49	9.0	14.58	62.08
9.9	32.59	17.62	9.9	17.54	36.16	9.9	44.94	12.28	10.0	24.03	50.21	10.0	14.57	61.65
10.9	32.72	17.25	10.9	17.71	35.78	10.9	45.00	11.90	11.0	23.99	49.92	11.0	14.58	61.23
11.9	32.85	16.92	11.9	17.89	35.41	11.9	45.07	11.52	12.0	23.94	49.60	12.0	14.59	60.85
12.9	32.98	16.60	12.9	18.06	35.05	12.9	45.13	11.15	13.0	23.89	49.27	13.0	14.60	60.46
13.9	33.09	16.30	13.9	18.23	34.72	13.9	45.19	10.81	14.0	23.87	48.94	14.0	14.60	60.10
14.9	33.20	16.01	14.9	18.37	34.39	14.9	45.24	10.48	14.9	23.87	48.57	15.0	14.61	59.74
15.9	33.30	15.72	15.9	18.50	34.07	15.9	45.29	10.15	15.9	23.90	48.21	16.0	14.61	59.41
16.9	33.39	15.41	16.9	18.63	33.74	16.9	45.33	9.81	16.9	23.94	47.86	17.0	14.60	59.05
17.9	33.48	15.09	17.9	18.75	33.40	17.9	45.37	9.45	17.9	24.01	47.52	18.0	14.58	58.69
18.9	33.58	14.77	18.9	18.87	33.04	18.9	45.41	9.09	18.9	24.10	47.19	19.0	14.57	58.32
19.9	33.68	14.44	19.9	19.01	32.68	19.9	45.45	8.72	19.9	24.20	46.87	19.9	14.56	57.96
20.9	33.81	14.10	20.9	19.16	32.32	20.9	45.51	8.35	20.9	24.31	46.57	20.9	14.56	57.58
21.9	33.93	13.76	21.9	19.33	31.95	21.9	45.56	7.97	21.9	24.41	46.28	21.9	14.56	57.16
22.9	34.06	13.41	22.9	19.51	31.57	22.9	45.64	7.59	22.9	24.50	45.99	22.9	14.57	56.75
23.9	34.20	13.08	23.9	19.70	31.19	23.9	45.72	7.20	23.9	24.60	45.69	23.9	14.61	56.34
24.9	34.36	12.76	24.9	19.93	30.82	24.9	45.80	6.82	24.9	24.67	45.40	24.9	14.64	55.92
25.9	34.53	12.45	25.9	20.17	30.47	25.9	45.90	6.45	25.9	24.73	45.11	25.9	14.68	55.52
26.9	34.67	12.16	26.9	20.42	30.13	26.9	45.99	6.11	26.9	24.80	44.80	26.9	14.73	55.12
27.9	34.83	11.87	27.9	20.66	29.82	27.9	46.09	5.78	27.9	24.88	44.48	27.9	14.78	54.75
28.9	34.97	11.60	28.9	20.89	29.52	28.9	46.18	5.45	28.9	24.96	44.17	28.9	14.82	54.39
29.9	35.11	11.34	29.9	21.09	29.23	29.9	46.27	5.13	29.9	25.08	43.84	29.9	14.85	54.04
30.9	35.24	11.07	30.9	21.29	28.93	30.9	46.34	4.81	30.9	25.22	43.52	30.9	14.87	53.70
31.9	35.37	10.79	31.9	21.47	28.61	31.9	46.41	4.49	31.9	25.41	43.20	31.9	14.90	53.35
8.31	-8.25		15.82	-15.79		7.01	-6.94		18.28	+18.25		7.63	-7.56	
21 ^h 38 ^m	38° 54.8		22 ^h 16 ^m	33° 21.2		22 ^h 37 ^m	51° 6.24		23 ^h 27 ^m	43° 57.1		23 ^h 47 ^m	23° 6.37	
-83° 5'	34'' .33		-86° 22'	50'' .92		-81° 48'	24'' .80		+86° 51'	38'' .62		-82° 28'	8'' .42	

APPARENT PLACES OF STARS, 1919.

253

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Apr.	h m	° ' "	Apr.	h m	° ' "	Apr.	h m	° ' "	Apr.	h m	° ' "	Apr.	h m	° ' "
	0 57	+85 49		1 30	+88 52		1 41	-85 10		4 10	+85 20		5 35	+85 9
	s	"		s	"		s	"		s	"		s	"
0.0	14.25	34.75	0.0	34.67	33.38	0.0	36.22	41.84	0.2	39.15	45.45	0.2	56.63	50.01
1.0	14.27	34.41	1.0	34.55	33.04	1.0	36.12	41.50	1.1	38.94	45.22	1.2	56.38	49.87
2.0	14.31	34.07	2.0	34.53	32.70	2.0	36.00	41.16	2.1	38.76	44.97	2.2	56.15	49.72
3.0	14.37	33.74	3.0	34.57	32.38	3.0	35.87	40.79	3.1	38.61	44.72	3.2	55.94	49.57
4.0	14.43	33.45	4.0	34.62	32.09	4.0	35.77	40.41	4.1	38.46	44.48	4.2	55.74	49.41
5.0	14.49	33.18	5.0	34.65	31.81	5.0	35.67	40.01	5.1	38.32	44.26	5.2	55.56	49.27
6.0	14.54	32.91	6.0	34.64	31.53	6.0	35.60	39.60	6.1	38.19	44.07	6.2	55.37	49.16
6.9	14.56	32.64	7.0	34.57	31.26	7.0	35.54	39.20	7.1	38.05	43.87	7.2	55.19	49.05
7.9	14.58	32.37	8.0	34.46	30.98	8.0	35.48	38.79	8.1	37.88	43.68	8.2	54.98	48.94
8.9	14.58	32.07	9.0	34.33	30.66	9.0	35.44	38.39	9.1	37.70	43.48	9.2	54.76	48.83
9.9	14.59	31.75	10.0	34.21	30.33	10.0	35.43	38.01	10.1	37.51	43.26	10.2	54.53	48.71
10.9	14.62	31.42	11.0	34.14	30.00	11.0	35.40	37.66	11.1	37.32	43.01	11.2	54.29	48.57
11.9	14.66	31.08	12.0	34.12	29.65	12.0	35.36	37.32	12.1	37.14	42.75	12.2	54.05	48.40
12.9	14.72	30.74	13.0	34.16	29.28	13.0	35.32	36.98	13.1	36.96	42.48	13.2	53.81	48.23
13.9	14.81	30.40	14.0	34.29	28.93	14.0	35.27	36.65	14.1	36.80	42.20	14.2	53.58	48.04
14.9	14.90	30.07	14.9	34.46	28.59	15.0	35.22	36.31	15.1	36.65	41.92	15.2	53.36	47.83
15.9	15.00	29.75	15.9	34.69	28.26	16.0	35.16	35.96	16.1	36.52	41.63	16.2	53.16	47.61
16.9	15.13	29.44	16.9	34.96	27.94	17.0	35.11	35.59	17.1	36.41	41.34	17.2	52.98	47.39
17.9	15.26	29.14	17.9	35.24	27.65	17.9	35.06	35.21	18.1	36.30	41.05	18.2	52.80	47.18
18.9	15.36	28.86	18.9	35.52	27.35	18.9	35.03	34.83	19.1	36.21	40.77	19.2	52.63	46.98
19.9	15.47	28.60	19.9	35.79	27.06	19.9	35.00	34.43	20.1	36.11	40.53	20.2	52.48	46.79
20.9	15.58	28.34	20.9	36.03	26.78	20.9	34.99	34.04	21.1	36.02	40.27	21.2	52.32	46.60
21.9	15.69	28.08	21.9	36.26	26.50	21.9	34.99	33.65	22.1	35.92	40.03	22.2	52.16	46.41
22.9	15.79	27.80	22.9	36.45	26.22	22.9	35.01	33.25	23.1	35.82	39.79	23.1	51.99	46.24
23.9	15.89	27.53	23.9	36.63	25.92	23.9	35.05	32.86	24.1	35.70	39.53	24.1	51.81	46.05
24.9	15.98	27.25	24.9	36.83	25.61	24.9	35.08	32.48	25.1	35.57	39.26	25.1	51.62	45.86
25.9	16.09	26.96	25.9	37.08	25.29	25.9	35.11	32.11	26.1	35.46	38.97	26.1	51.44	45.65
26.9	16.22	26.65	26.9	37.38	24.97	26.9	35.12	31.78	27.1	35.35	38.66	27.1	51.25	45.42
27.9	16.36	26.34	27.9	37.79	24.65	27.9	35.12	31.46	28.1	35.25	38.35	28.1	51.07	45.16
28.9	16.54	26.05	28.9	38.29	24.33	28.9	35.12	31.12	29.1	35.18	38.01	29.1	50.91	44.88
29.9	16.74	25.78	29.9	38.85	24.04	29.9	35.12	30.76	30.1	35.12	37.67	30.1	50.77	44.59
30.9	16.95	25.54	30.9	39.45	23.75	30.9	35.12	30.40	31.1	35.11	37.35	31.1	50.65	44.31
13.74	+13.70		50.91	+50.90		11.89	-11.85		12.32	+12.28		11.86	+11.82	
0 ^h 57 ^m	24°.633		1 ^h 31 ^m	11°.709		1 ^h 41 ^m	54°.846		4 ^h 10 ^m	37°.831		5 ^h 35 ^m	50°.330	
+85° 49'	24''.14		+88° 52'	20''.55		-85° 10'	45''.22		+85° 20'	28''.88		+85° 9'	34''.51	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensse. Mag. 6.2			5 Mensse. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Apr.	h m 5 45 s	° ' -84 50 "	Apr.	h m 6 46 s	° ' -80 44 "	Apr.	h m 7 3 s	° ' +87 10 "	Apr.	h m 7 14 s	° ' +82 34 "	Apr.	h m 7 15 s	° ' -86 54 "
0.2	41.27	5.37	0.3	46.24	11.14	0.3	19.51	56.33	0.3	15.79	28.48	0.3	32.74	45.21
1.2	41.01	5.33	1.3	46.09	11.19	1.3	19.05	56.33	1.3	15.61	28.48	1.3	32.31	45.31
2.2	40.74	5.30	2.3	45.95	11.25	2.3	18.60	56.30	2.3	15.45	28.47	2.3	31.88	45.43
3.2	40.46	5.27	3.3	45.80	11.32	3.3	18.18	56.26	3.3	15.30	28.43	3.3	31.42	45.54
4.2	40.17	5.21	4.2	45.63	11.38	4.3	17.80	56.21	4.3	15.15	28.40	4.3	30.94	45.64
5.2	39.87	5.13	5.2	45.46	11.40	5.3	17.42	56.16	5.3	15.01	28.39	5.3	30.44	45.74
6.2	39.58	5.03	6.2	45.31	11.41	6.3	17.06	56.15	6.3	14.90	28.38	6.3	29.93	45.80
7.2	39.29	4.90	7.2	45.15	11.39	7.3	16.69	56.14	7.3	14.76	28.38	7.3	29.42	45.84
8.2	39.02	4.76	8.2	44.99	11.35	8.2	16.32	56.14	8.3	14.61	28.41	8.3	28.94	45.84
9.2	38.77	4.60	9.2	44.84	11.29	9.2	15.90	56.15	9.3	14.46	28.44	9.3	28.46	45.83
10.2	38.52	4.46	10.2	44.69	11.24	10.2	15.47	56.15	10.3	14.30	28.45	10.3	28.01	45.84
11.2	38.27	4.33	11.2	44.55	11.19	11.2	15.01	56.14	11.2	14.12	28.45	11.2	27.58	45.84
12.2	38.03	4.21	12.2	44.41	11.14	12.2	14.54	56.10	12.2	13.95	28.44	12.2	27.15	45.83
13.2	37.80	4.09	13.2	44.27	11.12	13.2	14.06	56.04	13.2	13.77	28.40	13.2	26.73	45.84
14.2	37.56	3.96	14.2	44.13	11.09	14.2	13.60	55.96	14.2	13.58	28.35	14.2	26.31	45.88
15.2	37.32	3.86	15.2	43.98	11.08	15.2	13.15	55.87	15.2	13.41	28.27	15.2	25.89	45.91
16.2	37.07	3.75	16.2	43.84	11.05	16.2	12.72	55.76	16.2	13.25	28.18	16.2	25.46	45.95
17.2	36.82	3.62	17.2	43.69	11.02	17.2	12.30	55.65	17.2	13.10	28.09	17.2	25.00	45.98
18.2	36.55	3.50	18.2	43.55	10.98	18.2	11.91	55.54	18.2	12.95	27.99	18.2	24.55	46.00
19.2	36.30	3.37	19.2	43.40	10.94	19.2	11.53	55.43	19.2	12.81	27.90	19.2	24.08	46.01
20.2	36.05	3.19	20.2	43.25	10.87	20.2	11.17	55.32	20.2	12.67	27.81	20.2	23.60	46.00
21.2	35.79	3.01	21.2	43.09	10.78	21.2	10.81	55.22	21.2	12.54	27.72	21.2	23.12	45.97
22.2	35.54	2.82	22.2	42.95	10.69	22.2	10.46	55.13	22.2	12.41	27.67	22.2	22.64	45.92
23.2	35.29	2.61	23.2	42.80	10.58	23.2	10.10	55.05	23.2	12.27	27.62	23.2	22.16	45.86
24.2	35.07	2.40	24.2	42.66	10.45	24.2	9.72	54.96	24.2	12.13	27.55	24.2	21.71	45.77
25.1	34.84	2.19	25.2	42.52	10.32	25.2	9.32	54.88	25.2	11.99	27.47	25.2	21.28	45.69
26.1	34.64	1.99	26.2	42.38	10.20	26.2	8.90	54.76	26.2	11.82	27.39	26.2	20.85	45.63
27.1	34.44	1.80	27.2	42.25	10.10	27.2	8.47	54.63	27.2	11.65	27.27	27.2	20.45	45.57
28.1	34.21	1.64	28.2	42.12	10.01	28.2	8.04	54.47	28.2	11.50	27.13	28.2	20.04	45.54
29.1	34.00	1.49	29.2	41.99	9.93	29.2	7.65	54.29	29.2	11.34	26.96	29.2	19.64	45.51
30.1	33.78	1.33	30.2	41.86	9.86	30.2	7.28	54.10	30.2	11.20	26.78	30.2	19.22	45.49
31.1	33.54	1.16	31.2	41.72	9.77	31.2	6.95	53.89	31.2	11.08	26.59	31.2	18.77	45.46
11.11	-11.06		6.21	-6.13		20.34	+20.32		7.74	+7.67		18.57	-18.54	
5 ^h 45 ^m	51 ^s .396		6 ^h 46 ^m	48 ^s .653		7 ^h 3 ^m	2 ^s .335		7 ^h 14 ^m	7 ^s .912		7 ^h 15 ^m	39 ^s .691	
-84° 49'	44'' .27		-80° 43'	46'' .14		+87° 10'	43'' .86		+82° 34'	17'' .32		-86° 54'	19'' .75	

APPARENT PLACES OF STARS, 1919.

255

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamaleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Apr.	h m 8 18 s	+88 52 "	Apr.	h m 9 8 s	-85 20 "	Apr.	h m 9 25 s	+81 41 "	Apr.	h m 9 36 s	-80 35 "	Apr.	h m 10 21 s	+82 58 "
0.3	40.20	46.19	0.4	47.95	52.76	0.4	48.70	12.66	0.4	24.29	4.94	0.4	31.01	16.32
1.3	39.07	46.28	1.4	47.75	53.03	1.4	48.57	12.85	1.4	24.20	5.22	1.4	30.88	16.56
2.3	37.97	46.35	2.4	47.53	53.29	2.4	48.44	13.01	2.4	24.11	5.50	2.4	30.76	16.80
3.3	36.91	46.41	3.3	47.31	53.57	3.4	48.32	13.15	3.4	24.02	5.81	3.4	30.64	17.00
4.3	35.93	46.46	4.3	47.07	53.84	4.4	48.21	13.29	4.4	23.93	6.11	4.4	30.53	17.20
5.3	35.00	46.52	5.3	46.82	54.11	5.4	48.10	13.43	5.4	23.83	6.40	5.4	30.43	17.38
6.3	34.11	46.61	6.3	46.55	54.36	6.4	48.00	13.58	6.4	23.70	6.69	6.4	30.34	17.58
7.3	33.22	46.70	7.3	46.28	54.58	7.4	47.91	13.75	7.4	23.58	6.94	7.4	30.25	17.80
8.3	32.29	46.79	8.3	46.00	54.77	8.3	47.81	13.93	8.4	23.46	7.17	8.4	30.15	18.02
9.3	31.30	46.88	9.3	45.72	54.95	9.3	47.70	14.11	9.4	23.34	7.39	9.4	30.05	18.26
10.3	30.24	46.98	10.3	45.46	55.13	10.3	47.58	14.29	10.3	23.22	7.59	10.4	29.94	18.50
11.3	29.12	47.08	11.3	45.21	55.30	11.3	47.44	14.47	11.3	23.11	7.77	11.4	29.81	18.75
12.3	27.96	47.15	12.3	44.96	55.48	12.3	47.31	14.66	12.3	23.00	7.96	12.4	29.67	19.00
13.3	26.78	47.20	13.3	44.73	55.65	13.3	47.16	14.81	13.3	22.89	8.17	13.4	29.52	19.24
14.3	25.57	47.23	14.3	44.49	55.83	14.3	47.01	14.95	14.3	22.79	8.39	14.4	29.37	19.44
15.3	24.39	47.24	15.3	44.26	56.02	15.3	46.87	15.06	15.3	22.68	8.62	15.4	29.21	19.64
16.3	23.23	47.25	16.3	44.01	56.22	16.3	46.72	15.17	16.3	22.58	8.84	16.4	29.06	19.82
17.3	22.11	47.26	17.3	43.77	56.41	17.3	46.58	15.27	17.3	22.47	9.06	17.4	28.90	19.97
18.3	21.04	47.25	18.3	43.51	56.60	18.3	46.45	15.35	18.3	22.36	9.28	18.4	28.76	20.13
19.3	20.02	47.24	19.3	43.24	56.79	19.3	46.32	15.43	19.3	22.23	9.50	19.4	28.62	20.29
20.3	19.02	47.23	20.3	42.96	56.97	20.3	46.20	15.51	20.3	22.11	9.70	20.4	28.49	20.44
21.3	18.05	47.21	21.3	42.68	57.12	21.3	46.08	15.59	21.3	21.98	9.89	21.4	28.36	20.59
22.3	17.09	47.21	22.3	42.39	57.27	22.3	45.97	15.68	22.3	21.85	10.08	22.3	28.23	20.74
23.3	16.12	47.23	23.3	42.09	57.40	23.3	45.85	15.79	23.3	21.72	10.24	23.3	28.12	20.92
24.3	15.10	47.24	24.3	41.80	57.50	24.3	45.72	15.90	24.3	21.58	10.38	24.3	27.99	21.09
25.3	14.03	47.24	25.3	41.52	57.60	25.3	45.58	16.01	25.3	21.45	10.51	25.3	27.84	21.26
26.3	12.91	47.24	26.3	41.24	57.69	26.3	45.44	16.10	26.3	21.32	10.64	26.3	27.69	21.41
27.2	11.73	47.20	27.3	40.99	57.79	27.3	45.29	16.19	27.3	21.21	10.76	27.3	27.51	21.56
28.2	10.55	47.16	28.3	40.75	57.90	28.3	45.13	16.25	28.3	21.10	10.90	28.3	27.34	21.70
29.2	9.38	47.08	29.3	40.50	58.03	29.3	44.98	16.29	29.3	20.98	11.07	29.3	27.16	21.81
30.2	8.28	46.99	30.3	40.25	58.17	30.3	44.83	16.29	30.3	20.87	11.24	30.3	26.99	21.92
31.2	7.25	46.87	31.3	39.98	58.33	31.3	44.69	16.28	31.3	20.74	11.42	31.3	26.83	21.98
51.15	+51.14	12.33	-12.29	6.92	+6.84	6.11	-6.03	8.17	+8.11					
8 ^h 17 ^m	47 ^s .546	9 ^h 8 ^m	41 ^s .594	9 ^h 25 ^m	39 ^s .275	9 ^h 36 ^m	19 ^s .026	10 ^h 21 ^m	19 ^s .949					
+88° 52'	37'' .80	-85° 20'	26'' .78	+81° 41'	10'' .13	-80° 34'	39'' .26	+82° 58'	17'' .87					

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

γ Octantis Mag. 6.3			Bradley 1678. Mag. 6.3			ε Octantis. Mag. 5.4			33 H. Camelopard. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Apr.	h m 11 0	° ' " -84 9	Apr.	h m 12 14	° ' " +88 8	Apr.	h m 12 46	° ' " -84 41	Apr.	h m 12 48	° ' " +83 50	Apr.	h m 13 27	° ' " -85 22
	s "	"		s "	"		s "	"		s "	"		s "	"
0.4	7.31	49.94	0.5	61.84	47.54	0.5	38.07	12.51	0.5	41.50	59.92	0.5	55.57	25.91
1.4	7.24	50.28	1.5	61.65	47.87	1.5	38.12	12.88	1.5	41.48	60.27	1.5	55.68	26.25
2.4	7.17	50.65	2.5	61.43	48.18	2.5	38.18	13.25	2.5	41.45	60.60	2.5	55.79	26.61
3.4	7.11	51.03	3.5	61.21	48.47	3.5	38.24	13.64	3.5	41.41	60.91	3.5	55.92	26.96
4.4	7.02	51.42	4.5	61.01	48.75	4.5	38.29	14.05	4.5	41.38	61.20	4.5	56.03	27.36
5.4	6.93	51.80	5.5	60.83	49.02	5.5	38.33	14.46	5.5	41.36	61.48	5.5	56.13	27.79
6.4	6.82	52.18	6.5	60.69	49.29	6.5	38.34	14.88	6.5	41.35	61.76	6.5	56.20	28.21
7.4	6.69	52.53	7.5	60.57	49.56	7.5	38.34	15.30	7.5	41.35	62.04	7.5	56.25	28.62
8.4	6.55	52.87	8.5	60.46	49.85	8.5	38.30	15.68	8.5	41.35	62.34	8.5	56.29	29.00
9.4	6.41	53.18	9.5	60.33	50.16	9.5	38.27	16.06	9.5	41.35	62.65	9.5	56.31	29.38
10.4	6.28	53.47	10.5	60.17	50.48	10.5	38.24	16.40	10.5	41.34	62.97	10.5	56.32	29.74
11.4	6.16	53.77	11.5	59.99	50.83	11.5	38.21	16.75	11.5	41.30	63.32	11.5	56.34	30.08
12.4	6.05	54.06	12.5	59.75	51.16	12.5	38.20	17.09	12.5	41.26	63.67	12.5	56.37	30.42
13.4	5.94	54.34	13.5	59.47	51.50	13.5	38.18	17.42	13.5	41.20	64.02	13.5	56.41	30.75
14.4	5.83	54.63	14.4	59.15	51.82	14.5	38.17	17.75	14.5	41.14	64.36	14.5	56.45	31.09
15.4	5.72	54.94	15.4	58.82	52.12	15.5	38.17	18.10	15.5	41.07	64.68	15.5	56.50	31.43
16.4	5.62	55.25	16.4	58.45	52.41	16.5	38.17	18.46	16.5	40.99	65.00	16.5	56.55	31.77
17.4	5.51	55.56	17.4	58.09	52.69	17.5	38.16	18.82	17.5	40.91	65.32	17.5	56.59	32.13
18.4	5.38	55.89	18.4	57.75	52.96	18.5	38.15	19.19	18.5	40.84	65.60	18.5	56.63	32.50
19.4	5.26	56.21	19.4	57.40	53.20	19.5	38.12	19.57	19.5	40.76	65.88	19.5	56.67	32.89
20.4	5.12	56.53	20.4	57.07	53.44	20.5	38.09	19.95	20.5	40.70	66.15	20.5	56.68	33.27
21.4	4.97	56.82	21.4	56.77	53.68	21.5	38.05	20.34	21.5	40.64	66.42	21.5	56.69	33.67
22.4	4.81	57.10	22.4	56.48	53.95	22.4	37.99	20.71	22.5	40.59	66.70	22.5	56.68	34.06
23.4	4.64	57.38	23.4	56.20	54.21	23.4	37.93	21.08	23.4	40.53	66.98	23.5	56.64	34.44
24.4	4.47	57.63	24.4	55.90	54.48	24.4	37.84	21.42	24.4	40.48	67.27	24.5	56.61	34.81
25.4	4.32	57.87	25.4	55.58	54.75	25.4	37.75	21.75	25.4	40.39	67.58	25.5	56.57	35.15
26.4	4.16	58.11	26.4	55.21	55.03	26.4	37.70	22.08	26.4	40.31	67.89	26.5	56.54	35.48
27.4	4.01	58.34	27.4	54.79	55.30	27.4	37.63	22.39	27.4	40.22	68.19	27.5	56.52	35.80
28.4	3.86	58.59	28.4	54.31	55.55	28.4	37.57	22.70	28.4	40.11	68.49	28.5	56.51	36.12
29.4	3.74	58.86	29.4	53.80	55.80	29.4	37.53	23.02	29.4	39.98	68.78	29.5	56.51	36.45
30.4	3.61	59.13	30.4	53.29	56.02	30.4	37.50	23.36	30.4	39.85	69.03	30.5	56.52	36.79
31.3	3.47	59.41	31.4	52.77	56.22	31.4	37.46	23.72	31.4	39.72	69.28	31.5	56.53	37.16
9.84	-9.79		30.94	+30.92		10.80	-10.76		9.34	+9.28		12.40	-12.36	
10 ^h 59 ^m	54 ^s .546		12 ^h 14 ^m	29 ^s .190		12 ^h 46 ^m	19 ^s .119		12 ^h 48 ^m	31 ^s .308		13 ^h 27 ^m	32 ^s .891	
-84° 9'	29''.33		+88° 8'	56''.19		-84° 41'	1''.57		+83° 51'	11''.30		-85° 22'	19''.48	

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
Apr.	h m 14 14	° ' -83 17	Apr.	h m 15 3	° ' +87 32	Apr.	h m 15 24	° ' -84 11	Apr.	h m 16 54	° ' +82 10	Apr.	h m 17 16	° ' -80 46
0.6	2.90	56.06	0.6	12.82	26.08	0.6	41.55	48.95	0.7	13.45	3.55	0.7	26.66	57.58
1.6	3.01	56.37	1.6	13.06	26.39	1.6	41.73	49.18	1.7	13.59	3.75	1.7	26.81	57.65
2.6	3.14	56.69	2.6	13.26	26.70	2.6	41.92	49.41	2.7	13.72	3.96	2.7	26.98	57.73
3.6	3.27	57.02	3.6	13.45	26.99	3.6	42.14	49.67	3.7	13.85	4.17	3.7	27.15	57.80
4.6	3.40	57.38	4.6	13.62	27.28	4.6	42.35	49.94	4.7	13.97	4.37	4.7	27.33	57.90
5.6	3.50	57.76	5.6	13.81	27.53	5.6	42.55	50.25	5.7	14.09	4.54	5.7	27.50	58.04
6.6	3.61	58.15	6.6	14.01	27.78	6.6	42.75	50.57	6.7	14.21	4.70	6.7	27.68	58.19
7.6	3.70	58.53	7.6	14.23	28.02	7.6	42.93	50.90	7.7	14.33	4.85	7.7	27.84	58.37
8.5	3.77	58.91	8.6	14.47	28.28	8.6	43.07	51.23	8.7	14.46	5.01	8.7	27.99	58.54
9.5	3.83	59.29	9.6	14.72	28.55	9.6	43.21	51.56	9.7	14.60	5.18	9.7	28.13	58.73
10.5	3.88	59.63	10.6	14.97	28.83	10.6	43.34	51.86	10.7	14.73	5.37	10.7	28.27	58.91
11.5	3.94	59.96	11.6	15.20	29.15	11.6	43.46	52.14	11.7	14.87	5.58	11.7	28.40	59.07
12.5	3.99	60.29	12.6	15.41	29.47	12.6	43.59	52.42	12.6	15.00	5.81	12.7	28.53	59.21
13.5	4.05	60.60	13.6	15.60	29.80	13.6	43.72	52.70	13.6	15.13	6.05	13.7	28.65	59.36
14.5	4.11	60.92	14.6	15.75	30.15	14.6	43.87	52.96	14.6	15.24	6.32	14.7	28.79	59.49
15.5	4.20	61.23	15.6	15.88	30.50	15.6	44.01	53.22	15.6	15.35	6.59	15.7	28.92	59.63
16.5	4.27	61.56	16.6	15.98	30.82	16.6	44.16	53.49	16.6	15.47	6.86	16.7	29.06	59.77
17.5	4.35	61.90	17.6	16.08	31.15	17.6	44.31	53.77	17.6	15.58	7.13	17.6	29.21	59.92
18.5	4.42	62.25	18.6	16.15	31.47	18.6	44.47	54.08	18.6	15.67	7.40	18.6	29.36	60.07
19.5	4.48	62.62	19.6	16.23	31.76	19.6	44.62	54.40	19.6	15.77	7.65	19.6	29.51	60.25
20.5	4.54	62.98	20.5	16.31	32.05	20.6	44.77	54.72	20.6	15.86	7.90	20.6	29.66	60.44
21.5	4.60	63.36	21.5	16.39	32.34	21.6	44.91	55.06	21.6	15.97	8.13	21.6	29.80	60.63
22.5	4.64	63.74	22.5	16.48	32.63	22.6	45.02	55.41	22.6	16.07	8.35	22.6	29.95	60.87
23.5	4.67	64.13	23.5	16.59	32.91	23.6	45.12	55.76	23.6	16.16	8.58	23.6	30.08	61.10
24.5	4.68	64.49	24.5	16.70	33.20	24.6	45.22	56.10	24.6	16.27	8.82	24.6	30.21	61.31
25.5	4.69	64.84	25.5	16.81	33.51	25.5	45.31	56.44	25.6	16.37	9.09	25.6	30.31	61.52
26.5	4.71	65.18	26.5	16.89	33.84	26.5	45.39	56.74	26.6	16.47	9.35	26.6	30.42	61.73
27.5	4.74	65.49	27.5	16.94	34.18	27.5	45.48	57.03	27.6	16.56	9.65	27.6	30.53	61.92
28.5	4.77	65.81	28.5	16.95	34.55	28.5	45.58	57.31	28.6	16.65	9.97	28.6	30.65	62.10
29.5	4.82	66.13	29.5	16.93	34.90	29.5	45.70	57.60	29.6	16.73	10.30	29.6	30.78	62.26
30.5	4.86	66.46	30.5	16.87	35.24	30.5	45.83	57.91	30.6	16.79	10.63	30.6	30.91	62.44
31.5	4.91	66.83	31.5	16.80	35.57	31.5	45.95	58.23	31.6	16.85	10.95	31.6	31.05	62.62
8.57	-8.51		23.32	+23.29		9.89	-9.84		7.34	+7.27		6.24	-6.16	
14 ^h 13 ^m	46°.350		15 ^h 3 ^m	2°.510		15 ^h 24 ^m	23°.351		16 ^h 54 ^m	12°.991		17 ^h 16 ^m	17°.234	
-83° 17'	54''.52		+87° 32'	42''.66		-84° 11'	55''.43		+82° 10'	21''.42		-80° 47'	14''.27	
5934°-1919-17														

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
Apr.	h m	° ' "	Apr.	h m	° ' "	Apr.	h m	° ' "	Apr.	h m	° ' "	Apr.	h m	° ' "
	17 58	+86 36		18 7	-87 39		18 59	+89 0		19 31	-89 12		20 48	+82 13
	s	"		s	"		s	"		s	"		s	"
0.7	15.90	35.07	0.7	48.20	29.35	0.8	33.64	59.60	0.8	19.21	47.92	0.8	26.09	49.32
1.7	16.26	35.18	1.7	48.80	29.35	1.8	34.98	59.63	1.8	20.87	47.78	1.8	26.25	49.18
2.7	16.60	35.31	2.7	49.44	29.35	2.8	36.25	59.67	2.8	22.61	47.63	2.8	26.41	49.08
3.7	16.93	35.43	3.7	50.11	29.35	3.8	37.43	59.73	3.8	24.46	47.49	3.8	26.57	48.99
4.7	17.25	35.54	4.7	50.80	29.38	4.8	38.55	59.79	4.8	26.42	47.37	4.8	26.72	48.91
5.7	17.53	35.65	5.7	51.50	29.42	5.8	39.63	59.81	5.8	28.43	47.27	5.8	26.86	48.82
6.7	17.85	35.75	6.7	52.19	29.50	6.8	40.70	59.82	6.8	30.47	47.20	6.8	27.00	48.71
7.7	18.16	35.84	7.7	52.85	29.59	7.7	41.80	59.83	7.8	32.47	47.15	7.8	27.13	48.58
8.7	18.49	35.93	8.7	53.49	29.70	8.7	42.96	59.83	8.8	34.41	47.11	8.8	27.27	48.46
9.7	18.83	36.02	9.7	54.09	29.80	9.7	44.20	59.84	9.8	36.24	47.07	9.8	27.41	48.33
10.7	19.19	36.15	10.7	54.65	29.90	10.7	45.49	59.85	10.8	37.97	47.04	10.8	27.56	48.21
11.7	19.55	36.28	11.7	55.20	29.99	11.7	46.83	59.89	11.8	39.65	47.01	11.8	27.71	48.10
12.7	19.92	36.41	12.7	55.72	30.09	12.7	48.18	59.94	12.8	41.29	46.97	12.8	27.89	48.00
13.7	20.27	36.58	13.7	56.27	30.16	13.7	49.53	60.02	13.8	42.91	46.92	13.8	28.06	47.92
14.7	20.61	36.76	14.7	56.82	30.22	14.7	50.84	60.12	14.8	44.56	46.87	14.8	28.24	47.85
15.7	20.94	36.95	15.7	57.39	30.29	15.7	52.12	60.23	15.7	46.25	46.80	15.8	28.40	47.80
16.7	21.26	37.15	16.7	57.97	30.37	16.7	53.35	60.34	16.7	48.00	46.74	16.8	28.57	47.77
17.7	21.55	37.35	17.7	58.57	30.46	17.7	54.53	60.46	17.7	49.79	46.70	17.8	28.74	47.76
18.7	21.85	37.55	18.7	59.18	30.55	18.7	55.66	60.57	18.7	51.65	46.66	18.8	28.90	47.75
19.7	22.13	37.75	19.7	59.80	30.65	19.7	56.75	60.70	19.7	53.56	46.63	19.8	29.06	47.74
20.7	22.40	37.94	20.7	60.43	30.77	20.7	57.80	60.81	20.7	55.51	46.62	20.8	29.21	47.72
21.7	22.67	38.11	21.7	61.05	30.91	21.7	58.84	60.92	21.7	57.46	46.62	21.8	29.36	47.70
22.7	22.94	38.28	22.7	61.65	31.08	22.7	59.91	61.02	22.7	59.38	46.65	22.8	29.51	47.67
23.7	23.22	38.45	23.7	62.22	31.25	23.7	61.00	61.11	23.7	61.24	46.68	23.8	29.66	47.64
24.7	23.51	38.62	24.7	62.75	31.40	24.7	62.13	61.21	24.7	63.04	46.73	24.8	29.82	47.60
25.7	23.81	38.80	25.7	63.27	31.56	25.7	63.31	61.34	25.7	64.74	46.77	25.8	29.97	47.56
26.7	24.11	39.01	26.7	63.77	31.71	26.7	64.53	61.46	26.7	66.37	46.81	26.8	30.15	47.55
27.7	24.41	39.24	27.7	64.26	31.85	27.7	65.75	61.61	27.7	67.97	46.83	27.8	30.33	47.55
28.6	24.70	39.50	28.7	64.76	31.97	28.7	66.93	61.79	28.7	69.59	46.84	28.8	30.50	47.59
29.6	24.96	39.77	29.7	65.28	32.09	29.7	68.04	61.99	29.7	71.25	46.83	29.8	30.68	47.64
30.6	25.20	40.04	30.6	65.84	32.21	30.7	69.08	62.20	30.7	73.01	46.82	30.8	30.85	47.72
31.6	25.41	40.31	31.6	66.44	32.35	31.7	70.03	62.41	31.7	74.86	46.82	31.8	31.02	47.81
16.91	+16.88		24.48	-24.45		58.27	+58.26		72.81	-72.80		7.40	+7.33	
17 ^h 58 ^m	22 ^s .311		18 ^h 7 ^m	23 ^s .343		19 ^h 0 ^m	15 ^s .079		19 ^h 30 ^m	50 ^s .769		20 ^h 48 ^m	32 ^s .146	
+86° 36'	51''.04		-87° 39'	50''.89		+89° 1'	12''.80		-89° 13'	13''.35		+82° 13'	56''.82	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Apr.	21 38	-83 5	Apr.	22 16	-86 22	Apr.	22 37	-81 47	Apr.	23 27	+86 51	Apr.	23 47	-82 27
	s	"		s	"		s	"		s	"		s	"
0.9	35.37	10.79	0.9	21.47	28.61	0.9	46.41	64.49	0.9	25.41	43.20	0.9	14.90	53.35
1.9	35.50	10.48	1.9	21.65	28.27	1.9	46.48	64.16	1.9	25.60	42.92	1.9	14.92	52.98
2.9	35.63	10.18	2.9	21.84	27.91	2.9	46.55	63.79	2.9	25.83	42.65	2.9	14.94	52.61
3.9	35.77	9.86	3.9	22.06	27.55	3.9	46.63	63.40	3.9	26.03	42.39	3.9	14.97	52.21
4.9	35.95	9.53	4.9	22.30	27.20	4.9	46.73	63.02	4.9	26.23	42.15	4.9	15.01	51.80
5.9	36.12	9.22	5.9	22.56	26.86	5.9	46.83	62.65	5.9	26.42	41.91	5.9	15.07	51.37
6.9	36.30	8.94	6.9	22.85	26.52	6.9	46.96	62.31	6.9	26.57	41.67	6.9	15.15	50.95
7.9	36.49	8.67	7.9	23.15	26.21	7.9	47.09	61.97	7.9	26.72	41.42	7.9	15.22	50.57
8.9	36.67	8.44	8.9	23.45	25.93	8.9	47.21	61.66	8.9	26.87	41.15	8.9	15.30	50.19
9.9	36.84	8.21	9.9	23.74	25.66	9.9	47.31	61.37	9.9	27.04	40.87	9.9	15.38	49.83
10.8	37.02	8.01	10.9	24.01	25.40	10.9	47.42	61.09	10.9	27.22	40.57	10.9	15.45	49.49
11.8	37.16	7.81	11.9	24.25	25.14	11.9	47.53	60.81	11.9	27.42	40.27	11.9	15.51	49.18
12.8	37.31	7.59	12.9	24.50	24.89	12.9	47.63	60.52	12.9	27.65	39.98	12.9	15.57	48.86
13.8	37.46	7.37	13.9	24.73	24.63	13.9	47.72	60.24	13.9	27.91	39.70	13.9	15.63	48.55
14.8	37.60	7.13	14.9	24.96	24.36	14.9	47.81	59.96	14.9	28.19	39.42	14.9	15.68	48.21
15.8	37.75	6.89	15.9	25.20	24.09	15.9	47.90	59.65	15.9	28.47	39.17	15.9	15.73	47.87
16.8	37.92	6.64	16.9	25.46	23.82	16.9	48.01	59.35	16.9	28.75	38.93	16.9	15.78	47.50
17.8	38.09	6.40	17.9	25.72	23.54	17.9	48.12	59.03	17.9	29.03	38.70	17.9	15.86	47.15
18.8	38.25	6.16	18.9	26.00	23.25	18.9	48.23	58.72	18.9	29.32	38.50	18.9	15.93	46.78
19.8	38.44	5.92	19.9	26.31	22.97	19.9	48.36	58.40	19.9	29.60	38.30	19.9	16.03	46.40
20.8	38.63	5.70	20.8	26.62	22.71	20.9	48.50	58.11	20.9	29.85	38.10	20.9	16.12	46.02
21.8	38.83	5.49	21.8	26.95	22.44	21.9	48.63	57.82	21.9	30.10	37.87	21.9	16.22	45.66
22.8	39.04	5.29	22.8	27.29	22.17	22.9	48.77	57.54	22.9	30.34	37.66	22.9	16.33	45.32
23.8	39.24	5.10	23.8	27.62	21.94	23.9	48.92	57.27	23.9	30.58	37.44	23.9	16.44	44.99
24.8	39.43	4.93	24.8	27.95	21.74	24.9	49.06	57.04	24.9	30.84	37.22	24.9	16.54	44.67
25.8	39.61	4.79	25.8	28.27	21.53	25.8	49.20	56.81	25.9	31.11	36.98	25.9	16.64	44.37
26.8	39.78	4.64	26.8	28.56	21.33	26.8	49.32	56.58	26.9	31.41	36.75	26.9	16.74	44.08
27.8	39.95	4.48	27.8	28.83	21.13	27.8	49.42	56.35	27.9	31.73	36.54	27.9	16.83	43.79
28.8	40.11	4.30	28.8	29.11	20.91	28.8	49.54	56.10	28.9	32.09	36.35	28.9	16.91	43.48
29.8	40.27	4.11	29.8	29.39	20.69	29.8	49.66	55.83	29.9	32.47	36.18	29.9	16.99	43.16
30.8	40.45	3.90	30.8	29.68	20.43	30.8	49.78	55.56	30.9	32.84	36.02	30.9	17.07	42.82
31.8	40.64	3.69	31.8	30.00	20.18	31.8	49.92	55.28	31.9	33.19	35.88	31.9	17.17	42.46
8.31	-8.24		15.81	-15.78		7.01	-6.94		18.26	+18.23		7.62	-7.56	
21 ^h 38 ^m	38° 54.8		22 ^h 16 ^m	33° 21.2		22 ^h 37 ^m	51° 6.24		23 ^h 27 ^m	43° 57.1		23 ^h 47 ^m	23° 63.7	
-83° 5'	34'' 33		-86° 22'	50'' 92		-81° 48'	24'' 80		+86° 51'	38'' 62		-82° 28'	8'' 52	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
May	h m 0 57	° ' " +85 49	May	h m 1 30	° ' " +88 52	May	h m 1 41	° ' " -85 10	May	h m 4 10	° ' " +85 20	May	h m 5 35	° ' " +85 9
	s "	"		s "	"		s "	"		s "	"		s "	"
0.9	16.95	25.54	0.9	39.45	23.75	0.9	35.12	30.40	1.1	35.11	37.35	1.1	50.65	44.31
1.9	17.16	25.30	1.9	40.05	23.48	1.9	35.12	30.01	2.1	35.10	37.06	2.1	50.55	44.04
2.9	17.35	25.10	2.9	40.63	23.24	2.9	35.13	29.60	3.1	35.08	36.77	3.1	50.45	43.80
3.9	17.54	24.90	3.9	41.14	23.00	3.9	35.17	29.20	4.1	35.05	36.50	4.1	50.36	43.57
4.9	17.70	24.69	4.9	41.60	22.76	4.9	35.22	28.80	5.1	35.01	36.24	5.1	50.26	43.36
5.9	17.85	24.47	5.9	42.02	22.52	5.9	35.31	28.40	6.1	34.96	35.98	6.1	50.14	43.14
6.9	18.00	24.23	6.9	42.42	22.25	6.9	35.39	28.03	7.1	34.90	35.72	7.1	50.01	42.91
7.9	18.15	23.98	7.9	42.85	21.99	7.9	35.47	27.68	8.0	34.83	35.44	8.1	49.86	42.67
8.9	18.32	23.73	8.9	43.33	21.71	8.9	35.55	27.35	9.0	34.76	35.12	9.1	49.72	42.41
9.9	18.50	23.46	9.9	43.88	21.41	9.9	35.61	27.03	10.0	34.71	34.80	10.1	49.57	42.14
10.9	18.72	23.20	10.9	44.50	21.12	10.9	35.67	26.72	11.0	34.69	34.46	11.1	49.44	41.86
11.9	18.94	22.95	11.9	45.18	20.83	11.9	35.73	26.41	12.0	34.68	34.11	12.1	49.33	41.54
12.9	19.17	22.70	12.9	45.91	20.56	12.9	35.78	26.09	13.0	34.68	33.77	13.1	49.22	41.22
13.9	19.41	22.47	13.9	46.67	20.32	13.9	35.84	25.76	14.0	34.69	33.45	14.1	49.12	40.92
14.9	19.66	22.27	14.9	47.45	20.08	14.9	35.90	25.43	15.0	34.70	33.12	15.1	49.06	40.62
15.9	19.91	22.08	15.9	48.23	19.84	15.9	35.97	25.07	16.0	34.74	32.82	16.1	49.00	40.33
16.9	20.16	21.91	16.9	49.00	19.62	16.9	36.06	24.71	17.0	34.78	32.53	17.1	48.95	40.03
17.9	20.40	21.75	17.9	49.76	19.42	17.9	36.15	24.35	18.0	34.82	32.24	18.1	48.90	39.76
18.9	20.63	21.59	18.9	50.47	19.21	18.9	36.26	24.00	19.0	34.85	31.95	19.1	48.85	39.49
19.9	20.85	21.44	19.9	51.15	19.01	19.9	36.37	23.65	20.0	34.89	31.69	20.1	48.80	39.22
20.9	21.05	21.26	20.9	51.81	18.81	20.9	36.50	23.31	21.0	34.90	31.43	21.1	48.74	38.96
21.9	21.25	21.09	21.9	52.47	18.58	21.9	36.64	22.98	22.0	34.91	31.15	22.1	48.66	38.71
22.9	21.48	20.91	22.9	53.16	18.36	22.9	36.78	22.66	23.0	34.94	30.84	23.1	48.58	38.43
23.9	21.71	20.72	23.9	53.89	18.13	23.9	36.92	22.37	24.0	34.97	30.53	24.1	48.52	38.13
24.9	21.97	20.53	24.9	54.70	17.89	24.9	37.03	22.08	25.0	34.99	30.22	25.1	48.45	37.81
25.9	22.24	20.35	25.9	55.61	17.66	25.9	37.13	21.81	25.9	35.03	29.88	26.1	48.39	37.48
26.9	22.53	20.19	26.9	56.58	17.45	26.9	37.23	21.53	26.9	35.10	29.53	27.1	48.35	37.13
27.9	22.85	20.05	27.9	57.61	17.25	27.9	37.32	21.24	27.9	35.20	29.19	28.1	48.35	36.79
28.9	23.16	19.94	28.9	58.65	17.09	28.9	37.43	20.92	28.9	35.33	28.90	29.0	48.37	36.47
29.9	23.45	19.84	29.9	59.66	16.95	29.9	37.55	20.59	29.9	35.45	28.61	30.0	48.40	36.15
30.9	23.74	19.76	30.9	60.61	16.81	30.9	37.68	20.25	30.9	35.57	28.34	31.0	48.43	35.87
31.8	24.01	19.69	31.9	61.50	16.68	31.9	37.83	19.90	31.9	35.68	28.09	32.0	48.46	35.58
13.73	+13.69		50.81	+50.80		11.89	-11.84		12.32	+12.28		11.86	+11.81	
0 ^h 57 ^m	24 ^s .633		1 ^h 31 ^m	11 ^s .709		1 ^h 41 ^m	54 ^s .846		4 ^h 10 ^m	37 ^s .831		5 ^h 35 ^m	50 ^s .330	
+85° 49'	24'' .14		+88° 52'	20'' .55		-85° 10'	45'' .22		+85° 20'	28'' .88		+85° 9'	34'' .51	

APPARENT PLACES OF STARS, 1919.

261

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensse. Mag. 6.2			† Mensse. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
May	h m 5 45 s	° -84 49 "	May	h m 6 46 s	° -80 44 "	May	h m 7 2 s	° +87 10 "	May	h m 7 14 s	° +82 34 "	May	h m 7 15 s	° -86 54 "
1.1	33.54	61.16	1.2	41.72	9.77	1.2	66.95	53.89	1.2	11.08	26.59	1.2	18.77	45.46
2.1	33.29	60.98	2.2	41.58	9.67	2.2	66.65	53.70	2.2	10.97	26.43	2.2	18.31	45.41
3.1	33.05	60.75	3.2	41.44	9.54	3.2	66.36	53.52	3.2	10.87	26.29	3.2	17.83	45.35
4.1	32.82	60.52	4.2	41.30	9.40	4.2	66.08	53.37	4.2	10.77	26.13	4.2	17.36	45.26
5.1	32.62	60.28	5.2	41.16	9.23	5.2	65.80	53.22	5.2	10.66	25.99	5.2	16.90	45.16
6.1	32.41	60.01	6.2	41.02	9.04	6.2	65.48	53.07	6.2	10.53	25.87	6.2	16.46	45.02
7.1	32.22	59.75	7.2	40.89	8.84	7.2	65.15	52.92	7.2	10.41	25.75	7.2	16.05	44.88
8.1	32.05	59.50	8.2	40.76	8.66	8.2	64.78	52.75	8.2	10.27	25.62	8.2	15.65	44.73
9.1	31.87	59.25	9.2	40.66	8.48	9.2	64.42	52.58	9.2	10.13	25.47	9.2	15.27	44.60
10.1	31.70	59.01	10.1	40.54	8.32	10.2	64.04	52.39	10.2	9.99	25.29	10.2	14.91	44.47
11.1	31.53	58.79	11.1	40.43	8.16	11.2	63.67	52.16	11.2	9.84	25.11	11.2	14.55	44.37
12.1	31.36	58.58	12.1	40.32	8.01	12.2	63.33	51.94	12.2	9.70	24.89	12.2	14.19	44.26
13.1	31.19	58.36	13.1	40.21	7.86	13.2	62.99	51.71	13.2	9.58	24.67	13.2	13.82	44.15
14.1	31.01	58.14	14.1	40.09	7.71	14.2	62.70	51.46	14.2	9.45	24.44	14.2	13.44	44.05
15.1	30.83	57.92	15.1	39.98	7.56	15.1	62.41	51.20	15.2	9.35	24.21	15.2	13.05	43.95
16.1	30.65	57.69	16.1	39.85	7.38	16.1	62.16	50.94	16.2	9.26	23.97	16.2	12.66	43.82
17.1	30.47	57.45	17.1	39.73	7.20	17.1	61.91	50.71	17.1	9.16	23.74	17.2	12.25	43.69
18.1	30.29	57.17	18.1	39.62	6.99	18.1	61.68	50.49	18.1	9.08	23.55	18.1	11.84	43.51
19.1	30.12	56.88	19.1	39.51	6.77	19.1	61.46	50.26	19.1	9.00	23.34	19.1	11.45	43.34
20.1	29.95	56.58	20.1	39.39	6.55	20.1	61.24	50.03	20.1	8.91	23.15	20.1	11.06	43.16
21.1	29.80	56.28	21.1	39.28	6.30	21.1	61.00	49.81	21.1	8.82	22.96	21.1	10.67	42.97
22.1	29.66	55.98	22.1	39.18	6.05	22.1	60.73	49.60	22.1	8.73	22.77	22.1	10.32	42.77
23.1	29.54	55.68	23.1	39.07	5.80	23.1	60.46	49.38	23.1	8.63	22.57	23.1	9.99	42.56
24.1	29.42	55.39	24.1	38.98	5.57	24.1	60.19	49.15	24.1	8.52	22.34	24.1	9.67	42.37
25.1	29.30	55.11	25.1	38.89	5.37	25.1	59.92	48.89	25.1	8.40	22.09	25.1	9.35	42.20
26.1	29.17	54.86	26.1	38.80	5.16	26.1	59.66	48.61	26.1	8.29	21.82	26.1	9.04	42.05
27.1	29.04	54.63	27.1	38.70	4.96	27.1	59.43	48.30	27.1	8.20	21.53	27.1	8.73	41.90
28.1	28.90	54.39	28.1	38.61	4.78	28.1	59.24	47.98	28.1	8.13	21.23	28.1	8.39	41.75
29.1	28.76	54.12	29.1	38.52	4.59	29.1	59.08	47.67	29.1	8.08	20.94	29.1	8.08	41.60
30.1	28.61	53.84	30.1	38.42	4.36	30.1	58.95	47.38	30.1	8.03	20.66	30.1	7.67	41.42
31.0	28.46	53.52	31.1	38.31	4.10	31.1	58.84	47.10	31.1	7.99	20.40	31.1	7.30	41.23
32.0	28.33	53.19	32.1	38.21	3.83	32.1	58.73	46.83	32.1	7.95	20.16	32.1	6.94	41.00
11.10	-11.06		6.21	-6.18		20.33	+20.31		7.74	+7.67		18.56	-18.54	
5 ^h 45 ^m	51 ^s .396		6 ^h 46 ^m	48 ^s .653		7 ^h 3 ^m	2 ^s .335		7 ^h 14 ^m	7 ^s .912		7 ^h 15 ^m	39 ^s .691	
-84° 49'	44'''.27		-80° 43'	46'''.14		+87° 10'	43'''.86		+82° 34'	17'''.32		-86° 54'	19'''.75	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamæleontis. Mag. 5.2			30 H. Camelopardalis. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
May	h m 8 17	° ' " +88 52	May	h m 9 8	° ' " -85 20	May	h m 9 25	° ' " +81 41	May	h m 9 36	° ' " -80 35	May	h m 10 21	° ' " +82 58
	s	"		s	"		s	"		s	"		s	"
1.2	67.25	46.87	1.3	39.98	58.33	1.3	44.69	16.28	1.3	20.74	11.42	1.3	26.83	21.98
2.2	66.30	46.76	2.3	39.71	58.47	2.3	44.56	16.27	2.3	20.62	11.59	2.3	26.68	22.02
3.2	65.40	46.66	3.3	39.41	58.59	3.3	44.46	16.26	3.3	20.50	11.74	3.3	26.54	22.06
4.2	64.53	46.57	4.3	39.10	58.68	4.3	44.33	16.26	4.3	20.36	11.88	4.3	26.41	22.16
5.2	63.65	46.51	5.3	38.79	58.75	5.3	44.21	16.28	5.3	20.21	12.00	5.3	26.28	22.24
6.2	62.72	46.45	6.3	38.48	58.81	6.3	44.09	16.31	6.3	20.08	12.09	6.3	26.14	22.34
7.2	61.75	46.38	7.3	38.19	58.85	7.3	43.96	16.35	7.3	19.94	12.15	7.3	25.99	22.44
8.2	60.72	46.29	8.3	37.92	58.88	8.3	43.83	16.39	8.3	19.80	12.22	8.3	25.83	22.55
9.2	59.64	46.20	9.3	37.64	58.90	9.3	43.68	16.40	9.3	19.67	12.27	9.3	25.66	22.64
10.2	58.52	46.10	10.2	37.39	58.93	10.3	43.52	16.41	10.3	19.54	12.33	10.3	25.48	22.73
11.2	57.41	45.97	11.2	37.14	58.96	11.3	43.37	16.41	11.3	19.43	12.39	11.3	25.30	22.80
12.2	56.33	45.84	12.2	36.89	59.02	12.3	43.21	16.39	12.3	19.32	12.45	12.3	25.11	22.86
13.2	55.25	45.70	13.2	36.65	59.07	13.3	43.06	16.35	13.3	19.19	12.54	13.3	24.93	22.90
14.2	54.24	45.53	14.2	36.38	59.11	14.2	42.91	16.29	14.3	19.07	12.63	14.3	24.75	22.93
15.2	53.29	45.35	15.2	36.12	59.16	15.2	42.77	16.22	15.3	18.95	12.71	15.3	24.57	22.94
16.2	52.37	45.17	16.2	35.84	59.21	16.2	42.64	16.14	16.3	18.83	12.77	16.3	24.42	22.95
17.2	51.51	45.01	17.2	35.56	59.26	17.2	42.52	16.06	17.2	18.70	12.84	17.3	24.27	22.94
18.2	50.69	44.84	18.2	35.28	59.27	18.2	42.40	16.00	18.2	18.56	12.90	18.3	24.12	22.92
19.2	49.89	44.69	19.2	34.99	59.27	19.2	42.27	15.93	19.2	18.42	12.95	19.3	23.97	22.92
20.2	49.11	44.54	20.2	34.68	59.26	20.2	42.17	15.87	20.2	18.28	12.96	20.3	23.83	22.93
21.2	48.29	44.40	21.2	34.39	59.23	21.2	42.04	15.81	21.2	18.15	12.97	21.3	23.68	22.94
22.2	47.42	44.26	22.2	34.11	59.19	22.2	41.92	15.76	22.2	18.01	12.97	22.3	23.53	22.95
23.2	46.52	44.11	23.2	33.83	59.14	23.2	41.79	15.71	23.2	17.87	12.95	23.3	23.36	22.97
24.2	45.58	43.94	24.2	33.58	59.09	24.2	41.66	15.65	24.2	17.74	12.93	24.3	23.19	22.96
25.2	44.61	43.75	25.2	33.34	59.05	25.2	41.51	15.56	25.2	17.64	12.92	25.3	23.01	22.99
26.2	43.65	43.52	26.2	33.10	59.04	26.2	41.36	15.44	26.2	17.52	12.93	26.3	22.81	22.95
27.2	42.77	43.29	27.2	32.87	59.03	27.2	41.22	15.31	27.2	17.41	12.94	27.3	22.63	22.91
28.2	41.96	43.04	28.2	32.62	59.03	28.2	41.08	15.14	28.2	17.30	12.98	28.3	22.46	22.83
29.2	41.23	42.78	29.2	32.35	59.04	29.2	40.98	14.97	29.2	17.17	13.02	29.2	22.31	22.73
30.2	40.57	42.53	30.2	32.08	59.03	30.2	40.88	14.82	30.2	17.05	13.03	30.2	22.16	22.63
31.2	39.98	42.29	31.2	31.80	58.99	31.2	40.78	14.66	31.2	16.91	13.03	31.2	22.02	22.53
32.2	39.39	42.06	32.2	31.50	58.93	32.2	40.68	14.52	32.2	16.78	12.99	32.2	21.90	22.44
51.13 +51.12			12.33 -12.29			6.92 +6.84			6.11 -6.03			8.17 +8.11		
8 ^h 17 ^m 47 ^s .546			9 ^h 8 ^m 41 ^s .594			9 ^h 25 ^m 39 ^s .275			9 ^h 36 ^m 19 ^s .026			10 ^h 21 ^m 19 ^s .949		
+88° 52' 37".80			-85° 20' 26".78			+81° 41' 10".13			-80° 34' 39".26			+82° 58' 17".67		

APPARENT PLACES OF STARS, 1919.

263

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

γ Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ϵ Octantis. Mag. 5.4			32 H. Camelop. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
May	h m 10 59 s	° ' " -84 9 "	May	h m 12 14 s	° ' " +88 8 "	May	h m 12 46 s	° ' " -84 41 "	May	h m 12 48 s	° ' " +83 51 "	May	h m 13 27 s	° ' " -85 22 "
1.3	63.47	59.41	1.4	52.77	56.22	1.4	37.46	23.72	1.4	39.72	9.28	1.5	56.53	37.16
2.3	63.32	59.69	2.4	52.29	56.42	2.4	37.41	24.09	2.4	39.62	9.50	2.4	56.53	37.55
3.3	63.15	59.98	3.4	51.85	56.60	3.4	37.33	24.46	3.4	39.51	9.72	3.4	56.50	37.94
4.3	62.98	60.25	4.4	51.43	56.80	4.4	37.25	24.83	4.4	39.40	9.94	4.4	56.45	38.33
5.3	62.79	60.49	5.4	51.04	57.00	5.4	37.16	25.17	5.4	39.31	10.16	5.4	56.38	38.71
6.3	62.59	60.70	6.4	50.64	57.20	6.4	37.03	25.50	6.4	39.22	10.40	6.4	56.30	39.06
7.3	62.41	60.90	7.4	50.23	57.42	7.4	36.91	25.80	7.4	39.12	10.66	7.4	56.21	39.40
8.3	62.23	61.08	8.4	49.77	57.65	8.4	36.78	26.09	8.4	39.01	10.93	8.4	56.12	39.72
9.3	62.04	61.25	9.4	49.28	57.88	9.4	36.68	26.37	9.4	38.88	11.20	9.4	56.03	40.01
10.3	61.87	61.42	10.4	48.75	58.11	10.4	36.58	26.64	10.4	38.74	11.47	10.4	55.95	40.31
11.3	61.72	61.60	11.4	48.19	58.34	11.4	36.47	26.90	11.4	38.60	11.74	11.4	55.89	40.60
12.3	61.56	61.78	12.4	47.59	58.54	12.4	36.38	27.17	12.4	38.44	11.99	12.4	55.82	40.89
13.3	61.40	61.96	13.4	47.00	58.73	13.4	36.29	27.45	13.4	38.29	12.23	13.4	55.76	41.20
14.3	61.24	62.16	14.4	46.40	58.91	14.4	36.20	27.74	14.4	38.13	12.44	14.4	55.70	41.51
15.3	61.07	62.36	15.4	45.80	59.06	15.4	36.10	28.06	15.4	37.97	12.64	15.4	55.65	41.83
16.3	60.90	62.56	16.4	45.22	59.20	16.4	36.01	28.37	16.4	37.82	12.83	16.4	55.57	42.16
17.3	60.72	62.75	17.4	44.65	59.33	17.4	35.89	28.67	17.4	37.68	13.02	17.4	55.49	42.49
18.3	60.52	62.94	18.4	44.12	59.46	18.4	35.76	28.98	18.4	37.54	13.19	18.4	55.40	42.83
19.3	60.33	63.10	19.4	43.60	59.58	19.4	35.63	29.27	19.4	37.40	13.36	19.4	55.28	43.16
20.3	60.13	63.25	20.4	43.09	59.71	20.4	35.48	29.56	20.4	37.26	13.53	20.4	55.15	43.48
21.3	59.90	63.39	21.4	42.59	59.85	21.4	35.32	29.84	21.4	37.14	13.71	21.4	55.01	43.78
22.3	59.70	63.52	22.4	42.07	60.01	22.4	35.16	30.08	22.4	37.00	13.90	22.4	54.86	44.07
23.3	59.50	63.62	23.4	41.51	60.17	23.4	35.00	30.30	23.4	36.85	14.10	23.4	54.72	44.34
24.3	59.31	63.72	24.4	40.90	60.33	24.4	34.85	30.53	24.4	36.68	14.30	24.4	54.59	44.60
25.3	59.13	63.82	25.4	40.26	60.48	25.4	34.71	30.74	25.4	36.51	14.51	25.4	54.47	44.85
26.3	58.96	63.94	26.4	39.57	60.60	26.4	34.59	30.96	26.4	36.33	14.69	26.4	54.36	45.11
27.3	58.80	64.07	27.4	38.87	60.69	27.4	34.48	31.21	27.4	36.13	14.84	27.4	54.27	45.37
28.3	58.63	64.22	28.4	38.17	60.76	28.4	34.37	31.47	28.4	35.94	14.98	28.4	54.18	45.65
29.3	58.45	64.37	29.4	37.50	60.82	29.4	34.24	31.73	29.4	35.76	15.09	29.4	54.09	45.96
30.3	58.27	64.52	30.4	36.87	60.87	30.4	34.11	32.00	30.4	35.58	15.19	30.4	53.97	46.27
31.3	58.07	64.67	31.4	36.27	60.91	31.4	33.96	32.28	31.4	35.42	15.27	31.4	53.84	46.56
32.3	57.84	64.78	32.4	35.71	60.95	32.4	33.78	32.54	32.4	35.27	15.37	32.4	53.67	46.86
9.84	-9.79		30.97	+30.96		10.81	-10.76		9.34	+9.29		12.41	-12.37	
10 ^h 59 ^m	54° 54'		12 ^h 14 ^m	29° 19'		12 ^h 46 ^m	19° 11'		12 ^h 48 ^m	31° 30'		13 ^h 27 ^m	32° 89'	
-84° 9'	29'' 33		+88° 8'	56'' 19		-84° 41'	1'' 57		+83° 51'	11'' 30		-85° 22'	19'' 48	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2233. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
May	h m 14 14 s	° ' " -83 18 "	May	h m 15 3 s	° ' " +87 32 "	May	h m 15 24 s	° ' " -84 11 "	May	h m 16 54 s	° ' " +82 10 "	May	h m 17 16 s	° ' " -80 47 "
1.5	4.91	6.83	1.5	16.80	35.57	1.5	45.95	58.23	1.6	16.85	10.95	1.6	31.05	2.62
2.5	4.96	7.21	2.5	16.73	35.86	2.5	46.08	58.57	2.6	16.91	11.24	2.6	31.20	2.84
3.5	5.00	7.58	3.5	16.67	36.14	3.5	46.19	58.93	3.6	16.96	11.52	3.6	31.35	3.06
4.5	5.01	7.95	4.5	16.63	36.42	4.5	46.29	59.30	4.6	17.02	11.78	4.6	31.47	3.35
5.5	5.02	8.34	5.5	16.61	36.69	5.5	46.37	59.67	5.6	17.09	12.04	5.6	31.60	3.61
6.5	5.01	8.71	6.5	16.60	36.97	6.5	46.43	60.02	6.6	17.16	12.30	6.6	31.70	3.89
7.5	4.97	9.05	7.5	16.60	37.28	7.5	46.49	60.36	7.6	17.23	12.57	7.6	31.80	4.17
8.5	4.96	9.38	8.5	16.59	37.60	8.5	46.53	60.68	8.6	17.30	12.88	8.6	31.89	4.40
9.5	4.94	9.70	9.5	16.56	37.94	9.5	46.57	60.99	9.6	17.37	13.19	9.6	31.98	4.65
10.5	4.92	9.98	10.5	16.48	38.30	10.5	46.61	61.29	10.6	17.43	13.52	10.6	32.07	4.87
11.5	4.91	10.28	11.5	16.39	38.65	11.5	46.65	61.58	11.6	17.49	13.86	11.6	32.15	5.09
12.5	4.90	10.57	12.5	16.29	38.99	12.5	46.71	61.87	12.6	17.54	14.23	12.6	32.24	5.31
13.5	4.90	10.89	13.5	16.15	39.33	13.5	46.78	62.18	13.6	17.58	14.57	13.6	32.34	5.53
14.4	4.89	11.20	14.5	15.98	39.66	14.5	46.84	62.49	14.6	17.62	14.92	14.6	32.44	5.75
15.4	4.89	11.52	15.5	15.81	39.97	15.5	46.91	62.80	15.6	17.65	15.26	15.6	32.55	5.97
16.4	4.89	11.85	16.5	15.65	40.26	16.5	46.97	63.13	16.6	17.68	15.59	16.6	32.66	6.22
17.4	4.88	12.20	17.5	15.47	40.55	17.5	47.03	63.47	17.6	17.71	15.92	17.6	32.77	6.48
18.4	4.85	12.54	18.5	15.30	40.82	18.5	47.08	63.84	18.5	17.72	16.22	18.6	32.87	6.76
19.4	4.82	12.91	19.5	15.14	41.11	19.5	47.11	64.20	19.5	17.75	16.51	19.6	32.97	7.05
20.4	4.78	13.25	20.5	15.00	41.37	20.5	47.12	64.54	20.5	17.78	16.81	20.6	33.06	7.34
21.4	4.73	13.58	21.5	14.86	41.64	21.5	47.13	64.89	21.5	17.81	17.10	21.6	33.14	7.65
22.4	4.66	13.91	22.5	14.72	41.93	22.5	47.14	65.23	22.5	17.84	17.41	22.6	33.20	7.93
23.4	4.60	14.19	23.5	14.57	42.24	23.5	47.13	65.54	23.5	17.87	17.73	23.6	33.26	8.21
24.4	4.54	14.47	24.5	14.39	42.55	24.5	47.13	65.83	24.5	17.88	18.07	24.5	33.32	8.47
25.4	4.49	14.73	25.5	14.18	42.87	25.5	47.13	66.12	25.5	17.90	18.44	25.5	33.39	8.72
26.4	4.45	15.00	26.4	13.93	43.19	26.5	47.14	66.42	26.5	17.91	18.81	26.5	33.45	8.96
27.4	4.42	15.28	27.4	13.65	43.49	27.5	47.18	66.71	27.5	17.91	19.18	27.5	33.54	9.18
28.4	4.39	15.58	28.4	13.33	43.78	28.5	47.21	67.02	28.5	17.90	19.55	28.5	33.63	9.44
29.4	4.36	15.89	29.4	13.01	44.03	29.5	47.25	67.35	29.5	17.89	19.88	29.5	33.71	9.70
30.4	4.33	16.23	30.4	12.71	44.27	30.5	47.27	67.69	30.5	17.87	20.20	30.5	33.81	9.97
31.4	4.29	16.58	31.4	12.42	44.50	31.5	47.28	68.03	31.5	17.85	20.49	31.5	33.90	10.28
32.4	4.22	16.91	32.4	12.17	44.73	32.4	47.28	68.40	32.5	17.83	20.78	32.5	33.97	10.61
8.58	-8.52		23.34	+23.32		9.90	-9.85		7.34	+7.27		6.24	-6.16	
14 ^h 13 ^m	46°.350		15 ^h 3 ^m	2°.510		15 ^h 24 ^m	23°.351		16 ^h 54 ^m	12°.991		17 ^h 16 ^m	17°.234	
-83° 17'	54'' .52		+87° 32'	42'' .66		-84° 11'	55'' .43		+82° 10'	21'' .42		-80° 47'	14'' .37	

APPARENT PLACES OF STARS, 1919.

265

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
May	h m s	° ' "	May	h m s	° ' "	May	h m s	° ' "	May	h m s	° ' "	May	h m s	° ' "
17 58	+86 36	"	18 8	-87 39	"	19 0	+89 1	"	19 32	-89 12	"	20 48	+82 18	"
1.6	25.41	40.31	1.6	6.44	32.35	1.7	10.03	2.41	1.7	14.86	46.82	1.8	31.02	47.81
2.6	25.60	40.56	2.6	7.04	32.51	2.7	10.92	2.61	2.7	16.79	46.85	2.8	31.17	47.90
3.6	25.80	40.79	3.6	7.64	32.69	3.7	11.76	2.79	3.7	18.75	46.89	3.8	31.32	47.96
4.6	25.99	41.01	4.6	8.21	32.88	4.7	12.63	2.96	4.7	20.67	46.95	4.7	31.46	48.03
5.6	26.21	41.22	5.6	8.75	33.11	5.7	13.51	3.11	5.7	22.53	47.03	5.7	31.60	48.08
6.6	26.43	41.44	6.6	9.24	33.34	6.7	14.46	3.26	6.7	24.29	47.13	6.7	31.75	48.12
7.6	26.67	41.68	7.6	9.70	33.56	7.7	15.46	3.43	7.7	25.95	47.24	7.7	31.90	48.16
8.6	26.91	41.93	8.6	10.13	33.78	8.7	16.51	3.61	8.7	27.51	47.35	8.7	32.07	48.21
9.6	27.15	42.20	9.6	10.55	33.98	9.7	17.58	3.79	9.7	29.01	47.45	9.7	32.24	48.25
10.6	27.39	42.47	10.6	10.96	34.16	10.7	18.63	4.01	10.7	30.47	47.55	10.7	32.41	48.34
11.6	27.61	42.76	11.6	11.37	34.34	11.7	19.67	4.24	11.7	31.95	47.63	11.7	32.58	48.44
12.6	27.81	43.07	12.6	11.80	34.52	12.7	20.65	4.48	12.7	33.44	47.71	12.7	32.75	48.56
13.6	28.01	43.38	13.6	12.26	34.69	13.6	21.57	4.72	13.7	34.97	47.79	13.7	32.93	48.69
14.6	28.18	43.69	14.6	12.71	34.87	14.6	22.44	4.97	14.7	36.56	47.85	14.7	33.08	48.84
15.6	28.33	44.01	15.6	13.17	35.06	15.6	23.25	5.24	15.7	38.19	47.93	15.7	33.24	48.99
16.6	28.48	44.30	16.6	13.65	35.28	16.6	24.01	5.50	16.7	39.86	48.02	16.7	33.39	49.15
17.6	28.62	44.60	17.6	14.12	35.51	17.6	24.72	5.75	17.7	41.56	48.12	17.7	33.54	49.29
18.6	28.75	44.89	18.6	14.59	35.75	18.6	25.41	5.99	18.7	43.27	48.26	18.7	33.69	49.44
19.6	28.88	45.16	19.6	15.05	36.00	19.6	26.08	6.23	19.7	44.96	48.40	19.7	33.82	49.58
20.6	29.01	45.43	20.6	15.47	36.26	20.6	26.77	6.46	20.7	46.58	48.56	20.7	33.96	49.71
21.6	29.15	45.69	21.6	15.85	36.53	21.6	27.50	6.68	21.6	48.12	48.72	21.7	34.09	49.84
22.6	29.30	45.97	22.6	16.20	36.78	22.6	28.27	6.91	22.6	49.58	48.88	22.7	34.23	49.95
23.6	29.45	46.25	23.6	16.54	37.03	23.6	29.07	7.14	23.6	50.95	49.04	23.7	34.38	50.09
24.6	29.60	46.56	24.8	16.86	37.27	24.6	29.88	7.40	24.6	52.26	49.19	24.7	34.53	50.27
25.6	29.73	46.89	25.6	17.19	37.50	25.6	30.65	7.68	25.6	53.54	49.33	25.7	34.70	50.44
26.6	29.85	47.24	26.6	17.54	37.71	26.6	31.37	8.00	26.6	54.86	49.47	26.7	34.85	50.66
27.6	29.95	47.61	27.6	17.91	37.91	27.6	32.00	8.33	27.6	56.25	49.60	27.7	35.00	50.89
28.6	30.01	47.96	28.6	18.31	38.14	28.6	32.53	8.64	28.6	57.73	49.73	28.7	35.15	51.13
29.6	30.06	48.30	29.6	18.72	38.38	29.6	32.97	8.96	29.6	59.29	49.86	29.7	35.29	51.37
30.6	30.09	48.63	30.6	19.14	38.64	30.6	33.39	9.26	30.6	60.88	50.01	30.7	35.41	51.61
31.6	30.12	48.93	31.6	19.54	38.91	31.6	33.76	9.54	31.6	62.47	50.19	31.7	35.54	51.82
32.6	30.15	49.22	32.6	19.92	39.21	32.6	34.14	9.81	32.6	63.99	50.39	32.7	35.64	52.02
16.92	+16.89		24.49	-24.47		58.36	+58.35		72.83	-72.83		7.40	+7.33	
17 ^h 58 ^m 22 ^s .311			18 ^h 7 ^m 23 ^s .343			19 ^h 0 ^m 15 ^s .079			19 ^h 30 ^m 50 ^s .769			20 ^h 48 ^m 32 ^s .146		
+86° 36' 51".04			-87° 39' 50".89			+89° 1' 12".80			-89° 13' 13".35			+82° 13' 56".82		

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
May	h m	° '	May	h m	° '	May	h m	° '	May	h m	° '	May	h m	° '
	21 38	-83 5		22 16	-86 22		22 37	-81 47		23 27	+86 51		23 47	-82 27
	s	"		s	"		s	"		s	"		s	"
1.8	40.64	3.69	1.8	30.00	20.18	1.8	49.92	55.28	1.9	33.19	35.88	1.9	17.17	42.46
2.8	40.84	3.50	2.8	30.33	19.94	2.8	50.07	54.99	2.9	33.53	35.75	2.9	17.30	42.10
3.8	41.07	3.31	3.8	30.70	19.71	3.8	50.23	54.71	3.9	33.85	35.62	3.9	17.42	41.76
4.8	41.29	3.16	4.8	31.08	19.50	4.8	50.39	54.47	4.9	34.13	35.49	4.9	17.55	41.43
5.8	41.49	3.03	5.8	31.45	19.31	5.8	50.55	54.24	5.9	34.44	35.36	5.9	17.69	41.12
6.8	41.70	2.93	6.8	31.83	19.15	6.8	50.71	54.04	6.9	34.74	35.21	6.9	17.82	40.84
7.8	41.90	2.83	7.8	32.17	19.00	7.8	50.86	53.87	7.9	35.05	35.04	7.9	17.96	40.57
8.8	42.08	2.73	8.8	32.50	18.87	8.8	51.00	53.70	8.8	35.38	34.87	8.9	18.08	40.32
9.8	42.27	2.65	9.8	32.82	18.74	9.8	51.14	53.53	9.8	35.73	34.70	9.9	18.21	40.08
10.8	42.44	2.55	10.8	33.13	18.60	10.8	51.28	53.36	10.8	36.10	34.55	10.9	18.31	39.83
11.8	42.61	2.45	11.8	33.43	18.45	11.8	51.40	53.17	11.8	36.49	34.40	11.9	18.41	39.60
12.8	42.78	2.35	12.8	33.73	18.31	12.8	51.53	52.99	12.8	36.90	34.28	12.9	18.52	39.34
13.8	42.95	2.24	13.8	34.03	18.15	13.8	51.66	52.80	13.8	37.31	34.17	13.8	18.64	39.07
14.8	43.14	2.12	14.8	34.35	17.98	14.8	51.80	52.61	14.8	37.71	34.07	14.8	18.76	38.80
15.8	43.34	2.01	15.8	34.68	17.82	15.8	51.94	52.41	15.8	38.10	33.99	15.8	18.88	38.53
16.8	43.53	1.89	16.8	35.04	17.67	16.8	52.12	52.21	16.8	38.48	33.91	16.8	19.02	38.25
17.7	43.74	1.79	17.8	35.40	17.52	17.8	52.28	52.03	17.8	38.85	33.86	17.8	19.15	37.97
18.7	43.96	1.70	18.8	35.78	17.38	18.8	52.44	51.86	18.8	39.21	33.81	18.8	19.30	37.71
19.7	44.18	1.64	19.8	36.17	17.25	19.8	52.62	51.69	19.8	39.55	33.75	19.8	19.46	37.44
20.7	44.39	1.58	20.8	36.56	17.15	20.8	52.79	51.55	20.8	39.89	33.67	20.8	19.62	37.21
21.7	44.60	1.55	21.8	36.94	17.07	21.8	52.96	51.43	21.8	40.23	33.59	21.8	19.78	36.99
22.7	44.79	1.55	22.8	37.31	17.01	22.8	53.11	51.33	22.8	40.60	33.51	22.8	19.93	36.80
23.7	44.98	1.54	23.8	37.64	16.94	23.8	53.26	51.23	23.8	40.96	33.42	23.8	20.08	36.61
24.7	45.15	1.50	24.8	37.97	16.86	24.8	53.41	51.13	24.8	41.37	33.36	24.8	20.21	36.42
25.7	45.33	1.47	25.8	38.29	16.78	25.8	53.54	51.01	25.8	41.79	33.30	25.8	20.34	36.23
26.7	45.50	1.43	26.8	38.59	16.69	26.8	53.68	50.88	26.8	42.24	33.25	26.8	20.47	36.03
27.7	45.68	1.35	27.7	38.90	16.59	27.8	53.82	50.74	27.8	42.68	33.24	27.8	20.60	35.81
28.7	45.87	1.28	28.7	39.24	16.49	28.8	53.98	50.60	28.8	43.11	33.26	28.8	20.74	35.58
29.7	46.07	1.22	29.7	39.61	16.38	29.8	54.15	50.44	29.8	43.54	33.28	29.8	20.88	35.35
30.7	46.30	1.16	30.7	39.99	16.28	30.8	54.33	50.30	30.8	43.93	33.30	30.8	21.05	35.12
31.7	46.52	1.14	31.7	40.39	16.19	31.8	54.51	50.17	31.8	44.29	33.33	31.8	21.22	34.90
32.7	46.74	1.14	32.7	40.78	16.13	32.7	54.69	50.08	32.8	44.65	33.36	32.8	21.40	34.71
8.30	-8.24		15.80	-15.77		7.01	-6.94		18.25	+18.23		7.62	-7.56	
21 ^h 38 ^m	38 ^s .548		22 ^h 16 ^m	33 ^s .212		22 ^h 37 ^m	51 ^s .624		23 ^h 27 ^m	43 ^s .571		23 ^h 47 ^m	23 ^s .637	
-83° 5'	34'''.33		-86° 22'	50'''.92		-81° 48'	24'''.80		+86° 51'	38'''.62		-82° 28'	8'''.42	

APPARENT PLACES OF STARS, 1919.267

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
June	h m 0 57 s	° ' " +85 49 "	June	h m 1 31 s	° ' " +88 52 "	June	h m 1 41 s	° ' " -85 10 "	June	h m 4 10 s	° ' " +85 20 "	June	h m 5 35 s	° ' " +85 9 "
0.8	24.01	19.69	0.9	1.50	16.68	0.9	37.83	19.90	0.9	35.68	28.09	1.0	48.46	35.58
1.8	24.26	19.60	1.9	2.34	16.55	1.9	38.01	19.58	1.9	35.78	27.85	2.0	48.47	35.32
2.8	24.50	19.49	2.9	3.15	16.41	2.9	38.19	19.26	2.9	35.86	27.60	3.0	48.46	35.05
3.8	24.74	19.38	3.9	3.97	16.24	3.9	38.39	18.98	3.9	35.94	27.33	4.0	48.45	34.78
4.8	25.00	19.25	4.9	4.80	16.07	4.9	38.55	18.73	4.9	36.01	27.05	5.0	48.43	34.47
5.8	25.27	19.13	5.9	5.72	15.91	5.9	38.72	18.48	5.9	36.09	26.76	6.0	48.41	34.16
6.8	25.55	19.00	6.9	6.67	15.73	6.9	38.88	18.25	6.9	36.17	26.45	7.0	48.40	33.86
7.8	25.85	18.89	7.9	7.68	15.55	7.9	39.03	18.01	7.9	36.27	26.14	8.0	48.40	33.52
8.8	26.16	18.78	8.9	8.74	15.40	8.9	39.18	17.78	8.9	36.39	25.82	9.0	48.41	33.18
9.8	26.48	18.68	9.8	9.84	15.25	9.9	39.34	17.55	9.9	36.53	25.50	10.0	48.45	32.83
10.8	26.81	18.61	10.8	10.96	15.12	10.9	39.49	17.30	10.9	36.67	25.21	11.0	48.49	32.50
11.8	27.13	18.55	11.8	12.07	15.00	11.8	39.66	17.05	11.9	36.83	24.93	12.0	48.55	32.17
12.8	27.45	18.51	12.8	13.17	14.91	12.8	39.83	16.78	12.9	36.99	24.67	13.0	48.62	31.86
13.8	27.77	18.48	13.8	14.25	14.82	13.8	40.00	16.52	13.9	37.16	24.42	14.0	48.70	31.56
14.8	28.06	18.47	14.8	15.29	14.76	14.8	40.18	16.26	14.9	37.33	24.18	15.0	48.79	31.28
15.8	28.34	18.46	15.8	16.28	14.69	15.8	40.38	16.01	15.9	37.49	23.96	16.0	48.85	30.99
16.8	28.62	18.45	16.8	17.25	14.61	16.8	40.60	15.76	16.9	37.64	23.73	16.9	48.92	30.73
17.8	28.89	18.42	17.8	18.19	14.53	17.8	40.83	15.53	17.9	37.79	23.51	17.9	48.98	30.46
18.8	29.17	18.37	18.8	19.14	14.45	18.8	41.05	15.33	18.9	37.92	23.27	18.9	49.04	30.19
19.8	29.44	18.32	19.8	20.13	14.35	19.8	41.27	15.12	19.9	38.05	23.02	19.9	49.08	29.91
20.8	29.75	18.28	20.8	21.17	14.25	20.8	41.47	14.94	20.9	38.20	22.76	20.9	49.13	29.59
21.8	30.06	18.24	21.8	22.29	14.15	21.8	41.67	14.78	21.9	38.37	22.48	21.9	49.19	29.28
22.8	30.39	18.22	22.8	23.49	14.06	22.8	41.85	14.61	22.9	38.55	22.20	22.9	49.28	28.94
23.8	30.74	18.21	23.8	24.73	14.01	23.8	42.03	14.42	23.9	38.75	21.91	23.9	49.38	28.61
24.8	31.09	18.24	24.8	26.00	13.97	24.8	42.21	14.23	24.9	38.98	21.66	24.9	49.51	28.26
25.8	31.44	18.29	25.8	27.24	13.96	25.8	42.39	14.01	25.9	39.22	21.43	25.9	49.66	27.94
26.8	31.78	18.36	26.8	28.44	13.97	26.8	42.59	13.79	26.9	39.46	21.24	26.9	49.82	27.66
27.8	32.10	18.43	27.8	29.57	14.00	27.8	42.81	13.59	27.9	39.69	21.04	27.9	49.97	27.40
28.8	32.39	18.50	28.8	30.64	14.03	28.8	43.05	13.38	28.9	39.91	20.87	28.9	50.11	27.16
29.8	32.67	18.57	29.8	31.66	14.04	29.8	43.30	13.17	29.9	40.10	20.70	29.9	50.24	26.92
30.8	32.94	18.61	30.8	32.65	14.04	30.8	43.55	13.00	30.9	40.29	20.51	30.9	50.35	26.66
31.8	33.22	18.64	31.8	33.66	14.01	31.8	43.80	12.85	31.9	40.48	20.32	31.9	50.46	26.39
13.72	+13.89		50.74	+50.78		11.88	-11.84		12.31	+12.27		11.85	+11.81	
0 ^h 57 ^m	24°.633		1 ^h 31 ^m	11°.709		1 ^h 41 ^m	54°.846		4 ^h 10 ^m	37°.831		5 ^h 35 ^m	50°.330	
+85° 49'	24''.14		+88° 52'	20''.55		-85° 10'	45''.22		+85° 20'	28''.88		+85° 9'	34''.51	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensse. Mag. 6.2			ζ Mensse. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
June	h m 5 45	° ' " -84 49	June	h m 6 46	° ' " -80 43	June	h m 7 2	° ' " +87 10	June	h m 7 14	° ' " +82 34	June	h m 7 15	° ' " -86 54
	s "	"		s "	"		s "	"		s "	"		s "	"
1.0	28.33	53.19	1.1	38.21	63.83	1.1	58.73	46.83	1.1	7.95	20.16	1.1	6.94	41.00
2.0	28.22	52.85	2.1	38.12	63.55	2.1	58.60	46.59	2.1	7.91	19.93	2.1	6.60	40.76
3.0	28.12	52.51	3.1	38.04	63.26	3.1	58.44	46.34	3.1	7.85	19.71	3.1	6.30	40.50
4.0	28.04	52.17	4.1	37.96	62.97	4.1	58.27	46.09	4.1	7.77	19.48	4.1	6.01	40.25
5.0	27.96	51.86	5.1	37.90	62.68	5.1	58.09	45.82	5.1	7.69	19.23	5.1	5.74	40.00
6.0	27.90	51.56	6.1	37.83	62.39	6.1	57.89	45.54	6.1	7.62	18.97	6.1	5.49	39.76
7.0	27.83	51.27	7.1	37.76	62.15	7.1	57.70	45.22	7.1	7.54	18.68	7.1	5.25	39.53
8.0	27.76	50.98	8.1	37.70	61.89	8.1	57.52	44.91	8.1	7.48	18.40	8.1	5.01	39.30
9.0	27.69	50.71	9.1	37.64	61.65	9.1	57.37	44.58	9.1	7.41	18.08	9.1	4.77	39.10
10.0	27.60	50.45	10.1	37.57	61.41	10.1	57.24	44.25	10.1	7.36	17.77	10.1	4.52	38.88
11.0	27.53	50.16	11.1	37.50	61.14	11.1	57.13	43.93	11.1	7.31	17.45	11.1	4.27	38.66
12.0	27.45	49.87	12.1	37.44	60.88	12.1	57.04	43.60	12.1	7.28	17.14	12.1	4.00	38.44
13.0	27.37	49.58	13.1	37.37	60.62	13.1	56.99	43.27	13.1	7.27	16.84	13.1	3.74	38.20
14.0	27.29	49.25	14.1	37.30	60.33	14.1	56.95	42.97	14.1	7.26	16.55	14.1	3.47	37.96
15.0	27.23	48.91	15.1	37.23	60.02	15.1	56.92	42.68	15.1	7.25	16.27	15.1	3.21	37.70
16.0	27.17	48.58	16.0	37.17	59.71	16.1	56.89	42.39	16.1	7.23	15.99	16.1	2.96	37.42
17.0	27.12	48.21	17.0	37.12	59.39	17.1	56.85	42.12	17.1	7.21	15.71	17.1	2.72	37.13
18.0	27.09	47.86	18.0	37.06	59.07	18.1	56.81	41.84	18.1	7.18	15.45	18.1	2.49	36.83
18.9	27.06	47.51	19.0	37.01	58.74	19.1	56.73	41.55	19.1	7.15	15.19	19.1	2.30	36.53
19.9	27.05	47.18	20.0	36.97	58.41	20.0	56.64	41.26	20.1	7.13	14.92	20.1	2.12	36.24
20.9	27.04	46.87	21.0	36.94	58.12	21.0	56.56	40.94	21.1	7.08	14.61	21.1	1.97	35.96
21.9	27.03	46.57	22.0	36.91	57.84	22.0	56.50	40.60	22.1	7.05	14.30	22.1	1.82	35.71
22.9	27.02	46.31	23.0	36.87	57.58	23.0	56.45	40.24	23.0	7.04	13.96	23.0	1.65	35.47
23.9	26.98	46.03	24.0	36.83	57.32	24.0	56.44	39.87	24.0	7.03	13.59	24.0	1.48	35.24
24.9	26.94	45.75	25.0	36.79	57.05	25.0	56.48	39.50	25.0	7.04	13.24	25.0	1.30	35.00
25.9	26.91	45.44	26.0	36.75	56.78	26.0	56.54	39.16	26.0	7.07	12.90	26.0	1.10	34.76
26.9	26.88	45.13	27.0	36.71	56.47	27.0	56.63	38.82	27.0	7.10	12.59	27.0	0.89	34.49
27.9	26.87	44.79	28.0	36.67	56.15	28.0	56.72	38.51	28.0	7.14	12.29	28.0	0.69	34.19
28.9	26.85	44.44	29.0	36.63	55.80	29.0	56.80	38.22	29.0	7.18	12.00	29.0	0.49	33.87
29.9	26.86	44.07	30.0	36.59	55.46	30.0	56.86	37.93	30.0	7.19	11.74	30.0	0.34	33.55
30.9	26.88	43.71	31.0	36.58	55.10	31.0	56.90	37.64	31.0	7.20	11.46	31.0	0.20	33.22
31.9	26.91	43.38	32.0	36.57	54.76	32.0	56.93	37.35	32.0	7.21	11.18	32.0	0.10	32.89
11.10	-11.05		6.21	-6.13		20.32	+20.29		7.73	+7.67		18.55	-18.53	
5 ^h 45 ^m	51° 39'		6 ^h 46 ^m	48° 53'		7 ^h 3 ^m	2° 33'		7 ^h 14 ^m	7° 9' 12"		7 ^h 15 ^m	39° 59'	
-84° 49'	44'' 27"		-80° 43'	46'' 14"		+87° 10'	43'' 86"		+82° 34'	17'' 32"		-86° 54'	19'' 75"	

APPARENT PLACES OF STARS, 1919.

269

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamæleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
June	h m 8 17	° ' s +88 52	June	h m 9 8	° ' s -85 20	June	h m 9 25	° ' s +81 41	June	h m 9 36	° ' s -80 35	June	h m 10 21	° ' s +82 58
1.2	39.39	42.06	1.2	31.50	58.93	1.2	40.68	14.52	1.2	16.78	12.99	1.2	21.90	22.44
2.2	38.78	41.86	2.2	31.22	58.84	2.2	40.58	14.39	2.2	16.64	12.94	2.2	21.77	22.38
3.1	38.13	41.66	3.2	30.94	58.73	3.2	40.47	14.29	3.2	16.50	12.86	3.2	21.62	22.31
4.1	37.43	41.46	4.2	30.69	58.62	4.2	40.37	14.16	4.2	16.37	12.78	4.2	21.48	22.25
5.1	36.67	41.26	5.2	30.44	58.50	5.2	40.24	14.04	5.2	16.25	12.69	5.2	21.32	22.20
6.1	35.88	41.04	6.2	30.19	58.39	6.2	40.11	13.92	6.2	16.13	12.60	6.2	21.15	22.13
7.1	35.09	40.80	7.2	29.97	58.27	7.2	39.96	13.78	7.2	16.02	12.52	7.2	20.98	22.05
8.1	34.32	40.53	8.2	29.76	58.17	8.2	39.85	13.61	8.2	15.91	12.44	8.2	20.80	21.96
9.1	33.57	40.25	9.2	29.53	58.08	9.2	39.72	13.43	9.2	15.81	12.38	9.2	20.62	21.84
10.1	32.89	39.97	10.2	29.31	57.98	10.2	39.62	13.24	10.2	15.70	12.31	10.2	20.46	21.71
11.1	32.26	39.69	11.2	29.09	57.88	11.2	39.50	13.04	11.2	15.59	12.25	11.2	20.31	21.58
12.1	31.69	39.40	12.2	28.87	57.79	12.2	39.40	12.82	12.2	15.48	12.18	12.2	20.16	21.44
13.1	31.18	39.11	13.2	28.63	57.69	13.2	39.30	12.60	13.2	15.37	12.10	13.2	20.01	21.28
14.1	30.72	38.82	14.2	28.38	57.57	14.2	39.21	12.38	14.2	15.24	12.02	14.2	19.88	21.12
15.1	30.29	38.53	15.1	28.13	57.43	15.2	39.13	12.18	15.2	15.12	11.92	15.2	19.75	20.97
16.1	29.88	38.26	16.1	27.88	57.28	16.2	39.05	11.98	16.2	15.00	11.79	16.2	19.63	20.83
17.1	29.46	38.01	17.1	27.64	57.12	17.2	38.97	11.79	17.2	14.87	11.66	17.2	19.51	20.69
18.1	29.01	37.76	18.1	27.39	56.93	18.2	38.89	11.61	18.2	14.75	11.51	18.2	19.39	20.56
19.1	28.52	37.51	19.1	27.16	56.75	19.2	38.80	11.43	19.2	14.64	11.33	19.2	19.25	20.43
20.1	27.98	37.24	20.1	26.97	56.56	20.1	38.70	11.24	20.2	14.53	11.18	20.2	19.12	20.31
21.1	27.42	36.96	21.1	26.76	56.38	21.1	38.59	11.02	21.2	14.43	11.03	21.2	18.96	20.17
22.1	26.88	36.64	22.1	26.58	56.20	22.1	38.48	10.80	22.1	14.33	10.88	22.2	18.80	20.00
23.1	26.37	36.33	23.1	26.40	56.06	23.1	38.38	10.56	23.1	14.24	10.74	23.2	18.65	19.81
24.1	25.93	35.97	24.1	26.22	55.93	24.1	38.28	10.28	24.1	14.15	10.63	24.2	18.50	19.58
25.1	25.59	35.61	25.1	26.02	55.81	25.1	38.20	10.01	25.1	14.06	10.52	25.2	18.36	19.36
26.1	25.34	35.26	26.1	25.82	55.67	26.1	38.14	9.71	26.1	13.96	10.40	26.2	18.25	19.13
27.1	25.16	34.93	27.1	25.60	55.50	27.1	38.09	9.42	27.1	13.86	10.27	27.2	18.15	18.89
28.1	25.01	34.61	28.1	25.37	55.33	28.1	38.04	9.15	28.1	13.75	10.12	28.2	18.06	18.65
29.1	24.86	34.33	29.1	25.15	55.13	29.1	37.99	8.91	29.1	13.63	9.94	29.2	17.97	18.44
30.1	24.68	34.04	30.1	24.94	54.90	30.1	37.94	8.67	30.1	13.53	9.74	30.2	17.87	18.24
31.1	24.45	33.76	31.1	24.74	54.65	31.1	37.88	8.44	31.1	13.42	9.51	31.2	17.76	18.04
32.1	24.17	33.48	32.1	24.56	54.41	32.1	37.81	8.21	32.1	13.32	9.28	32.2	17.63	17.85
51.04 +51.03			12.33 -12.29			6.92 +6.84			6.11 -6.03			8.17 +8.11		
8 ^h 17 ^m 47 ^s .546			9 ^h 8 ^m 41 ^s .594			9 ^h 25 ^m 39 ^s .275			9 ^h 36 ^m 19 ^s .026			10 ^h 21 ^m 19 ^s .949		
+88° 52' 37".80			-85° 20' 26".78			+81° 41' 10".13			-80° 34' 39".26			+82° 58' 17".67		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			33 H. Camelopard. seq. Mag. 5.3			ϵ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
June	h m	° '	June	h m	° '	June	h m	° '	June	h m	° '	June	h m	° '
	10 59	-84 10		12 14	+88 9		12 46	-84 41		12 48	+83 51		13 27	-85 22
	s	"		s	"		s	"		s	"		s	"
1.3	57.84	4.78	1.3	35.71	0.95	1.3	33.78	32.54	1.3	35.27	15.37	1.4	53.67	46.86
2.3	57.62	4.86	2.3	35.16	1.01	2.3	33.60	32.77	2.3	35.12	15.48	2.4	53.50	47.15
3.3	57.40	4.92	3.3	34.61	1.10	3.3	33.41	32.97	3.3	34.97	15.61	3.4	53.32	47.40
4.3	57.18	4.97	4.3	34.03	1.18	4.3	33.22	33.17	4.3	34.80	15.74	4.4	53.13	47.64
5.3	56.98	5.01	5.3	33.42	1.27	5.3	33.03	33.35	5.3	34.63	15.87	5.4	52.94	47.84
6.3	56.79	5.03	6.3	32.77	1.36	6.3	32.85	33.50	6.3	34.45	16.01	6.4	52.76	48.05
7.2	56.60	5.06	7.3	32.08	1.42	7.3	32.68	33.65	7.3	34.25	16.15	7.4	52.61	48.25
8.2	56.41	5.09	8.3	31.38	1.49	8.3	32.52	33.80	8.3	34.06	16.28	8.3	52.45	48.44
9.2	56.24	5.13	9.3	30.66	1.53	9.3	32.36	33.97	9.3	33.85	16.39	9.3	52.29	48.64
10.2	56.06	5.18	10.3	29.95	1.55	10.3	32.21	34.14	10.3	33.64	16.47	10.3	52.15	48.86
11.2	55.88	5.22	11.3	29.24	1.56	11.3	32.06	34.31	11.3	33.45	16.53	11.3	52.00	49.06
12.2	55.69	5.26	12.3	28.55	1.57	12.3	31.89	34.49	12.3	33.25	16.59	12.3	51.84	49.30
13.2	55.51	5.31	13.3	27.88	1.56	13.3	31.72	34.67	13.3	33.05	16.65	13.3	51.67	49.56
14.2	55.31	5.36	14.3	27.24	1.53	14.3	31.54	34.86	14.3	32.87	16.69	14.3	51.50	49.76
15.2	55.10	5.39	15.3	26.63	1.50	15.3	31.36	35.04	15.3	32.69	16.71	15.3	51.31	49.99
16.2	54.88	5.40	16.3	26.03	1.48	16.3	31.15	35.20	16.3	32.52	16.74	16.3	51.09	50.21
17.2	54.65	5.40	17.3	25.44	1.47	17.3	30.93	35.35	17.3	32.35	16.78	17.3	50.87	50.41
18.2	54.45	5.37	18.3	24.85	1.47	18.3	30.71	35.48	18.3	32.18	16.83	18.3	50.65	50.60
19.2	54.24	5.33	19.3	24.25	1.47	19.3	30.49	35.59	19.3	32.00	16.88	19.3	50.43	50.76
20.2	54.03	5.28	20.3	23.61	1.47	20.3	30.29	35.69	20.3	31.82	16.93	20.3	50.20	50.91
21.2	53.84	5.23	21.3	22.93	1.47	21.3	30.10	35.78	21.3	31.62	16.98	21.3	50.00	51.05
22.2	53.66	5.18	22.3	22.20	1.43	22.3	29.92	35.86	22.3	31.39	17.04	22.3	49.81	51.17
23.2	53.49	5.15	23.3	21.46	1.39	23.3	29.75	35.95	23.3	31.19	17.06	23.3	49.63	51.31
24.2	53.33	5.14	24.3	20.72	1.32	24.3	29.59	36.05	24.3	30.97	17.06	24.3	49.47	51.46
25.2	53.16	5.14	25.3	20.00	1.23	25.3	29.42	36.18	25.3	30.76	17.03	25.3	49.30	51.66
26.2	52.98	5.14	26.2	19.32	1.12	26.3	29.25	36.32	26.3	30.56	16.98	26.3	49.12	51.81
27.2	52.79	5.13	27.2	18.67	0.99	27.3	29.06	36.46	27.3	30.37	16.93	27.3	48.93	51.99
28.2	52.59	5.10	28.2	18.07	0.88	28.3	28.84	36.58	28.3	30.19	16.87	28.3	48.71	52.17
29.2	52.37	5.04	29.2	17.51	0.78	29.3	28.62	36.69	29.3	30.01	16.81	29.3	48.48	52.33
30.2	52.15	4.96	30.2	16.95	0.70	30.3	28.38	36.76	30.3	29.84	16.77	30.3	48.23	52.47
31.2	51.95	4.87	31.2	16.36	0.62	31.3	28.15	36.82	31.3	29.67	16.76	31.3	47.97	52.58
32.2	51.76	4.74	32.2	15.77	0.56	32.3	27.93	36.86	32.3	29.48	16.74	32.3	47.72	52.69
9.84	-9.79		30.98	+30.97		10.81	-10.77		9.34	+9.29		12.42	-12.38	
10 ^h 59 ^m	54 ^s .546		12 ^h 14 ^m	29 ^s .190		12 ^h 46 ^m	19 ^s .119		12 ^h 48 ^m	31 ^s .308		13 ^h 27 ^m	32 ^s .891	
-84° 9'	29'''.33		+88° 8'	56'''.19		-84° 41'	1'''.57		+83° 51'	11'''.30		-85° 22'	19'''.48	

APPARENT PLACES OF STARS, 1919.

271

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.
h m s	° ' "		h m s	° ' "		h m s	° ' "		h m s	° ' "		h m s	° ' "	
14 14	-83 18	June	15 3	+87 32	June	15 24	-84 12	June	16 54	+82 10	June	17 16	-80 47	
4.22	16.91	1.4	12.17	44.73	1.4	47.28	8.40	1.5	17.83	20.78	1.5	33.97	10.61	
4.14	17.22	2.4	11.92	44.96	2.4	47.25	8.74	2.5	17.82	21.07	2.5	34.03	10.93	
4.04	17.51	3.4	11.68	45.20	3.4	47.21	9.07	3.5	17.82	21.36	3.5	34.08	11.25	
3.94	17.79	4.4	11.44	45.47	4.4	47.16	9.38	4.5	17.81	21.68	4.5	34.12	11.54	
3.84	18.03	5.4	11.18	45.73	5.4	47.11	9.67	5.5	17.81	22.01	5.5	34.15	11.83	
3.76	18.26	6.4	10.91	46.00	6.4	47.06	9.95	6.5	17.80	22.35	6.5	34.18	12.11	
3.67	18.49	7.4	10.60	46.28	7.4	47.01	10.22	7.5	17.79	22.71	7.5	34.21	12.37	
3.59	18.72	8.4	10.28	46.56	8.4	46.97	10.49	8.5	17.75	23.07	8.5	34.25	12.62	
3.52	18.95	9.4	9.92	46.84	9.4	46.93	10.75	9.5	17.72	23.44	9.5	34.28	12.86	
3.44	19.19	10.4	9.55	47.10	10.4	46.91	11.03	10.5	17.68	23.77	10.5	34.32	13.13	
3.38	19.42	11.4	9.17	47.34	11.4	46.88	11.31	11.5	17.64	24.11	11.5	34.37	13.39	
3.30	19.69	12.4	8.78	47.57	12.4	46.85	11.60	12.5	17.59	24.45	12.5	34.42	13.66	
3.22	19.96	13.4	8.39	47.78	13.4	46.82	11.90	13.5	17.54	24.77	13.5	34.47	13.95	
3.13	20.22	14.4	8.01	47.97	14.4	46.78	12.20	14.5	17.48	25.07	14.5	34.52	14.25	
3.03	20.48	15.4	7.64	48.17	15.4	46.72	12.51	15.5	17.44	25.35	15.5	34.56	14.57	
2.92	20.74	16.4	7.29	48.34	16.4	46.66	12.82	16.5	17.39	25.64	16.5	34.60	14.89	
2.81	20.98	17.4	6.95	48.53	17.4	46.58	13.12	17.5	17.35	25.91	17.5	34.61	15.21	
2.68	21.22	18.4	6.61	48.71	18.4	46.48	13.41	18.5	17.30	26.20	18.5	34.63	15.52	
2.54	21.42	19.4	6.26	48.91	19.4	46.38	13.68	19.5	17.25	26.49	19.5	34.63	15.82	
2.41	21.62	20.4	5.90	49.14	20.4	46.29	13.93	20.5	17.20	26.81	20.5	34.63	16.09	
2.30	21.80	21.4	5.51	49.36	21.4	46.19	14.17	21.5	17.15	27.14	21.5	34.62	16.36	
2.19	21.97	22.4	5.09	49.59	22.4	46.11	14.40	22.5	17.08	27.47	22.5	34.63	16.60	
2.08	22.14	23.4	4.62	49.79	23.4	46.05	14.62	23.5	17.02	27.81	23.5	34.64	16.85	
1.99	22.33	24.4	4.15	49.99	24.4	45.98	14.86	24.4	16.93	28.15	24.5	34.66	17.11	
1.90	22.52	25.4	3.64	50.17	25.4	45.93	15.10	25.4	16.84	28.46	25.5	34.69	17.37	
1.81	22.74	26.4	3.15	50.31	26.4	45.87	15.38	26.4	16.75	28.76	26.5	34.73	17.65	
1.71	22.97	27.4	2.67	50.45	27.4	45.79	15.66	27.4	16.66	29.03	27.5	34.74	17.96	
1.57	23.19	28.4	2.23	50.56	28.4	45.71	15.95	28.4	16.57	29.27	28.5	34.76	18.28	
1.44	23.40	29.4	1.80	50.66	29.4	45.61	16.24	29.4	16.49	29.52	29.4	34.77	18.60	
1.29	23.60	30.4	1.39	50.79	30.4	45.48	16.51	30.4	16.40	29.76	30.4	34.76	18.92	
1.14	23.78	31.4	0.98	50.93	31.4	45.35	16.75	31.4	16.32	30.01	31.4	34.73	19.22	
0.98	23.92	32.3	0.58	51.07	32.4	45.21	16.98	32.4	16.24	30.28	32.4	34.70	19.50	
58	-8.52	23.36	+23.34	9.90	-9.85	7.34	+7.28	6.25	-6.17					
13 ^m	46°.350	15 ^h	3 ^m 2°.510	15 ^h	24 ^m 23°.351	16 ^h	54 ^m 12°.991	17 ^h	16 ^m 17°.234					
17'	54''.52	+87°	32' 42''.66	-84°	11' 55''.43	+82°	10' 21''.42	-80°	47' 14''.27					

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
June	h m	° '	June	h m	° '	June	h m	° '	June	h m	° '	June	h m	° '
	17 58	+86 36		18 8	-87 39		19 0	+89 1		19 33	-89 12		20 48	+82 13
	s	"		s	"		s	"		s	"		s	"
1.6	30.15	49.22	1.6	19.92	39.21	1.6	34.14	9.81	1.6	3.99	50.39	1.7	35.64	52.02
2.6	30.20	49.50	2.6	20.24	39.51	2.6	34.59	10.08	2.6	5.43	50.60	2.7	35.77	52.22
3.6	30.27	49.78	3.6	20.52	39.81	3.6	35.08	10.34	3.6	6.74	50.82	3.7	35.89	52.40
4.5	30.35	50.08	4.6	20.77	40.11	4.6	35.60	10.60	4.6	7.94	51.04	4.7	36.01	52.60
5.5	30.42	50.40	5.6	21.00	40.39	5.6	36.16	10.88	5.6	9.06	51.27	5.7	36.13	52.81
6.5	30.48	50.74	6.5	21.20	40.65	6.6	36.73	11.17	6.6	10.12	51.49	6.7	36.27	53.03
7.5	30.54	51.08	7.5	21.42	40.92	7.6	37.26	11.49	7.6	11.15	51.69	7.7	36.41	53.25
8.5	30.59	51.45	8.5	21.64	41.17	8.6	37.75	11.82	8.6	12.20	51.88	8.7	36.54	53.52
9.5	30.61	51.81	9.5	21.86	41.41	9.6	38.18	12.16	9.6	13.27	52.06	9.7	36.67	53.79
10.5	30.62	52.15	10.5	22.10	41.66	10.6	38.53	12.50	10.6	14.39	52.25	10.6	36.80	54.06
11.5	30.62	52.50	11.5	22.35	41.93	11.6	38.84	12.84	11.6	15.54	52.44	11.6	36.91	54.34
12.5	30.59	52.85	12.5	22.62	42.20	12.6	39.07	13.18	12.6	16.72	52.64	12.6	37.02	54.62
13.5	30.55	53.19	13.5	22.89	42.48	13.6	39.26	13.51	13.6	17.93	52.86	13.6	37.13	54.90
14.5	30.51	53.51	14.5	23.14	42.79	14.6	39.40	13.83	14.6	19.15	53.09	14.6	37.23	55.19
15.5	30.47	53.82	15.5	23.38	43.10	15.6	39.53	14.13	15.6	20.34	53.33	15.6	37.33	55.47
16.5	30.42	54.11	16.5	23.58	43.42	16.6	39.67	14.42	16.6	21.49	53.59	16.6	37.41	55.73
17.5	30.38	54.39	17.5	23.76	43.75	17.6	39.83	14.70	17.6	22.55	53.86	17.6	37.51	55.98
18.5	30.37	54.70	18.5	23.91	44.07	18.6	40.02	14.98	18.6	23.51	54.14	18.6	37.60	56.22
19.5	30.34	55.01	19.5	24.02	44.38	19.5	40.24	15.27	19.6	24.38	54.41	19.6	37.70	56.48
20.5	30.31	55.33	20.5	24.12	44.67	20.5	40.48	15.59	20.6	25.16	54.65	20.6	37.80	56.76
21.5	30.28	55.69	21.5	24.21	44.96	21.5	40.73	15.93	21.6	25.89	54.90	21.6	37.91	57.06
22.5	30.23	56.05	22.5	24.30	45.23	22.5	40.91	16.29	22.6	26.62	55.14	22.6	38.02	57.36
23.5	30.15	56.42	23.5	24.43	45.49	23.5	41.01	16.66	23.6	27.40	55.34	23.6	38.12	57.68
24.5	30.06	56.79	24.5	24.57	45.76	24.5	41.01	17.03	24.6	28.27	55.56	24.6	38.21	58.02
25.5	29.93	57.13	25.5	24.75	46.03	25.5	40.92	17.40	25.6	29.22	55.78	25.6	38.30	58.39
26.5	29.80	57.47	26.5	24.93	46.31	26.5	40.75	17.74	26.6	30.21	56.02	26.6	38.38	58.74
27.5	29.66	57.77	27.5	25.09	46.62	27.5	40.55	18.07	27.5	31.21	56.29	27.6	38.44	59.08
28.5	29.51	58.05	28.5	25.24	46.95	28.5	40.34	18.40	28.5	32.17	56.57	28.6	38.50	59.41
29.5	29.38	58.33	29.5	25.34	47.29	29.5	40.15	18.71	29.5	33.04	56.85	29.6	38.55	59.70
30.5	29.27	58.61	30.5	25.40	47.61	30.5	40.03	19.01	30.5	33.79	57.16	30.6	38.62	59.99
31.5	29.17	58.90	31.5	25.41	47.95	31.5	39.96	19.31	31.5	34.42	57.48	31.6	38.68	60.28
32.5	29.07	59.21	32.5	25.40	48.27	32.5	39.91	19.63	32.5	34.94	57.78	32.6	38.74	60.57
16.94	+16.91		24.51	-24.49		58.50	+58.49		72.97	-72.97		7.40	+7.33	
17 ^h 58 ^m	22°.311		18 ^h 7 ^m	23°.343		19 ^h 0 ^m	15°.079		19 ^h 30 ^m	50°.769		20 ^h 48 ^m	32°.146	
+86° 36'	51''.04		-87° 39'	50''.89		+89° 1'	12''.80		-89° 13'	13''.35		+82° 13'	56''.82	

APPARENT PLACES OF STARS, 1919.

273

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
June	h m	° '	June	h m	° '	June	h m	° '	June	h m	° '	June	h m	° '
	21 38	-83 5		22 16	-86 22		22 37	-81 47		23 27	+86 51		23 47	-82 27
	s	"		s	"		s	"		s	"		s	"
1.7	46.74	1.14	1.7	40.78	16.13	1.7	54.69	50.08	1.8	44.65	33.36	1.8	21.40	34.71
2.7	46.94	1.16	2.7	41.18	16.09	2.7	54.87	50.00	2.8	45.00	33.37	2.8	21.57	34.52
3.7	47.14	1.19	3.7	41.56	16.09	3.7	55.04	49.95	3.8	45.35	33.38	3.8	21.75	34.37
4.7	47.33	1.24	4.7	41.93	16.10	4.7	55.21	49.90	4.8	45.71	33.36	4.8	21.92	34.23
5.7	47.51	1.30	5.7	42.26	16.11	5.7	55.35	49.88	5.8	46.11	33.35	5.8	22.06	34.10
6.7	47.68	1.34	6.7	42.58	16.12	6.7	55.49	49.84	6.8	46.52	33.34	6.8	22.21	33.99
7.7	47.84	1.39	7.7	42.90	16.12	7.7	55.63	49.80	7.8	46.94	33.34	7.8	22.35	33.87
8.7	48.00	1.43	8.7	43.21	16.12	8.7	55.77	49.76	8.8	47.38	33.38	8.8	22.49	33.75
9.7	48.17	1.45	9.7	43.51	16.10	9.7	55.91	49.72	9.8	47.80	33.41	9.8	22.63	33.61
10.7	48.34	1.47	10.7	43.83	16.10	10.7	56.06	49.67	10.8	48.24	33.46	10.8	22.79	33.48
11.7	48.52	1.50	11.7	44.16	16.08	11.7	56.21	49.62	11.8	48.67	33.55	11.8	22.94	33.34
12.7	48.70	1.54	12.7	44.51	16.06	12.7	56.38	49.56	12.8	49.09	33.64	12.8	23.11	33.20
13.7	48.89	1.58	13.7	44.87	16.05	13.7	56.55	49.52	13.8	49.47	33.73	13.8	23.27	33.05
14.7	49.09	1.62	14.7	45.24	16.05	14.7	56.72	49.49	14.7	49.85	33.83	14.8	23.45	32.91
15.7	49.29	1.69	15.7	45.61	16.07	15.7	56.89	49.48	15.7	50.22	33.93	15.8	23.62	32.78
16.7	49.49	1.77	16.7	45.99	16.10	16.7	57.07	49.47	16.7	50.57	34.03	16.8	23.81	32.68
17.7	49.67	1.87	17.7	46.36	16.16	17.7	57.23	49.48	17.7	50.92	34.11	17.8	23.99	32.60
18.7	49.86	1.98	18.7	46.71	16.24	18.7	57.40	49.52	18.7	51.27	34.19	18.8	24.17	32.54
19.7	50.03	2.11	19.7	47.04	16.32	19.7	57.55	49.56	19.7	51.63	34.27	19.7	24.35	32.48
20.7	50.17	2.24	20.7	47.36	16.41	20.7	57.69	49.62	20.7	52.03	34.35	20.7	24.50	32.44
21.7	50.32	2.35	21.7	47.64	16.48	21.7	57.84	49.65	21.7	52.44	34.43	21.7	24.65	32.39
22.7	50.46	2.46	22.7	47.93	16.54	22.7	57.97	49.66	22.7	52.86	34.54	22.7	24.80	32.34
23.6	50.61	2.55	23.7	48.22	16.60	23.7	58.10	49.68	23.7	53.29	34.67	23.7	24.94	32.28
24.6	50.78	2.62	24.7	48.54	16.65	24.7	58.25	49.69	24.7	53.72	34.83	24.7	25.09	32.20
25.6	50.95	2.69	25.7	48.85	16.69	25.7	58.39	49.68	25.7	54.14	35.01	25.7	25.26	32.11
26.6	51.13	2.76	26.7	49.18	16.73	26.7	58.56	49.68	26.7	54.52	35.20	26.7	25.43	32.02
27.6	51.31	2.86	27.7	49.55	16.80	27.7	58.73	49.70	27.7	54.86	35.39	27.7	25.61	31.93
28.6	51.50	3.00	28.7	49.91	16.88	28.7	58.91	49.74	28.7	55.19	35.57	28.7	25.79	31.87
29.6	51.68	3.13	29.7	50.27	16.97	29.7	59.08	49.80	29.7	55.52	35.74	29.7	25.99	31.83
30.6	51.86	3.30	30.7	50.61	17.09	30.7	59.22	49.89	30.7	55.84	35.88	30.7	26.18	31.82
31.6	52.01	3.49	31.7	50.93	17.22	31.7	59.38	50.01	31.7	56.16	36.02	31.7	26.35	31.82
32.6	52.15	3.69	32.6	51.23	17.37	32.7	59.53	50.12	32.7	56.50	36.16	32.7	26.52	31.86
8.30	-8.24		15.80	-15.77		7.01	-6.94		18.25	+18.23		7.62	-7.55	
21 ^h 38 ^m	38°.548		22 ^h 16 ^m	33°.212		22 ^h 37 ^m	51°.624		23 ^h 27 ^m	43°.571		23 ^h 47 ^m	23°.637	
-83° 5'	34''.33		-86° 22'	50''.92		-81° 48'	24''.80		+86° 51'	38''.62		-82° 28'	8''.42	

5934°—1919—18

ARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

1 R THE UPPER TRANSIT AT WASHINGTON.

			α Irsæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge Mag. 6.		
			Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.
July	h m	s	h m	s	h m	h m	s	h m	h m	s	h m	h m	s	h m
July	0 57	+85 49	July	1 31	+88 52	July	1 41	-85 10	July	4 10	+85 20	July	5 35	
	s	"		s	"		s	"		s	"		s	"
0.8	32.94	18.61	0.8	32.65	14.04	0.8	43.55	13.00	0.9	40.29	20.51	0.9	50.35	
1.8	33.22	18.64	1.8	33.66	14.01	1.8	43.80	12.85	1.9	40.48	20.32	1.9	50.46	
2.8	33.51	18.66	2.8	34.71	13.98	2.8	44.04	12.72	2.9	40.67	20.10	2.9	50.55	
3.8	33.81	18.69	3.8	35.81	13.95	3.8	44.28	12.61	3.9	40.86	19.87	3.9	50.66	
4.8	34.13	18.73	4.8	36.97	13.94	4.8	44.50	12.51	4.9	41.05	19.64	4.9	50.78	
5.8	34.45	18.77	5.8	38.16	13.92	5.8	44.72	12.41	5.9	41.28	19.42	5.9	50.91	
6.8	34.78	18.83	6.8	39.40	13.91	6.8	44.92	12.30	6.9	41.51	19.19	6.9	51.05	
7.7	35.13	18.91	7.8	40.65	13.92	7.8	45.13	12.20	7.9	41.75	18.99	7.9	51.22	
8.7	35.47	18.99	8.8	41.87	13.95	8.8	45.35	12.09	8.9	42.02	18.80	8.9	51.39	
9.7	35.80	19.09	9.8	43.10	14.00	9.8	45.58	11.96	9.9	42.28	18.61	9.9	51.57	
10.7	36.12	19.22	10.8	44.30	14.09	10.8	45.80	11.84	10.9	42.55	18.46	10.9	51.76	
11.7	36.43	19.35	11.8	45.45	14.18	11.8	46.04	11.72	11.9	42.82	18.31	11.9	51.95	
12.7	36.72	19.49	12.8	46.57	14.27	12.8	46.29	11.59	12.9	43.07	18.17	12.9	52.14	
13.7	37.01	19.62	13.8	47.64	14.35	13.8	46.56	11.49	13.9	43.32	18.03	13.9	52.33	
14.7	37.28	19.75	14.8	48.67	14.41	14.8	46.82	11.39	14.9	43.56	17.91	14.9	52.51	
15.7	37.55	19.88	15.8	49.68	14.48	15.8	47.09	11.30	15.9	43.78	17.77	15.9	52.66	
16.7	37.82	19.99	16.7	50.71	14.54	16.8	47.35	11.25	16.9	44.01	17.63	16.9	52.82	
17.7	38.10	20.08	17.7	51.79	14.58	17.8	47.60	11.23	17.9	44.24	17.49	17.9	52.99	
18.7	38.40	20.18	18.7	52.93	14.63	18.7	47.85	11.22	18.9	44.48	17.31	18.9	53.16	
19.7	38.72	20.29	19.7	54.13	14.67	19.7	48.08	11.18	19.8	44.74	17.14	19.9	53.34	
20.7	39.05	20.42	20.7	55.39	14.75	20.7	48.29	11.15	20.8	45.02	16.96	20.9	53.53	
21.7	39.39	20.58	21.7	56.69	14.85	21.7	48.51	11.13	21.8	45.33	16.81	21.9	53.76	
22.7	39.73	20.76	22.7	57.96	14.99	22.7	48.72	11.08	22.8	45.65	16.68	22.9	54.00	
23.7	40.05	20.98	23.7	59.19	15.13	23.7	48.95	11.02	23.8	45.96	16.58	23.9	54.26	
24.7	40.36	21.20	24.7	60.36	15.30	24.7	49.18	10.95	24.8	46.27	16.49	24.9	54.51	
25.7	40.64	21.40	25.7	61.45	15.48	25.7	49.45	10.89	25.8	46.56	16.43	25.9	54.76	
26.7	40.91	21.61	26.7	62.47	15.63	26.7	49.73	10.83	26.8	46.85	16.37	26.9	55.00	
27.7	41.15	21.83	27.7	63.46	15.78	27.7	50.00	10.81	27.8	47.12	16.31	27.9	55.20	
28.7	41.39	22.00	28.7	64.44	15.89	28.7	50.28	10.80	28.8	47.36	16.25	28.9	55.41	
29.7	41.65	22.17	29.7	65.45	16.00	29.7	50.54	10.83	29.8	47.63	16.16	29.9	55.61	
30.7	41.93	22.32	30.7	66.49	16.11	30.7	50.79	10.87	30.8	47.89	16.06	30.9	55.81	
31.7	42.20	22.49	31.7	67.59	16.22	31.7	51.02	10.93	31.8	48.15	15.95	31.9	56.02	
13.73	+13.69		50.74	+50.73		11.88	-11.83		12.30	+12.26		11.84	+	
0 ^h 57 ^m 24 ^s .633			1 ^h 31 ^m 11 ^s .709			1 ^h 41 ^m 54 ^s .846			4 ^h 10 ^m 37 ^s .831			5 ^h 35 ^m 11 ^s .831		
+85° 49' 24".14			+88° 52' 20".55			-85° 10' 45".22			+85° 20' 28".88			+85° 9' 11".83		

APPARENT PLACES OF STARS, 1919.

275

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Menae. Mag. 6.2			5 Mensse. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
sh. an- ne.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
ly	h m 5 45	° ' -84 49	July	h m 6 46	° ' -80 43	July	h m 7 2	° ' +87 10	July	h m 7 14	° ' +82 34	July	h m 7 14	° ' -86 54
	s "	"		s "	"		s "	"		s "	"		s "	"
1.9	26.88	43.71	1.0	36.58	55.10	1.0	56.90	37.64	1.0	7.20	11.46	1.0	60.20	33.22
1.9	26.91	43.38	2.0	36.57	54.76	2.0	56.93	37.35	2.0	7.21	11.18	2.0	60.10	32.89
1.9	26.95	43.06	3.0	36.55	54.43	3.0	56.94	37.04	3.0	7.22	10.87	3.0	60.01	32.59
1.9	26.99	42.74	4.0	36.55	54.11	4.0	56.95	36.73	4.0	7.21	10.56	4.0	59.95	32.30
1.9	27.04	42.46	4.9	36.54	53.82	5.0	56.99	36.39	5.0	7.22	10.24	5.0	59.89	32.01
1.9	27.08	42.17	5.9	36.54	53.52	6.0	57.02	36.05	6.0	7.23	9.90	6.0	59.82	31.74
1.9	27.13	41.90	6.9	36.54	53.23	7.0	57.10	35.70	7.0	7.25	9.57	7.0	59.76	31.47
1.9	27.17	41.61	7.9	36.54	52.94	8.0	57.18	35.35	8.0	7.28	9.22	8.0	59.67	31.19
1.9	27.20	41.32	8.9	36.53	52.64	8.9	57.30	35.01	9.0	7.33	8.87	9.0	59.59	30.91
1.9	27.24	41.03	9.9	36.53	52.34	9.9	57.43	34.67	10.0	7.38	8.54	10.0	59.50	30.62
1.9	27.27	40.71	10.9	36.52	52.03	10.9	57.60	34.33	10.9	7.43	8.23	11.0	59.42	30.33
1.9	27.31	40.39	11.9	36.51	51.72	11.9	57.77	34.00	11.9	7.50	7.92	11.9	59.33	30.02
1.9	27.36	40.07	12.9	36.51	51.39	12.9	57.94	33.71	12.9	7.57	7.63	12.9	59.25	29.71
1.9	27.42	39.74	13.9	36.52	51.03	13.9	58.11	33.42	13.9	7.63	7.35	13.9	59.19	29.38
1.9	27.50	39.40	14.9	36.53	50.67	14.9	58.27	33.13	14.9	7.69	7.08	14.9	59.14	29.03
1.9	27.58	39.07	15.9	36.54	50.33	15.9	58.42	32.84	15.9	7.74	6.81	15.9	59.12	28.68
1.9	27.68	38.75	16.9	36.55	50.00	16.9	58.54	32.55	16.9	7.79	6.52	16.9	59.12	28.35
1.9	27.78	38.46	17.9	36.59	49.68	17.9	58.66	32.23	17.9	7.83	6.21	17.9	59.15	28.02
1.9	27.89	38.18	18.9	36.62	49.37	18.9	58.79	31.90	18.9	7.87	5.89	18.9	59.18	27.73
1.9	27.99	37.94	19.9	36.65	49.08	19.9	58.92	31.56	19.9	7.92	5.55	19.9	59.22	27.44
1.9	28.08	37.70	20.9	36.68	48.80	20.9	59.09	31.21	20.9	7.98	5.21	20.9	59.25	27.17
1.9	28.16	37.45	21.9	36.70	48.54	21.9	59.31	30.87	21.9	8.07	4.87	21.9	59.26	26.90
1.9	28.24	37.19	22.9	36.73	48.27	22.9	59.57	30.53	22.9	8.15	4.53	22.9	59.26	26.64
1.9	28.32	36.92	23.9	36.74	47.98	23.9	59.84	30.19	23.9	8.26	4.20	23.9	59.24	26.36
1.9	28.40	36.63	24.9	36.76	47.66	24.9	60.13	29.87	24.9	8.38	3.89	24.9	59.23	26.05
1.9	28.49	36.31	25.9	36.79	47.33	25.9	60.41	29.58	25.9	8.49	3.61	25.9	59.23	25.73
1.9	28.60	35.99	26.9	36.83	46.99	26.9	60.68	29.31	26.9	8.58	3.34	26.9	59.24	25.40
1.9	28.73	35.69	27.9	36.87	46.62	27.9	60.92	29.07	27.9	8.68	3.08	27.9	59.29	25.05
1.9	28.86	35.40	28.9	36.90	46.28	28.9	61.16	28.80	28.9	8.76	2.82	28.9	59.38	24.71
1.9	29.01	35.13	29.9	36.96	45.96	29.9	61.36	28.53	29.9	8.84	2.55	29.9	59.47	24.38
1.9	29.16	34.87	30.9	37.02	45.67	30.9	61.57	28.24	30.9	8.91	2.26	30.9	59.58	24.09
1.9	29.31	34.64	31.9	37.08	45.38	31.9	61.79	27.93	31.9	8.99	1.97	31.9	59.71	23.79
11.09	-11.05		6.21	-6.13		20.30	+20.27		7.73	+7.67		18.54	-18.51	
5 ^h 45 ^m	51° 39'		6 ^h 46 ^m	48° 53'		7 ^h 3 ^m	2° 33'		7 ^h 14 ^m	7° 9'		7 ^h 15 ^m	39° 59'	
4° 49'	44'' 27		-80° 43'	46'' 14		+87° 10'	43'' 86		+82° 34'	17'' 32		-86° 54'	19'' 75	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			γ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			γ Chamaeleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
July	h m 8 17	° ' " +88 52	July	h m 9 8	° ' " -85 20	July	h m 9 25	° ' " +81 40	July	h m 9 36	° ' " -80 35	July	h m 10 21	° ' " +82 58
	s "	"		s "	"		s "	"		s "	"		s "	"
1.1	24.45	33.76	1.1	24.74	54.65	1.1	37.88	68.44	1.1	13.42	9.51	1.2	17.76	18.04
2.1	24.17	33.48	2.1	24.56	54.41	2.1	37.81	68.21	2.1	13.32	9.28	2.2	17.63	17.85
3.1	23.85	33.17	3.1	24.39	54.16	3.1	37.73	67.96	3.1	13.23	9.05	3.2	17.51	17.66
4.1	23.52	32.85	4.1	24.24	53.92	4.1	37.65	67.70	4.1	13.14	8.83	4.1	17.37	17.46
5.1	23.20	32.51	5.1	24.09	53.70	5.1	37.57	67.43	5.1	13.06	8.61	5.1	17.24	17.24
6.1	22.91	32.18	6.1	23.96	53.48	6.1	37.48	67.16	6.1	12.99	8.41	6.1	17.12	17.02
7.1	22.68	31.84	7.1	23.81	53.26	7.1	37.42	66.87	7.1	12.91	8.21	7.1	16.99	16.78
8.1	22.49	31.48	8.1	23.67	53.05	8.1	37.36	66.56	8.1	12.85	8.02	8.1	16.89	16.50
9.0	22.37	31.11	9.1	23.53	52.83	9.1	37.30	66.24	9.1	12.77	7.83	9.1	16.78	16.23
10.0	22.31	30.76	10.1	23.38	52.60	10.1	37.25	65.92	10.1	12.69	7.63	10.1	16.68	15.96
11.0	22.31	30.42	11.1	23.21	52.38	11.1	37.21	65.60	11.1	12.61	7.42	11.1	16.59	15.68
12.0	22.35	30.08	12.1	23.04	52.16	12.1	37.20	65.30	12.1	12.52	7.22	12.1	16.51	15.40
13.0	22.41	29.75	13.1	22.88	51.91	13.1	37.17	65.00	13.1	12.43	7.00	13.1	16.45	15.12
14.0	22.48	29.44	14.1	22.72	51.64	14.1	37.13	64.71	14.1	12.35	6.74	14.1	16.37	14.84
15.0	22.54	29.13	15.1	22.57	51.36	15.1	37.10	64.44	15.1	12.27	6.47	15.1	16.29	14.60
16.0	22.55	28.83	16.1	22.43	51.07	16.1	37.08	64.17	16.1	12.19	6.20	16.1	16.21	14.36
17.0	22.51	28.52	17.1	22.30	50.77	17.1	37.03	63.90	17.1	12.11	5.91	17.1	16.13	14.11
18.0	22.46	28.19	18.1	22.20	50.47	18.1	36.98	63.62	18.1	12.05	5.63	18.1	16.06	13.85
19.0	22.39	27.85	19.1	22.11	50.18	19.1	36.93	63.32	19.1	11.99	5.38	19.1	15.94	13.57
20.0	22.34	27.49	20.1	22.03	49.93	20.1	36.88	62.98	20.1	11.95	5.13	20.1	15.83	13.29
21.0	22.35	27.12	21.1	21.94	49.69	21.1	36.85	62.64	21.1	11.90	4.88	21.1	15.73	12.98
22.0	22.46	26.74	22.0	21.85	49.45	22.1	36.81	62.27	22.1	11.85	4.65	22.1	15.65	12.65
23.0	22.66	26.34	23.0	21.76	49.23	23.1	36.80	61.91	23.1	11.80	4.44	23.1	15.59	12.30
24.0	22.94	25.95	24.0	21.65	48.99	24.1	36.80	61.55	24.1	11.74	4.21	24.1	15.53	11.95
25.0	23.27	25.60	25.0	21.52	48.72	25.1	36.81	61.21	25.1	11.68	3.94	25.1	15.48	11.62
26.0	23.62	25.26	26.0	21.40	48.44	26.0	36.82	60.88	26.1	11.62	3.67	26.1	15.45	11.30
27.0	23.96	24.94	27.0	21.29	48.13	27.0	36.83	60.56	27.1	11.55	3.39	27.1	15.41	11.00
27.9	24.24	24.64	28.0	21.19	47.81	28.0	36.83	60.25	28.1	11.49	3.08	28.1	15.37	10.71
28.9	24.47	24.33	29.0	21.13	47.48	29.0	36.83	59.96	29.0	11.44	2.76	29.1	15.32	10.43
29.9	24.66	24.01	30.0	21.06	47.16	30.0	36.81	59.67	30.0	11.39	2.42	30.1	15.26	10.14
30.9	24.81	23.67	31.0	21.01	46.83	31.0	36.79	59.35	31.0	11.35	2.11	31.1	15.20	9.86
31.9	24.98	23.33	32.0	20.97	46.51	32.0	36.77	59.03	32.0	11.32	1.82	32.1	15.13	9.54
50.92	+50.91		12.33	-12.29		6.91	+6.84		6.11	-6.03		8.17	+8.11	
8 ^h 17 ^m	47 ^s .546		9 ^h 8 ^m	41 ^s .594		9 ^h 25 ^m	39 ^s .275		9 ^h 36 ^m	19 ^s .026		10 ^h 21 ^m	19 ^s .949	
+88° 52'	37'''.80		-85° 20'	26'''.78		+81° 41'	10'''.13		-80° 34'	39'''.26		+82° 58'	17'''.67	

APPARENT PLACES OF STARS, 1919.

277

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ϵ Octantis. Mag. 5.4			32 H. Camelopard. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
July	h m 10 59 s	° ' -84 9 "	July	h m 12 13 s	° ' +88 8 "	July	h m 12 46 s	° ' -84 41 "	July	h m 12 48 s	° ' +83 51 "	July	h m 13 27 s	° ' -85 22 "
1.2	51.95	64.87	1.2	76.36	60.62	1.3	28.15	36.82	1.3	29.67	16.76	1.3	47.97	52.58
2.2	51.76	64.74	2.2	75.77	60.56	2.3	27.93	36.86	2.3	29.48	16.74	2.3	47.72	52.69
3.2	51.56	64.62	3.2	75.13	60.50	3.3	27.72	36.88	3.3	29.30	16.72	3.3	47.48	52.77
4.2	51.38	64.50	4.2	74.47	60.41	4.2	27.52	36.89	4.3	29.09	16.71	4.3	47.24	52.83
5.2	51.22	64.37	5.2	73.78	60.33	5.2	27.31	36.90	5.2	28.89	16.67	5.3	47.02	52.89
6.2	51.07	64.27	6.2	73.09	60.23	6.2	27.13	36.90	6.2	28.68	16.64	6.3	46.82	52.95
7.2	50.91	64.17	7.2	72.39	60.10	7.2	26.94	36.92	7.2	28.46	16.58	7.3	46.61	53.00
8.2	50.74	64.06	8.2	71.70	59.96	8.2	26.75	36.95	8.2	28.25	16.51	8.3	46.40	53.09
9.2	50.57	63.96	9.2	71.04	59.81	9.2	26.57	36.98	9.2	28.05	16.42	9.3	46.20	53.17
10.2	50.41	63.87	10.2	70.41	59.65	10.2	26.37	37.02	10.2	27.85	16.31	10.3	45.98	53.25
11.2	50.23	63.76	11.2	69.79	59.48	11.2	26.17	37.05	11.2	27.66	16.20	11.3	45.76	53.34
12.2	50.05	63.65	12.2	69.20	59.31	12.2	25.97	37.08	12.2	27.48	16.09	12.3	45.58	53.43
13.2	49.87	63.52	13.2	68.63	59.13	13.2	25.74	37.10	13.2	27.31	15.96	13.3	45.28	53.50
14.1	49.68	63.39	14.2	68.12	58.95	14.2	25.51	37.10	14.2	27.14	15.83	14.3	45.01	53.56
15.1	49.49	63.21	15.2	67.60	58.79	15.2	25.28	37.09	15.2	26.97	15.71	15.2	44.75	53.61
16.1	49.31	63.03	16.2	67.05	58.64	16.2	25.04	37.05	16.2	26.80	15.61	16.2	44.47	53.62
17.1	49.13	62.84	17.2	66.51	58.49	17.2	24.81	37.01	17.2	26.63	15.51	17.2	44.22	53.63
18.1	48.98	62.65	18.2	65.89	58.33	18.2	24.61	36.93	18.2	26.43	15.41	18.2	43.97	53.63
19.1	48.83	62.45	19.2	65.26	58.16	19.2	24.41	36.86	19.2	26.23	15.32	19.2	43.73	53.62
20.1	48.70	62.27	20.2	64.60	57.99	20.2	24.21	36.80	20.2	26.03	15.20	20.2	43.51	53.61
21.1	48.57	62.11	21.2	63.94	57.80	21.2	24.04	36.74	21.2	25.82	15.07	21.2	43.31	53.61
22.1	48.45	61.96	22.2	63.29	57.57	22.2	23.87	36.70	22.2	25.61	14.90	22.2	43.11	53.62
23.1	48.31	61.81	23.2	62.68	57.33	23.2	23.70	36.67	23.2	25.42	14.72	23.2	42.91	53.65
24.1	48.17	61.67	24.2	62.12	57.08	24.2	23.52	36.66	24.2	25.24	14.52	24.2	42.69	53.68
25.1	48.01	61.50	25.2	61.61	56.83	25.2	23.31	36.63	25.2	25.06	14.31	25.2	42.45	53.69
26.1	47.84	61.32	26.2	61.14	56.58	26.2	23.09	36.58	26.2	24.93	14.10	26.2	42.21	53.71
27.1	47.67	61.12	27.2	60.68	56.34	27.2	22.86	36.53	27.2	24.77	13.91	27.2	41.94	53.70
28.1	47.51	60.89	28.2	60.22	56.12	28.2	22.63	36.43	28.2	24.61	13.73	28.2	41.66	53.67
29.1	47.37	60.65	29.2	59.75	55.90	29.2	22.40	36.32	29.2	24.45	13.56	29.2	41.39	53.62
30.1	47.22	60.38	30.2	59.24	55.70	30.2	22.19	36.19	30.2	24.28	13.41	30.2	41.12	53.55
31.1	47.09	60.13	31.2	58.72	55.49	31.2	21.99	36.05	31.2	24.11	13.26	31.2	40.88	53.46
32.1	46.98	59.89	32.1	58.16	55.28	32.2	21.80	35.90	32.2	23.93	13.08	32.2	40.65	53.38
9.84	-9.79		30.97	+30.95		10.81	-10.77		9.34	+9.29		12.42	-12.38	
10 ^h 59 ^m	54° 54'	54.546	12 ^h 14 ^m	29° 19'	19.190	12 ^h 46 ^m	19° 11'	11.9	12 ^h 48 ^m	31° 30'	31.308	13 ^h 27 ^m	32° 89'	89.1
-84° 9'	29'' 33		+88° 8'	56'' 19		-84° 41'	1'' 57		+83° 51'	11'' 30		-85° 22'	19'' 48	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ϵ Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
July	h m 14 13	° ' " -83 18	July	h m 15 2	° ' " +87 32	July	h m 15 24	° ' " -84 12	July	h m 16 54	° ' " +82 10	July	h m 17 16	° ' " -80 47
	s "	"		s "	"		s "	"		s "	"		s "	"
1.3	61.14	23.78	1.4	60.98	50.93	1.4	45.35	16.75	1.4	16.32	30.01	1.4	34.73	19.22
2.3	60.98	23.92	2.3	60.58	51.07	2.4	45.21	16.98	2.4	16.24	30.28	2.4	34.70	19.50
3.3	60.83	24.07	3.3	60.15	51.23	3.4	45.07	17.18	3.4	16.16	30.57	3.4	34.67	19.77
4.3	60.69	24.17	4.3	59.69	51.40	4.4	44.93	17.37	4.4	16.08	30.86	4.4	34.64	20.02
5.3	60.55	24.28	5.3	59.22	51.57	5.4	44.80	17.55	5.4	15.99	31.16	5.4	34.60	20.27
6.3	60.41	24.39	6.3	58.72	51.72	6.4	44.69	17.73	6.4	15.89	31.46	6.4	34.59	20.51
7.3	60.28	24.52	7.3	58.21	51.85	7.4	44.58	17.92	7.4	15.79	31.76	7.4	34.57	20.76
8.3	60.16	24.64	8.3	57.68	51.98	8.3	44.47	18.11	8.4	15.69	32.05	8.4	34.55	21.01
9.3	60.04	24.76	9.3	57.16	52.09	9.3	44.34	18.30	9.4	15.56	32.32	9.4	34.53	21.25
10.3	59.91	24.90	10.3	56.62	52.18	10.3	44.23	18.51	10.4	15.44	32.57	10.4	34.51	21.52
11.3	59.77	25.03	11.3	56.10	52.26	11.3	44.11	18.73	11.4	15.32	32.81	11.4	34.50	21.79
12.3	59.63	25.16	12.3	55.59	52.32	12.3	43.98	18.95	12.4	15.21	33.01	12.4	34.47	22.07
13.3	59.48	25.29	13.3	55.11	52.38	13.3	43.84	19.17	13.4	15.10	33.22	13.4	34.44	22.35
14.3	59.31	25.42	14.3	54.63	52.44	14.3	43.70	19.37	14.4	14.98	33.42	14.4	34.40	22.65
15.3	59.14	25.53	15.3	54.16	52.49	15.3	43.53	19.58	15.4	14.87	33.62	15.4	34.36	22.93
16.3	58.96	25.62	16.3	53.71	52.56	16.3	43.35	19.76	16.4	14.76	33.84	16.4	34.31	23.20
17.3	58.78	25.68	17.3	53.24	52.65	17.3	43.17	19.90	17.4	14.65	34.06	17.4	34.24	23.44
18.3	58.63	25.73	18.3	52.74	52.73	18.3	43.00	20.04	18.4	14.53	34.29	18.4	34.17	23.67
19.3	58.47	25.76	19.3	52.22	52.82	19.3	42.85	20.15	19.4	14.41	34.54	19.4	34.12	23.88
20.3	58.32	25.80	20.3	51.66	52.91	20.3	42.69	20.26	20.4	14.28	34.79	20.4	34.06	24.07
21.3	58.18	25.84	21.3	51.07	52.97	21.3	42.55	20.37	21.4	14.14	35.04	21.4	34.01	24.26
22.3	58.05	25.89	22.3	50.48	53.03	22.3	42.42	20.50	22.4	14.00	35.29	22.4	33.97	24.49
23.3	57.93	25.96	23.3	49.88	53.05	23.3	42.30	20.65	23.4	13.84	35.49	23.4	33.93	24.71
24.3	57.79	26.04	24.3	49.32	53.05	24.3	42.17	20.82	24.4	13.70	35.68	24.4	33.90	24.95
25.3	57.64	26.13	25.3	48.76	53.04	25.3	42.02	20.99	25.4	13.55	35.83	25.4	33.86	25.19
26.3	57.48	26.19	26.3	48.24	53.00	26.3	41.85	21.15	26.4	13.41	35.98	26.4	33.81	25.46
27.2	57.30	26.26	27.3	47.73	52.99	27.3	41.67	21.30	27.4	13.27	36.13	27.4	33.75	25.71
28.2	57.11	26.30	28.3	47.25	52.98	28.3	41.48	21.44	28.4	13.14	36.27	28.4	33.66	25.96
29.2	56.92	26.30	29.3	46.77	52.98	29.3	41.28	21.54	29.4	13.00	36.44	29.4	33.57	26.19
30.2	56.74	26.29	30.3	46.27	52.99	30.3	41.08	21.63	30.3	12.87	36.61	30.4	33.48	26.40
31.2	56.56	26.26	31.3	45.74	53.00	31.3	40.88	21.70	31.3	12.73	36.80	31.4	33.39	26.59
32.2	56.39	26.22	32.3	45.20	53.02	32.3	40.68	21.76	32.3	12.59	36.98	32.4	33.30	26.76
8.58	-8.52		23.37	+23.35		9.90	-9.85		7.35	+7.28		6.25	-6.17	
14 ^h 13 ^m 46 ^s .350			15 ^h 3 ^m 2 ^s .510			15 ^h 24 ^m 23 ^s .351			16 ^h 54 ^m 12 ^s .991			17 ^h 16 ^m 17 ^s .234		
-83° 17' 54".52			+87° 32' 42".66			-84° 11' 55".43			+82° 10' 21".42			-80° 47' 14".27		

APPARENT PLACES OF STARS, 1919.

279

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
h m	s	° ' "	h m	s	° ' "	h m	s	° ' "	h m	s	° ' "	h m	s	° ' "
July 17 58	17 58	+86 36	July 18 8	18 8	-87 39	July 19 0	19 0	+89 1	July 19 33	19 33	-89 12	July 20 48	20 48	+82 14
1.5	29.17	58.90	1.5	25.41	47.95	1.5	39.96	19.31	1.5	34.42	57.48	1.6	38.68	0.28
2.5	29.07	59.21	2.5	25.40	48.27	2.5	39.91	19.63	2.5	34.94	57.78	2.6	38.74	0.57
3.5	28.96	59.53	3.5	25.37	48.56	3.5	39.87	19.96	3.5	35.37	58.07	3.6	38.83	0.88
4.5	28.85	59.85	4.5	25.34	48.85	4.5	39.83	20.30	4.5	35.78	58.34	4.6	38.89	1.21
5.5	28.72	60.18	5.5	25.31	49.12	5.5	39.74	20.67	5.5	36.18	58.59	5.6	38.97	1.54
6.5	28.58	60.53	6.5	25.29	49.39	6.5	39.58	21.03	6.5	36.58	58.84	6.6	39.05	1.90
7.5	28.41	60.87	7.5	25.28	49.66	7.5	39.38	21.38	7.5	37.02	59.09	7.6	39.11	2.26
8.5	28.23	61.20	8.5	25.27	49.94	8.5	39.11	21.74	8.5	37.48	59.35	8.6	39.17	2.62
9.5	28.05	61.52	9.5	25.28	50.22	9.5	38.77	22.08	9.5	37.98	59.62	9.6	39.22	2.99
10.4	27.85	61.83	10.5	25.29	50.51	10.5	38.39	22.42	10.5	38.50	59.89	10.6	39.27	3.35
11.4	27.65	62.12	11.5	25.30	50.82	11.5	37.95	22.76	11.5	39.03	60.20	11.6	39.30	3.71
12.4	27.43	62.42	12.5	25.29	51.13	12.5	37.48	23.08	12.5	39.55	60.52	12.6	39.33	4.06
13.4	27.21	62.69	13.4	25.25	51.46	13.5	37.02	23.37	13.5	40.03	60.85	13.6	39.36	4.40
14.4	27.01	62.93	14.4	25.20	51.79	14.5	36.58	23.67	14.5	40.42	61.17	14.6	39.39	4.74
15.4	26.82	63.19	15.4	25.10	52.11	15.5	36.16	23.96	15.5	40.73	61.49	15.6	39.40	5.06
16.4	26.63	63.45	16.4	24.97	52.43	16.5	35.78	24.25	16.5	40.91	61.79	16.6	39.43	5.38
17.4	26.44	63.72	17.4	24.80	52.71	17.5	35.43	24.56	17.5	41.00	62.10	17.5	39.46	5.71
18.4	26.24	64.01	18.4	24.63	52.98	18.5	35.08	24.88	18.5	41.02	62.39	18.5	39.50	6.05
19.4	26.04	64.32	19.4	24.47	53.24	19.5	34.70	25.21	19.5	41.02	62.68	19.5	39.55	6.42
20.4	25.82	64.64	20.4	24.32	53.48	20.5	34.26	25.58	20.5	41.04	62.95	20.5	39.59	6.79
21.4	25.57	64.96	21.4	24.21	53.73	21.5	33.72	25.95	21.5	41.11	63.21	21.5	39.61	7.17
22.4	25.30	65.28	22.4	24.11	53.97	22.5	33.09	26.31	22.5	41.28	63.47	22.5	39.62	7.59
23.4	25.01	65.56	23.4	24.03	54.24	23.5	32.37	26.65	23.5	41.51	63.74	23.5	39.63	7.99
24.4	24.71	65.81	24.4	23.95	54.53	24.5	31.59	26.98	24.5	41.76	64.02	24.5	39.63	8.38
25.4	24.41	66.05	25.4	23.85	54.82	25.5	30.81	27.27	25.5	41.99	64.34	25.5	39.63	8.75
26.4	24.12	66.27	26.4	23.71	55.12	26.4	30.05	27.55	26.5	42.14	64.67	26.5	39.62	9.09
27.4	23.84	66.47	27.4	23.53	55.42	27.4	29.33	27.81	27.5	42.18	65.00	27.5	39.60	9.44
28.4	23.59	66.69	28.4	23.30	55.72	28.4	28.66	28.07	28.5	42.10	65.34	28.5	39.59	9.76
29.4	23.34	66.92	29.4	23.06	56.00	29.4	28.03	28.34	29.5	41.90	65.67	29.5	39.59	10.09
30.4	23.07	67.16	30.4	22.78	56.28	30.4	27.42	28.64	30.5	41.61	65.98	30.5	39.59	10.43
31.4	22.81	67.43	31.4	22.50	56.52	31.4	26.82	28.95	31.5	41.25	66.28	31.5	39.59	10.77
32.4	22.55	67.69	32.4	22.22	56.76	32.4	26.19	29.26	32.5	40.88	66.57	32.5	39.59	11.14
16.95	+16.92		24.54	-24.52		58.67	+58.66		73.18	-73.18		7.40	+7.33	
17 ^h 58 ^m 22 ^s .311			18 ^h 7 ^m 23 ^s .343			19 ^h 0 ^m 15 ^s .079			19 ^h 30 ^m 50 ^s .769			20 ^h 48 ^m 32 ^s .146		
+86° 36' 51".04			-87° 39' 50".89			+89° 1' 12".80			-89° 13' 13".35			+82° 13' 56".82		

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ ¹ Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
July	h m 21 38	° ' " -83 5	July	h m 22 16	° ' " -86 22	July	h m 22 37	° ' " -81 47	July	h m 23 27	° ' " +86 51	July	h m 23 47	° ' " -82 27
	s "	"		s "	"		s "	"		s "	"		s "	"
1.6	52.01	3.49	1.7	50.93	17.22	1.7	59.38	50.01	1.7	56.16	36.02	1.7	26.35	31.82
2.6	52.15	3.69	2.6	51.23	17.37	2.7	59.53	50.12	2.7	56.50	36.16	2.7	26.52	31.86
3.6	52.28	3.88	3.6	51.51	17.53	3.7	59.66	50.22	3.7	56.87	36.31	3.7	26.66	31.90
4.6	52.41	4.06	4.6	51.77	17.67	4.7	59.78	50.32	4.7	57.25	36.46	4.7	26.82	31.93
5.6	52.53	4.23	5.6	52.01	17.82	5.7	59.91	50.43	5.7	57.63	36.64	5.7	26.96	31.97
6.6	52.65	4.40	6.6	52.27	17.96	6.7	60.03	50.54	6.7	58.02	36.82	6.7	27.10	32.00
7.6	52.77	4.56	7.6	52.53	18.09	7.7	60.15	50.64	7.7	58.41	37.02	7.7	27.25	32.03
8.6	52.90	4.72	8.6	52.80	18.22	8.6	60.28	50.73	8.7	58.78	37.25	8.7	27.40	32.04
9.6	53.04	4.88	9.6	53.07	18.35	9.6	60.42	50.82	9.7	59.14	37.48	9.7	27.57	32.05
10.6	53.18	5.04	10.6	53.36	18.48	10.6	60.56	50.91	10.7	59.48	37.71	10.7	27.73	32.06
11.6	53.32	5.21	11.6	53.65	18.62	11.6	60.70	51.01	11.7	59.81	37.95	11.7	27.90	32.06
12.6	53.47	5.39	12.6	53.95	18.76	12.6	60.85	51.14	12.7	60.12	38.19	12.7	28.07	32.10
13.6	53.62	5.59	13.6	54.25	18.93	13.6	61.00	51.26	13.7	60.41	38.43	13.7	28.25	32.13
14.6	53.77	5.82	14.6	54.54	19.11	14.6	61.14	51.40	14.7	60.68	38.66	14.7	28.43	32.15
15.6	53.90	6.04	15.6	54.83	19.31	15.6	61.28	51.58	15.7	60.96	38.87	15.7	28.59	32.27
16.6	54.01	6.28	16.6	55.10	19.54	16.6	61.41	51.76	16.7	61.25	39.09	16.7	28.76	32.35
17.6	54.11	6.53	17.6	55.83	19.77	17.6	61.53	51.95	17.7	61.56	39.30	17.7	28.90	32.46
18.6	54.21	6.77	18.6	55.53	19.97	18.6	61.63	52.14	18.7	61.88	39.51	18.7	29.05	32.58
19.6	54.30	7.00	19.6	55.73	20.17	19.6	61.73	52.32	19.7	62.21	39.74	19.7	29.18	32.66
20.6	54.39	7.20	20.6	55.92	20.36	20.6	61.83	52.47	20.6	62.56	39.98	20.7	29.31	32.79
21.6	54.47	7.40	21.6	56.13	20.54	21.6	61.93	52.62	21.6	62.91	40.25	21.7	29.44	32.88
22.6	54.57	7.59	22.6	56.35	20.71	22.6	62.03	52.77	22.6	63.25	40.54	22.7	29.58	32.96
23.6	54.68	7.77	23.6	56.59	20.87	23.6	62.16	52.91	23.6	63.55	40.85	23.7	29.72	33.01
24.6	54.81	7.97	24.6	56.83	21.06	24.6	62.29	53.05	24.6	63.82	41.17	24.7	29.88	33.06
25.6	54.93	8.20	25.6	57.08	21.26	25.6	62.42	53.22	25.6	64.06	41.48	25.6	30.05	33.17
26.6	55.04	8.46	26.6	57.34	21.49	26.6	62.55	53.40	26.6	64.30	41.79	26.6	30.22	33.27
27.6	55.15	8.72	27.6	57.59	21.73	27.6	62.68	53.61	27.6	64.52	42.08	27.6	30.37	33.39
28.6	55.25	9.00	28.6	57.82	21.99	28.6	62.78	53.84	28.6	64.73	42.35	28.6	30.52	33.53
29.5	55.33	9.29	29.6	58.01	22.26	29.6	62.88	54.08	29.6	64.97	42.62	29.6	30.67	33.71
30.5	55.39	9.58	30.6	58.19	22.54	30.6	62.97	54.33	30.6	65.23	42.89	30.6	30.81	33.89
31.5	55.45	9.86	31.6	58.34	22.80	31.6	63.06	54.58	31.6	65.49	43.16	31.6	30.93	34.06
32.5	55.50	10.13	32.6	58.48	23.06	32.6	63.13	54.81	32.6	65.77	43.43	32.6	31.05	34.27
8.31	-8.24	15.80	-15.77	7.01	-6.94	18.26	+18.23	7.62	-7.55					
21 ^h 38 ^m 38 ^s .548	22 ^h 16 ^m 33 ^s .212	22 ^h 37 ^m 51 ^s .624	23 ^h 27 ^m 43 ^s .571	23 ^h 47 ^m 23 ^s .637	-83° 5' 34".33	-86° 22' 50".92	-81° 48' 24".80	+86° 51' 38".62	-82° 28' 8".42					

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Aug.	h m ° ' "		Aug.	h m ° ' "		Aug.	h m ° ' "		Aug.	h m ° ' "		Aug.	h m ° ' "	
	0 57 +85 49			1 32 +88 52			1 41 -85 10			4 10 +85 20			5 35 +85 9	
0.7	42.20 22.49	0.7	7.59 16.22	0.7	51.02 10.93	0.8	48.15 15.95	0.9	56.02 19.08					
1.7	42.49 22.66	1.7	8.71 16.34	1.7	51.26 11.00	1.8	48.42 15.84	1.9	56.23 18.86					
2.7	42.79 22.85	2.7	9.88 16.48	2.7	51.48 11.06	2.8	48.71 15.72	2.9	56.46 18.63					
3.7	43.09 23.05	3.7	11.05 16.63	3.7	51.71 11.12	3.8	49.03 15.62	3.9	56.71 18.41					
4.7	43.39 23.27	4.7	12.22 16.80	4.7	51.93 11.17	4.8	49.34 15.54	4.9	56.96 18.21					
5.7	43.68 23.50	5.7	13.38 16.98	5.7	52.15 11.21	5.8	49.66 15.48	5.9	57.23 18.02					
6.7	43.96 23.75	6.7	14.51 17.18	6.7	52.38 11.25	6.8	49.98 15.42	6.9	57.50 17.84					
7.7	44.24 24.01	7.7	15.59 17.41	7.7	52.62 11.28	7.8	50.30 15.39	7.9	57.78 17.68					
8.7	44.48 24.27	8.7	16.62 17.63	8.7	52.87 11.31	8.8	50.61 15.38	8.9	58.06 17.53					
9.7	44.73 24.54	9.7	17.61 17.83	9.7	53.12 11.35	9.8	50.92 15.37	9.8	58.34 17.38					
10.7	44.96 24.81	10.7	18.55 18.04	10.7	53.38 11.40	10.8	51.21 15.36	10.8	58.59 17.26					
11.7	45.18 25.06	11.7	19.45 18.25	11.7	53.65 11.48	11.8	51.50 15.36	11.8	58.84 17.14					
12.6	45.40 25.30	12.7	20.35 18.45	12.7	53.89 11.58	12.8	51.77 15.36	12.8	59.08 17.01					
13.6	45.62 25.53	13.7	21.27 18.63	13.7	54.14 11.70	13.8	52.04 15.32	13.8	59.32 16.87					
14.6	45.85 25.76	14.7	22.25 18.82	14.7	54.37 11.83	14.8	52.32 15.29	14.8	59.56 16.71					
15.6	46.10 25.99	15.7	23.29 19.00	15.7	54.59 11.96	15.8	52.61 15.25	15.8	59.81 16.53					
16.6	46.37 26.23	16.7	24.39 19.22	16.7	54.79 12.10	16.8	52.93 15.21	16.8	60.08 16.36					
17.6	46.65 26.51	17.7	25.51 19.44	17.7	54.99 12.23	17.8	53.26 15.17	17.8	60.36 16.18					
18.6	46.93 26.80	18.7	26.63 19.66	18.7	55.18 12.33	18.8	53.59 15.16	18.8	60.66 16.03					
19.6	47.20 27.11	19.7	27.72 19.92	19.7	55.37 12.44	19.8	53.96 15.17	19.8	60.98 15.89					
20.6	47.45 27.44	20.7	28.73 20.20	20.7	55.59 12.54	20.8	54.30 15.21	20.8	61.30 15.79					
21.6	47.64 27.76	21.6	29.68 20.48	21.7	55.82 12.63	21.8	54.63 15.26	21.8	61.61 15.71					
22.6	47.84 28.09	22.6	30.54 20.76	22.7	56.06 12.73	22.8	54.95 15.32	22.8	61.89 15.63					
23.6	48.04 28.40	23.6	31.34 21.04	23.6	56.29 12.86	23.8	55.24 15.39	23.8	62.20 15.57					
24.6	48.22 28.70	24.6	32.13 21.30	24.6	56.53 13.01	24.8	55.53 15.45	24.8	62.48 15.49					
25.6	48.39 28.99	25.6	32.92 21.55	25.6	56.77 13.19	25.7	55.81 15.50	25.8	62.74 15.41					
26.6	48.58 29.27	26.6	33.74 21.79	26.6	56.99 13.38	26.7	56.08 15.51	26.8	63.00 15.32					
27.6	48.77 29.54	27.6	34.60 22.03	27.6	57.19 13.59	27.7	56.37 15.53	27.8	63.26 15.22					
28.6	48.98 29.82	28.6	35.51 22.27	28.6	57.38 13.79	28.7	56.67 15.56	28.8	63.52 15.11					
29.6	49.20 30.11	29.6	36.44 22.52	29.6	57.56 14.01	29.7	56.98 15.59	29.8	63.78 15.00					
30.6	49.43 30.42	30.6	37.37 22.79	30.6	57.74 14.23	30.7	57.29 15.61	30.8	64.10 14.88					
31.6	49.64 30.73	31.6	38.31 23.05	31.6	57.91 14.42	31.7	57.62 15.64	31.8	64.40 14.77					
13.73	+13.70	50.80	+50.79	11.88	-11.83	12.30	+12.26	11.84	+11.80					
0 ^h 57 ^m	24 ^s .633	1 ^h 31 ^m	11 ^s .709	1 ^h 41 ^m	54 ^s .846	4 ^h 10 ^m	37 ^s .831	5 ^h 35 ^m	50 ^s .330					
+85° 49'	24''.14	+88° 52'	20''.55	-85° 10'	45''.22	+85° 20'	28''.88	+85° 9'	34''.51					

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensse. Mag. 6.2			J Mensse. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Aug.	h m 5 45 s	° ' " -84 49 "	Aug.	h m 6 46 s	° ' " -80 43 "	Aug.	h m 7 3 s	° ' " +87 10 "	Aug.	h m 7 14 s	° ' " +82 33 "	Aug.	h m 7 14 s	° ' " -86 54 "
0.9	29.31	34.64	0.9	37.08	45.38	0.9	1.79	27.93	0.9	8.99	61.97	0.9	59.71	23.79
1.9	29.47	34.40	1.9	37.14	45.11	1.9	2.01	27.62	1.9	9.07	61.65	1.9	59.84	23.51
2.9	29.62	34.18	2.9	37.19	44.85	2.9	2.25	27.31	2.9	9.16	61.34	2.9	59.97	23.24
3.9	29.76	33.96	3.9	37.26	44.58	3.9	2.53	26.99	3.9	9.25	61.03	3.9	60.10	22.98
4.9	29.90	33.76	4.9	37.31	44.32	4.9	2.82	26.68	4.9	9.36	60.72	4.9	60.20	22.72
5.9	30.04	33.54	5.9	37.37	44.05	5.9	3.13	26.37	5.9	9.49	60.41	5.9	60.31	22.45
6.9	30.18	33.31	6.9	37.42	43.77	6.9	3.46	26.08	6.9	9.61	60.12	6.9	60.42	22.18
7.9	30.32	33.08	7.9	37.48	43.49	7.9	3.81	25.79	7.9	9.75	59.84	7.9	60.52	21.89
8.9	30.47	32.83	8.9	37.55	43.20	8.9	4.17	25.52	8.9	9.88	59.57	8.9	60.63	21.60
9.9	30.62	32.58	9.9	37.61	42.90	9.9	4.53	25.28	9.9	10.02	59.33	9.9	60.76	21.29
10.9	30.80	32.33	10.9	37.67	42.60	10.9	4.87	25.05	10.9	10.15	59.08	10.9	60.89	20.97
11.9	30.98	32.07	11.9	37.76	42.30	11.9	5.20	24.81	11.9	10.27	58.85	11.9	61.05	20.66
12.8	31.16	31.83	12.9	37.83	42.01	12.9	5.51	24.57	12.9	10.38	58.62	12.9	61.24	20.34
13.8	31.35	31.62	13.9	37.91	41.73	13.9	5.80	24.33	13.9	10.49	58.37	13.9	61.43	20.06
14.8	31.55	31.43	14.9	38.00	41.48	14.9	6.10	24.07	14.9	10.59	58.11	14.9	61.66	19.78
15.8	31.75	31.27	15.9	38.09	41.24	15.9	6.41	23.79	15.9	10.70	57.82	15.9	61.90	19.54
16.8	31.94	31.12	16.9	38.18	41.02	16.9	6.73	23.51	16.9	10.83	57.54	16.9	62.12	19.31
17.8	32.12	30.99	17.9	38.27	40.82	17.9	7.10	23.22	17.9	10.97	57.25	17.9	62.31	19.10
18.8	32.28	30.83	18.9	38.35	40.62	18.9	7.50	22.93	18.9	11.12	56.94	18.9	62.51	18.89
19.8	32.45	30.66	19.9	38.43	40.40	19.9	7.92	22.66	19.9	11.29	56.66	19.9	62.69	18.66
20.8	32.63	30.49	20.9	38.51	40.17	20.9	8.37	22.42	20.9	11.46	56.41	20.9	62.86	18.41
21.8	32.81	30.31	21.9	38.59	39.93	21.9	8.82	22.18	21.9	11.63	56.17	21.9	63.04	18.14
22.8	32.99	30.10	22.9	38.68	39.67	22.9	9.25	21.97	22.9	11.80	55.96	22.9	63.24	17.88
23.8	33.19	29.90	23.9	38.76	39.40	23.9	9.66	21.78	23.9	11.95	55.77	23.9	63.46	17.58
24.8	33.41	29.70	24.9	38.86	39.15	24.9	10.04	21.59	24.9	12.09	55.57	24.9	63.70	17.31
25.8	33.64	29.54	25.9	38.97	38.91	25.9	10.41	21.40	25.9	12.23	55.37	25.9	63.97	17.03
26.8	33.87	29.40	26.9	39.08	38.69	26.9	10.78	21.20	26.9	12.36	55.15	26.9	64.26	16.78
27.8	34.10	29.28	27.9	39.19	38.48	27.9	11.13	20.98	27.9	12.48	54.93	27.9	64.56	16.55
28.8	34.33	29.17	28.9	39.30	38.30	28.9	11.49	20.74	28.9	12.62	54.68	28.9	64.86	16.34
29.8	34.55	29.07	29.9	39.41	38.13	29.9	11.87	20.49	29.9	12.77	54.44	29.9	65.16	16.14
30.8	34.76	28.98	30.9	39.53	37.98	30.9	12.29	20.25	30.9	12.92	54.19	30.9	65.46	15.95
31.8	34.98	28.90	31.9	39.64	37.83	31.9	12.71	20.02	31.9	13.07	53.95	31.9	65.75	15.77
11.09	-11.04		6.21	-6.13		20.28	+20.25		7.73	+7.66		18.52	-18.50	
5 ^h 45 ^m	51° 39'		6 ^h 46 ^m	48° 53'		7 ^h 3 ^m	2° 33'		7 ^h 14 ^m	7° 9'		7 ^h 15 ^m	39° 69'	
-84° 49'	44'' 27		-80° 43'	46'' 14		+87° 10'	43'' 86		+82° 34'	17'' 32		-86° 54'	19'' 75	

APPARENT PLACES OF STARS, 1919.

283

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			γ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			γ Chamaeleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
Aug.	h m s	° ' "	Aug.	h m s	° ' "	Aug.	h m s	° ' "	Aug.	h m s	° ' "	Aug.	h m s	° ' "
	8 17	+88 52		9 8	-85 20		9 25	+81 40		9 36	-80 34		10 21	+82 57
0.9	24.98	23.33	1.0	20.97	46.51	1.0	36.77	59.03	1.0	11.32	61.82	1.1	15.13	69.54
1.9	25.16	22.99	2.0	20.94	46.23	2.0	36.75	58.69	2.0	11.30	61.54	2.1	15.06	69.22
2.9	25.39	22.62	3.0	20.91	45.96	3.0	36.73	58.35	3.0	11.27	61.25	3.1	15.00	68.89
3.9	25.69	22.26	4.0	20.89	45.68	4.0	36.72	57.98	4.0	11.26	60.98	4.1	14.94	68.55
4.9	26.03	21.89	5.0	20.85	45.40	5.0	36.73	57.61	5.0	11.24	60.71	5.1	14.89	68.19
5.9	26.44	21.53	6.0	20.82	45.13	6.0	36.74	57.24	6.0	11.21	60.43	6.1	14.85	67.83
6.9	26.90	21.19	7.0	20.78	44.85	7.0	36.77	56.88	7.0	11.18	60.15	7.1	14.82	67.46
7.9	27.40	20.85	8.0	20.74	44.55	8.0	36.80	56.54	8.0	11.15	59.87	8.1	14.81	67.10
8.9	27.95	20.51	8.9	20.70	44.25	9.0	36.84	56.19	9.0	11.11	59.57	9.1	14.80	66.75
9.9	28.49	20.19	9.9	20.66	43.94	10.0	36.88	55.86	10.0	11.08	59.26	10.0	14.80	66.42
10.9	29.03	19.88	10.9	20.61	43.61	11.0	36.91	55.52	11.0	11.06	58.93	11.0	14.79	66.09
11.9	29.55	19.57	11.9	20.59	43.28	12.0	36.93	55.20	12.0	11.03	58.60	12.0	14.78	65.77
12.9	30.03	19.28	12.9	20.59	42.93	13.0	36.95	54.89	13.0	11.02	58.24	13.0	14.77	65.46
13.9	30.46	18.97	13.9	20.59	42.59	13.9	36.97	54.57	14.0	11.01	57.91	14.0	14.74	65.14
14.9	30.87	18.65	14.9	20.63	42.26	14.9	36.98	54.24	15.0	11.01	57.58	15.0	14.70	64.82
15.9	31.27	18.31	15.9	20.67	41.96	15.9	37.00	53.91	16.0	11.01	57.28	16.0	14.66	64.47
16.9	31.73	17.96	16.9	20.71	41.67	16.9	37.01	53.54	16.9	11.02	56.99	17.0	14.63	64.10
17.9	32.26	17.60	17.9	20.75	41.40	17.9	37.05	53.18	17.9	11.04	56.70	18.0	14.62	63.73
18.9	32.88	17.24	18.9	20.78	41.13	18.9	37.08	52.78	18.9	11.05	56.44	19.0	14.61	63.33
19.9	33.59	16.89	19.9	20.80	40.87	19.9	37.13	52.39	19.9	11.05	56.18	20.0	14.61	62.94
20.9	34.36	16.53	20.9	20.81	40.58	20.9	37.19	52.02	20.9	11.04	55.90	21.0	14.64	62.54
21.9	35.15	16.21	21.9	20.82	40.29	21.9	37.26	51.65	21.9	11.04	55.60	22.0	14.68	62.15
22.9	35.94	15.92	22.9	20.83	39.97	22.9	37.33	51.31	22.9	11.04	55.28	23.0	14.72	61.80
23.9	36.70	15.63	23.9	20.86	39.64	23.9	37.40	50.99	23.9	11.04	54.94	24.0	14.75	61.47
24.9	37.40	15.35	24.9	20.89	39.30	24.9	37.47	50.69	24.9	11.04	54.60	25.0	14.76	61.14
25.9	38.05	15.07	25.9	20.95	38.96	25.9	37.51	50.38	25.9	11.05	54.25	26.0	14.77	60.80
26.9	38.66	14.79	26.9	21.03	38.64	26.9	37.56	50.06	26.9	11.08	53.90	27.0	14.78	60.46
27.9	39.26	14.51	27.9	21.12	38.32	27.9	37.60	49.74	27.9	11.11	53.59	27.9	14.78	60.13
28.9	39.87	14.21	28.9	21.22	38.03	28.9	37.64	49.39	28.9	11.15	53.27	28.9	14.78	59.78
29.9	40.52	13.88	29.9	21.32	37.73	29.9	37.68	49.03	29.9	11.19	52.99	29.9	14.79	59.41
30.9	41.22	13.54	30.9	21.42	37.45	30.9	37.73	48.67	30.9	11.23	52.69	30.9	14.80	59.03
31.9	41.97	13.22	31.9	21.52	37.17	31.9	37.79	48.31	31.9	11.27	52.40	31.9	14.81	58.66
50.79	+50.78		12.32	-12.28		6.91	+6.84		6.11	-6.03		8.17	+8.11	
8 ^h 17 ^m	47 ^s .546		9 ^h 8 ^m	41 ^s .594		9 ^h 25 ^m	39 ^s .275		9 ^h 36 ^m	19 ^s .026		10 ^h 21 ^m	19 ^s .949	
+88° 52'	37''.80		-85° 20'	26''.78		+81° 41'	10''.13		-80° 34'	39''.26		+82° 58'	17''.67	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Aug.	h m 10 59 s	° ' -84 9 "	Aug.	h m 12 13 s	° ' +88 8 "	Aug.	h m 12 46 s	° ' -84 41 "	Aug.	h m 12 48 s	° ' +83 51 "	Aug.	h m 13 27 s	° ' -85 22 "
1.1	46.98	59.89	1.1	58.16	55.28	1.2	21.80	35.90	1.2	23.93	13.08	1.2	40.65	53.38
2.1	46.88	59.64	2.1	57.59	55.06	2.2	21.62	35.75	2.2	23.74	12.91	2.2	40.42	53.29
3.1	46.78	59.41	3.1	57.02	54.82	3.2	21.45	35.62	3.2	23.55	12.72	3.2	40.21	53.19
4.1	46.68	59.17	4.1	56.47	54.55	4.2	21.28	35.48	4.2	23.37	12.52	4.2	40.00	53.10
5.1	46.57	58.95	5.1	55.94	54.28	5.2	21.11	35.36	5.2	23.19	12.29	5.2	39.80	53.02
6.1	46.46	58.73	6.1	55.42	53.99	6.2	20.94	35.25	6.2	23.02	12.06	6.2	39.58	52.96
7.1	46.36	58.51	7.1	54.95	53.69	7.2	20.76	35.13	7.2	22.86	11.82	7.2	39.36	52.89
8.1	46.25	58.28	8.1	54.51	53.39	8.2	20.58	35.00	8.2	22.71	11.55	8.2	39.14	52.82
9.1	46.12	58.04	9.1	54.09	53.09	9.2	20.38	34.87	9.2	22.56	11.29	9.2	38.90	52.74
10.1	46.00	57.80	10.1	53.71	52.80	10.1	20.19	34.75	10.1	22.43	11.02	10.2	38.66	52.66
11.1	45.88	57.52	11.1	53.35	52.52	11.1	19.99	34.59	11.1	22.29	10.78	11.2	38.40	52.56
12.1	45.77	57.24	12.1	52.98	52.25	12.1	19.78	34.41	12.1	22.16	10.55	12.2	38.15	52.43
13.1	45.67	56.95	13.1	52.60	51.99	13.1	19.58	34.22	13.1	22.02	10.32	13.2	37.89	52.30
14.1	45.57	56.64	14.1	52.19	51.73	14.1	19.40	34.00	14.1	21.88	10.10	14.2	37.65	52.13
15.1	45.49	56.33	15.1	51.73	51.46	15.1	19.22	33.78	15.1	21.72	9.88	15.2	37.42	51.95
16.1	45.43	56.04	16.1	51.25	51.17	16.1	19.07	33.58	16.1	21.56	9.65	16.2	37.23	51.78
17.1	45.38	55.76	17.1	50.76	50.86	17.1	18.94	33.38	17.1	21.39	9.39	17.2	37.04	51.63
18.1	45.33	55.51	18.1	50.29	50.54	18.1	18.81	33.18	18.1	21.22	9.11	18.2	36.87	51.48
19.0	45.28	55.27	19.1	49.86	50.18	19.1	18.68	33.00	19.1	21.07	8.81	19.2	36.69	51.33
20.0	45.22	55.03	20.1	49.46	49.82	20.1	18.54	32.85	20.1	20.92	8.49	20.1	36.51	51.21
21.0	45.13	54.78	21.1	49.11	49.46	21.1	18.40	32.68	21.1	20.79	8.17	21.1	36.31	51.09
22.0	45.05	54.51	22.1	48.82	49.12	22.1	18.22	32.50	22.1	20.69	7.85	22.1	36.09	50.97
23.0	44.97	54.23	23.1	48.55	48.77	23.1	18.05	32.32	23.1	20.58	7.52	23.1	35.88	50.83
24.0	44.88	53.91	24.1	48.29	48.44	24.1	17.90	32.10	24.1	20.48	7.23	24.1	35.64	50.66
25.0	44.82	53.58	25.1	48.02	48.11	25.1	17.73	31.86	25.1	20.37	6.95	25.1	35.41	50.47
26.0	44.76	53.25	26.1	47.73	47.82	26.1	17.54	31.61	26.1	20.26	6.67	26.1	35.18	50.25
27.0	44.71	52.91	27.1	47.41	47.53	27.1	17.40	31.34	27.1	20.13	6.40	27.1	34.98	50.03
28.0	44.68	52.58	28.1	47.07	47.21	28.1	17.25	31.06	28.1	20.00	6.13	28.1	34.79	49.79
29.0	44.66	52.26	29.1	46.72	46.90	29.1	17.14	30.79	29.1	19.86	5.85	29.1	34.60	49.56
30.0	44.65	51.97	30.1	46.37	46.57	30.1	17.03	30.52	30.1	19.73	5.56	30.1	34.45	49.32
31.0	44.64	51.67	31.1	46.02	46.23	31.1	16.92	30.26	31.1	19.60	5.25	31.1	34.29	49.09
32.0	44.63	51.37	32.1	45.69	45.86	32.1	16.82	30.02	32.1	19.47	4.92	32.1	34.14	48.87
9.84	-9.79		30.94	+30.92		10.81	-10.77		9.34	+9.28		12.42	-12.36	
10 ^h 59 ^m	54 ^s .546		12 ^h 14 ^m	29 ^s .190		12 ^h 46 ^m	19 ^s .119		12 ^h 48 ^m	31 ^s .308		13 ^h 27 ^m	32 ^s .891	
-84° 9'	29''.33		+88° 8'	56''.19		-84° 41'	1''.57		+83° 51'	11''.30		-85° 22'	19''.48	

APPARENT PLACES OF STARS, 1919.

285

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '
	14 13	-83 18		15 2	+87 32		15 24	-84 12		16 54	+82 10		17 16	-80 47
	s	"		s	"		s	"		s	"		s	"
1.2	56.39	26.22	1.3	45.20	53.02	1.3	40.68	21.76	1.3	12.59	36.98	1.4	33.30	26.76
2.2	56.24	26.18	2.3	44.64	53.03	2.3	40.50	21.81	2.3	12.44	37.18	2.4	33.22	26.93
3.2	56.09	26.14	3.3	44.07	53.04	3.3	40.34	21.86	3.3	12.29	37.37	3.4	33.13	27.08
4.2	55.93	26.11	4.3	43.50	53.04	4.3	40.17	21.90	4.3	12.14	37.56	4.4	33.06	27.25
5.2	55.79	26.10	5.3	42.90	53.01	5.3	40.01	21.96	5.3	11.97	37.71	5.3	32.98	27.42
6.2	55.65	26.09	6.3	42.33	52.98	6.3	39.84	22.02	6.3	11.80	37.86	6.3	32.91	27.60
7.2	55.49	26.07	7.3	41.76	52.93	7.3	39.67	22.09	7.3	11.63	37.99	7.3	32.83	27.79
8.2	55.34	26.05	8.2	41.19	52.85	8.3	39.50	22.17	8.3	11.46	38.10	8.3	32.75	27.97
9.2	55.17	26.03	9.2	40.66	52.76	9.3	39.31	22.26	9.3	11.31	38.21	9.3	32.67	28.17
10.2	54.99	26.00	10.2	40.14	52.66	10.3	39.12	22.32	10.3	11.15	38.30	10.3	32.59	28.37
11.2	54.81	25.96	11.2	39.62	52.58	11.3	38.92	22.39	11.3	11.00	38.39	11.3	32.50	28.57
12.2	54.63	25.91	12.2	39.12	52.50	12.3	38.71	22.44	12.3	10.85	38.46	12.3	32.39	28.76
13.2	54.45	25.83	13.2	38.62	52.44	13.2	38.49	22.44	13.3	10.70	38.56	13.3	32.28	28.93
14.2	54.26	25.74	14.2	38.12	52.37	14.2	38.27	22.45	14.3	10.54	38.69	14.3	32.15	29.07
15.2	54.10	25.60	15.2	37.58	52.32	15.2	38.06	22.44	15.3	10.38	38.81	15.3	32.04	29.21
16.2	53.95	25.48	16.2	37.03	52.27	16.2	37.87	22.40	16.3	10.21	38.93	16.3	31.93	29.31
17.2	53.80	25.37	17.2	36.43	52.22	17.2	37.70	22.37	17.3	10.04	39.06	17.3	31.84	29.41
18.2	53.67	25.26	18.2	35.83	52.13	18.2	37.54	22.36	18.3	9.86	39.18	18.3	31.75	29.51
19.2	53.55	25.17	19.2	35.22	52.01	19.2	37.39	22.34	19.3	9.67	39.28	19.3	31.66	29.60
20.2	53.41	25.09	20.2	34.64	51.88	20.2	37.21	22.34	20.3	9.48	39.35	20.3	31.58	29.72
21.2	53.27	25.03	21.2	34.07	51.73	21.2	37.04	22.36	21.3	9.30	39.40	21.3	31.49	29.86
22.2	53.12	24.95	22.2	33.54	51.57	22.2	36.85	22.37	22.3	9.12	39.42	22.3	31.39	30.01
23.2	52.94	24.86	23.2	33.02	51.41	23.2	36.66	22.38	23.3	8.95	39.43	23.3	31.29	30.16
24.2	52.77	24.74	24.2	32.55	51.26	24.2	36.45	22.37	24.3	8.78	39.44	24.3	31.18	30.30
25.2	52.60	24.61	25.2	32.06	51.12	25.2	36.23	22.33	25.3	8.62	39.48	25.3	31.05	30.41
26.2	52.43	24.45	26.2	31.58	50.99	26.2	36.00	22.27	26.3	8.47	39.51	26.3	30.91	30.51
27.2	52.26	24.27	27.2	31.08	50.88	27.2	35.79	22.20	27.3	8.29	39.56	27.3	30.78	30.58
28.2	52.11	24.08	28.2	30.57	50.78	28.2	35.59	22.11	28.3	8.12	39.61	28.3	30.64	30.64
29.2	51.96	23.91	29.2	30.04	50.66	29.2	35.39	22.01	29.3	7.94	39.67	29.3	30.52	30.68
30.2	51.83	23.72	30.2	29.49	50.53	30.2	35.19	21.90	30.3	7.77	39.73	30.3	30.39	30.72
31.2	51.69	23.54	31.2	28.94	50.39	31.2	35.01	21.80	31.3	7.60	39.78	31.3	30.28	30.76
32.1	51.56	23.35	32.2	28.39	50.24	32.2	34.84	21.71	32.3	7.41	39.83	32.3	30.17	30.80
8.58	-8.52		23.37	+23.35		9.91	-9.86		7.35	+7.28		6.25	-6.17	
14 ^h 13 ^m 46 ^s .350			15 ^h 3 ^m 2 ^s .510			15 ^h 24 ^m 23 ^s .351			16 ^h 54 ^m 12 ^s .991			17 ^h 16 ^m 17 ^s .234		
-83° 17' 54".52			+87° 32' 42".66			-84° 11' 55".43			+82° 10' 21".42			-80° 47' 14".27		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Aug.	h m 17 58	° ' +86 37	Aug.	h m 18 8	° ' -87 39	Aug.	h m 18 59	° ' +89 1	Aug.	h m 19 33	° ' -89 13	Aug.	h m 20 48	° ' +82 14
	s "	"		s "	"		s "	"		s "	"		s "	"
1.4	22.55	7.69	1.4	22.22	56.76	1.4	86.19	29.26	1.5	40.88	6.57	1.5	39.59	11.14
2.4	22.27	7.96	2.4	21.94	56.99	2.4	85.51	29.58	2.5	40.51	6.84	2.5	39.59	11.52
3.4	21.98	8.22	3.4	21.67	57.21	3.4	84.78	29.90	3.4	40.17	7.10	3.5	39.60	11.90
4.4	21.66	8.47	4.4	21.42	57.43	4.4	83.97	30.22	4.4	39.84	7.36	4.5	39.59	12.29
5.4	21.34	8.71	5.4	21.18	57.65	5.4	83.11	30.53	5.4	39.56	7.62	5.5	39.56	12.67
6.4	21.01	8.93	6.4	20.94	57.88	6.4	82.20	30.82	6.4	39.30	7.88	6.5	39.53	13.06
7.4	20.67	9.14	7.4	20.70	58.12	7.4	81.24	31.11	7.4	39.05	8.16	7.5	39.51	13.44
8.4	20.32	9.34	8.4	20.46	58.37	8.4	80.26	31.39	8.4	38.79	8.47	8.5	39.47	13.82
9.4	19.97	9.54	9.4	20.19	58.64	9.4	79.26	31.64	9.4	38.52	8.78	9.5	39.42	14.16
10.4	19.63	9.72	10.4	19.91	58.91	10.4	78.26	31.88	10.4	38.17	9.10	10.5	39.38	14.50
11.4	19.29	9.88	11.4	19.59	59.17	11.4	77.31	32.13	11.4	37.74	9.41	11.5	39.33	14.83
12.4	18.97	10.05	12.4	19.24	59.42	12.4	76.37	32.37	12.4	37.21	9.73	12.5	39.28	15.16
13.4	18.66	10.22	13.4	18.86	59.66	13.4	75.51	32.61	13.4	36.57	10.02	13.5	39.24	15.49
14.4	18.34	10.41	14.4	18.47	59.86	14.4	74.65	32.88	14.4	35.83	10.31	14.5	39.20	15.83
15.4	18.02	10.61	15.4	18.07	60.04	15.4	73.78	33.15	15.4	35.07	10.56	15.5	39.17	16.19
16.3	17.69	10.83	16.4	17.68	60.22	16.4	72.86	33.43	16.4	34.30	10.81	16.5	39.14	16.57
17.3	17.32	11.05	17.4	17.32	60.37	17.4	71.87	33.72	17.4	33.58	11.04	17.5	39.10	16.95
18.3	16.94	11.25	18.3	16.99	60.54	18.4	70.79	34.01	18.4	32.93	11.25	18.5	39.05	17.35
19.3	16.54	11.46	19.3	16.68	60.71	19.4	69.63	34.31	19.4	32.35	11.49	19.5	39.00	17.74
20.3	16.12	11.65	20.3	16.37	60.90	20.4	68.39	34.56	20.4	31.83	11.75	20.5	38.94	18.11
21.3	15.73	11.80	21.3	16.07	61.10	21.4	67.13	34.81	21.4	31.30	12.02	21.5	38.85	18.48
22.3	15.34	11.94	22.3	15.74	61.30	22.4	65.90	35.04	22.4	30.72	12.29	22.4	38.77	18.82
23.3	14.94	12.05	23.3	15.36	61.52	23.4	64.68	35.23	23.4	30.05	12.57	23.4	38.68	19.15
24.3	14.56	12.15	24.3	14.94	61.73	24.4	63.53	35.42	24.4	29.25	12.86	24.4	38.60	19.45
25.3	14.20	12.27	25.3	14.48	61.92	25.4	62.44	35.61	25.4	28.34	13.14	25.4	38.52	19.76
26.3	13.84	12.40	26.3	14.02	62.08	26.4	61.39	35.81	26.4	27.33	13.39	26.4	38.46	20.06
27.3	13.48	12.53	27.3	13.54	62.23	27.4	60.35	36.03	27.4	26.25	13.64	27.4	38.39	20.39
28.3	13.13	12.67	28.3	13.06	62.37	28.4	59.28	36.26	28.4	25.14	13.88	28.4	38.32	20.72
29.3	12.76	12.83	29.3	12.59	62.51	29.4	58.18	36.50	29.4	24.05	14.11	29.4	38.26	21.06
30.3	12.37	12.99	30.3	12.12	62.62	30.4	57.04	36.73	30.4	22.97	14.30	30.4	38.18	21.43
31.3	11.96	13.15	31.3	11.68	62.72	31.3	55.84	36.97	31.4	21.93	14.50	31.4	38.10	21.77
32.3	11.56	13.29	32.3	11.25	62.83	32.3	54.59	37.21	32.4	20.90	14.71	32.4	38.03	22.12
16.96 +16.93			24.56 -24.54			58.82 +58.81			73.42 -73.41			7.40 +7.34		
17 ^h 58 ^m 22 ^s .311			18 ^h 7 ^m 23 ^s .343			19 ^h 0 ^m 15 ^s .079			19 ^h 30 ^m 50 ^s .769			20 ^h 48 ^m 32 ^s .146		
+86° 36' 51".04			-87° 39' 50".89			+89° 1' 12".80			-89° 13' 13".35			+82° 13' 56".82		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '	Aug.	h m	° '
	21 38	-83 5		22 16	-86 22		22 38	-81 47		23 28	+86 51		23 47	-82 27
	s	"		s	"		s	"		s	"		s	"
1.5	55.50	10.13	1.6	58.48	23.06	1.6	3.13	54.81	1.6	5.77	43.43	1.6	31.05	34.27
2.5	55.54	10.39	2.6	58.61	23.31	2.6	3.20	55.03	2.6	6.06	43.74	2.6	31.15	34.45
3.5	55.59	10.65	3.6	58.74	23.56	3.6	3.27	55.25	3.6	6.33	44.04	3.6	31.27	34.61
4.5	55.65	10.89	4.6	58.88	23.79	4.6	3.35	55.47	4.6	6.59	44.36	4.6	31.39	34.78
5.5	55.71	11.14	5.6	59.03	24.03	5.6	3.44	55.69	5.6	6.84	44.69	5.6	31.50	34.95
6.5	55.77	11.39	6.6	59.18	24.27	6.6	3.52	55.90	6.6	7.07	45.03	6.6	31.63	35.11
7.5	55.83	11.66	7.6	59.35	24.50	7.6	3.61	56.11	7.6	7.28	45.38	7.6	31.75	35.27
8.5	55.91	11.91	8.5	59.52	24.76	8.6	3.70	56.34	8.6	7.47	45.73	8.6	31.88	35.44
9.5	55.98	12.19	9.5	59.69	25.02	9.6	3.79	56.57	9.6	7.65	46.07	9.6	32.02	35.61
10.5	56.04	12.47	10.5	59.86	25.30	10.6	3.89	56.81	10.6	7.82	46.41	10.6	32.16	35.80
11.5	56.09	12.78	11.5	60.00	25.58	11.6	3.97	57.08	11.6	7.97	46.74	11.6	32.29	36.00
12.5	56.14	13.09	12.5	60.14	25.91	12.6	4.04	57.37	12.6	8.13	47.06	12.6	32.41	36.23
13.5	56.17	13.41	13.5	60.24	26.23	13.5	4.09	57.67	13.6	8.30	47.37	13.6	32.51	36.47
14.5	56.18	13.72	14.5	60.33	26.54	14.5	4.15	57.96	14.6	8.48	47.67	14.6	32.61	36.72
15.5	56.19	14.02	15.5	60.38	26.82	15.5	4.20	58.25	15.6	8.67	47.98	15.6	32.70	36.97
16.5	56.19	14.30	16.5	60.44	27.10	16.5	4.24	58.53	16.6	8.90	48.31	16.6	32.79	37.21
17.5	56.19	14.57	17.5	60.49	27.37	17.5	4.27	58.77	17.6	9.12	48.68	17.6	32.87	37.44
18.5	56.22	14.81	18.5	60.54	27.62	18.5	4.31	59.01	18.6	9.32	49.05	18.6	32.95	37.64
19.5	56.25	15.05	19.5	60.62	27.86	19.5	4.36	59.25	19.6	9.51	49.44	19.6	33.03	37.84
20.5	56.27	15.32	20.5	60.71	28.12	20.5	4.42	59.49	20.6	9.66	49.83	20.6	33.13	38.03
21.5	56.30	15.59	21.5	60.82	28.38	21.5	4.49	59.73	21.6	9.77	50.22	21.6	33.23	38.24
22.5	56.33	15.87	22.5	60.93	28.66	22.5	4.55	60.00	22.6	9.87	50.60	22.6	33.35	38.46
23.5	56.35	16.17	23.5	61.02	28.97	23.5	4.61	60.28	23.6	9.95	50.97	23.6	33.46	38.70
24.5	56.36	16.49	24.5	61.08	29.29	24.5	4.66	60.59	24.6	10.03	51.31	24.6	33.56	38.97
25.5	56.36	16.83	25.5	61.13	29.63	25.5	4.70	60.92	25.6	10.12	51.64	25.6	33.65	39.24
26.5	56.33	17.17	26.5	61.14	29.96	26.5	4.73	61.24	26.5	10.22	51.98	26.6	33.73	39.53
27.5	56.30	17.50	27.5	61.16	30.29	27.5	4.74	61.56	27.5	10.33	52.30	27.6	33.79	39.83
28.5	56.27	17.79	28.5	61.14	30.62	28.5	4.74	61.87	28.5	10.46	52.63	28.6	33.85	40.13
29.5	56.23	18.08	29.5	61.11	30.94	29.5	4.75	62.16	29.5	10.60	53.00	29.6	33.90	40.42
30.5	56.19	18.36	30.5	61.08	31.25	30.5	4.75	62.45	30.5	10.73	53.35	30.6	33.94	40.70
31.5	56.15	18.63	31.5	61.05	31.54	31.5	4.76	62.73	31.5	10.86	53.72	31.5	33.99	40.98
32.5	56.12	18.90	32.5	61.03	31.83	32.5	4.76	63.00	32.5	10.96	54.10	32.5	34.04	41.25
8.31	-8.25		15.81	-15.78		7.01	-6.94		18.28	+18.25		7.62	-7.56	
21 ^h 38 ^m	38 ^s .548		22 ^h 16 ^m	33 ^s .212		22 ^h 37 ^m	51 ^s .624		23 ^h 27 ^m	43 ^s .571		23 ^h 47 ^m	23 ^s .637	
-83° 5'	34''.33		-86° 22'	50''.92		-81° 48'	24''.80		+86° 51'	38''.62		-82° 28'	8''.42	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Sept.	h m 0 57	° ' +85 49	Sept.	h m 1 32	° ' +88 52	Sept.	h m 1 41	° ' -85 10	Sept.	h m 4 10	° ' +85 20	Sept.	h m 5 36	° ' +85 9
	s "	"		s "	"		s "	"		s "	"		s "	"
0.6	49.64	30.73	0.6	38.31	23.05	0.6	57.91	14.42	0.7	57.62	15.64	0.8	4.40	14.77
1.6	49.85	31.06	1.6	39.24	23.33	1.6	58.08	14.62	1.7	57.95	15.70	1.8	4.71	14.69
2.6	50.05	31.40	2.6	40.13	23.64	2.6	58.26	14.81	2.7	58.28	15.79	2.8	5.03	14.62
3.6	50.24	31.75	3.6	40.97	23.96	3.6	58.43	14.99	3.7	58.61	15.88	3.8	5.35	14.56
4.6	50.42	32.11	4.6	41.77	24.28	4.6	58.61	15.18	4.7	58.94	15.98	4.8	5.67	14.52
5.6	50.57	32.47	5.6	42.52	24.61	5.6	58.80	15.37	5.7	59.25	16.11	5.8	5.99	14.51
6.6	50.72	32.82	6.6	43.19	24.94	6.6	59.00	15.57	6.7	59.54	16.24	6.8	6.29	14.49
7.6	50.86	33.16	7.6	43.84	25.27	7.6	59.20	15.78	7.7	59.84	16.37	7.8	6.58	14.49
8.6	50.99	33.50	8.6	44.48	25.58	8.6	59.38	16.01	8.7	60.12	16.48	8.8	6.87	14.48
9.6	51.12	33.82	9.6	45.11	25.87	9.6	59.59	16.25	9.7	60.40	16.59	9.8	7.15	14.45
10.6	51.25	34.13	10.6	45.79	26.15	10.6	59.74	16.52	10.7	60.67	16.68	10.8	7.42	14.41
11.6	51.40	34.44	11.6	46.51	26.43	11.6	59.89	16.80	11.7	60.95	16.77	11.8	7.70	14.37
12.6	51.58	34.76	12.6	47.29	26.72	12.6	60.02	17.07	12.7	61.26	16.86	12.8	7.98	14.32
13.6	51.75	35.09	13.6	48.10	27.03	13.6	60.14	17.34	13.7	61.57	16.94	13.8	8.31	14.27
14.6	51.93	35.47	14.6	48.92	27.36	14.6	60.26	17.60	14.7	61.90	17.04	14.8	8.63	14.23
15.6	52.10	35.84	15.6	49.72	27.72	15.6	60.37	17.84	15.7	62.24	17.16	15.7	8.97	14.20
16.6	52.25	36.25	16.6	50.45	28.10	16.6	60.50	18.07	16.7	62.57	17.32	16.7	9.32	14.19
17.6	52.39	36.65	17.6	51.09	28.47	17.6	60.62	18.29	17.7	62.91	17.50	17.7	9.66	14.22
18.5	52.49	37.05	18.6	51.67	28.85	18.6	60.76	18.52	18.7	63.21	17.69	18.7	10.00	14.26
19.5	52.58	37.44	19.6	52.16	29.22	19.6	60.92	18.76	19.7	63.50	17.88	19.7	10.32	14.31
20.5	52.66	37.81	20.6	52.61	29.56	20.6	61.07	19.03	20.7	63.77	18.07	20.7	10.61	14.37
21.5	52.74	38.15	21.6	53.06	29.91	21.6	61.22	19.32	21.7	64.03	18.25	21.7	10.88	14.42
22.5	52.81	38.48	22.6	53.52	30.23	22.6	61.35	19.62	22.7	64.29	18.40	22.7	11.16	14.46
23.5	52.89	38.81	23.6	54.02	30.55	23.6	61.46	19.93	23.7	64.54	18.56	23.7	11.44	14.48
24.5	52.99	39.16	24.6	54.56	30.87	24.6	61.56	20.26	24.7	64.80	18.70	24.7	11.71	14.50
25.5	53.09	39.49	25.6	55.12	31.19	25.6	61.65	20.58	25.7	65.08	18.84	25.7	12.00	14.50
26.5	53.20	39.85	26.6	55.72	31.51	26.6	61.73	20.92	26.7	65.36	18.97	26.7	12.29	14.50
27.5	53.32	40.22	27.5	56.29	31.85	27.6	61.79	21.21	27.7	65.65	19.14	27.7	12.61	14.52
28.5	53.43	40.60	28.5	56.85	32.21	28.6	61.86	21.51	28.7	65.95	19.31	28.7	12.92	14.55
29.5	53.52	40.98	29.5	57.38	32.58	29.5	61.92	21.81	29.7	66.25	19.50	29.7	13.25	14.60
30.5	53.60	41.37	30.5	57.87	32.96	30.5	61.99	22.09	30.6	66.54	19.69	30.7	13.57	14.68
31.5	53.67	41.76	31.5	58.31	33.34	31.5	62.07	22.38	31.6	66.84	19.92	31.7	13.89	14.76
13.74	+13.71	50.90	+50.89	11.88	-11.84	12.30	+12.26	11.84	+11.79					
0 ^h 57 ^m	24°.633	1 ^h 31 ^m	11°.709	1 ^h 41 ^m	54°.846	4 ^h 10 ^m	37°.831	5 ^h 25 ^m	50°.330					
+85° 49'	24''.14	+88° 52'	20''.55	-85° 10'	45''.22	+85° 20'	28''.88	+85° 9'	34''.51					

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensae. Mag. 6.2			ζ Mensae. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelopard. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Sept.	h m 5 45	° ' " -84 49	Sept.	h m 6 46	° ' " -80 43	Sept.	h m 7 3	° ' " +87 10	Sept.	h m 7 14	° ' " +82 33	Sept.	h m 7 15	° ' " -86 54
	s	"		s	"		s	"		s	"		s	"
0.8	34.98	28.90	0.8	39.64	37.83	0.8	12.71	20.02	0.9	13.07	53.95	0.9	5.75	15.77
1.8	35.19	28.81	1.8	39.75	37.66	1.8	13.16	19.80	1.9	13.25	53.72	1.9	6.04	15.59
2.8	35.40	28.72	2.8	39.85	37.49	2.8	13.63	19.59	2.9	13.43	53.50	2.9	6.31	15.41
3.8	35.60	28.62	3.8	39.96	37.32	3.8	14.10	19.39	3.8	13.60	53.29	3.9	6.59	15.21
4.8	35.82	28.52	4.8	40.06	37.15	4.8	14.58	19.20	4.8	13.79	53.09	4.8	6.86	15.00
5.8	36.04	28.42	5.8	40.16	36.97	5.8	15.07	19.02	5.8	13.98	52.91	5.8	7.14	14.80
6.8	36.26	28.31	6.8	40.29	36.78	6.8	15.55	18.87	6.8	14.16	52.75	6.8	7.42	14.59
7.8	36.48	28.19	7.8	40.41	36.59	7.8	16.01	18.73	7.8	14.33	52.60	7.8	7.73	14.39
8.8	36.72	28.09	8.8	40.53	36.41	8.8	16.45	18.58	8.8	14.51	52.45	8.8	8.05	14.17
9.8	36.97	28.02	9.8	40.65	36.26	9.8	16.88	18.44	9.8	14.66	52.28	9.8	8.41	13.97
10.8	37.22	27.96	10.8	40.79	36.11	10.8	17.30	18.27	10.8	14.81	52.11	10.8	8.78	13.80
11.8	37.48	27.92	11.8	40.92	36.00	11.8	17.72	18.10	11.8	14.98	51.92	11.8	9.15	13.65
12.8	37.72	27.92	12.8	41.05	35.91	12.8	18.15	17.91	12.8	15.15	51.72	12.8	9.52	13.52
13.8	37.95	27.92	13.8	41.18	35.82	13.8	18.61	17.72	13.8	15.32	51.52	13.8	9.86	13.41
14.8	38.17	27.93	14.8	41.31	35.77	14.8	19.10	17.53	14.8	15.50	51.29	14.8	10.21	13.32
15.8	38.38	27.93	15.8	41.41	35.68	15.8	19.63	17.34	15.8	15.70	51.09	15.8	10.54	13.22
16.8	38.60	27.92	16.8	41.54	35.60	16.8	20.18	17.19	16.8	15.92	50.91	16.8	10.85	13.11
17.8	38.81	27.89	17.8	41.66	35.49	17.8	20.73	17.06	17.8	16.13	50.76	17.8	11.15	12.98
18.7	39.03	27.84	18.8	41.78	35.38	18.8	21.27	16.96	18.8	16.33	50.63	18.8	11.47	12.83
19.7	39.26	27.80	19.8	41.90	35.26	19.8	21.79	16.86	19.8	16.54	50.53	19.8	11.81	12.67
20.7	39.49	27.78	20.8	42.03	35.15	20.8	22.27	16.77	20.8	16.73	50.43	20.8	12.17	12.52
21.7	39.76	27.77	21.8	42.16	35.05	21.8	22.75	16.69	21.8	16.91	50.32	21.8	12.55	12.38
22.7	40.02	27.78	22.8	42.31	34.96	22.8	23.21	16.60	22.8	17.08	50.21	22.8	12.97	12.24
23.7	40.28	27.82	23.8	42.45	34.90	23.8	23.65	16.50	23.8	17.24	50.08	23.8	13.38	12.14
24.7	40.53	27.86	24.8	42.59	34.86	24.8	24.10	16.37	24.8	17.41	49.95	24.8	13.80	12.07
25.7	40.77	27.91	25.8	42.74	34.86	25.8	24.56	16.24	25.8	17.58	49.81	25.8	14.21	12.01
26.7	41.02	28.00	26.8	42.88	34.85	26.8	25.03	16.11	26.8	17.76	49.66	26.8	14.61	11.96
27.7	41.26	28.08	27.8	43.02	34.84	27.8	25.53	16.00	27.8	17.95	49.52	27.8	15.00	11.92
28.7	41.48	28.16	28.8	43.15	34.83	28.8	26.05	15.89	28.8	18.14	49.39	28.8	15.39	11.88
29.7	41.71	28.22	29.8	43.29	34.82	29.8	26.58	15.78	29.8	18.35	49.29	29.8	15.78	11.84
30.7	41.93	28.30	30.8	43.42	34.83	30.8	27.13	15.69	30.8	18.55	49.19	30.8	16.15	11.79
31.7	42.15	28.37	31.8	43.54	34.80	31.8	27.67	15.62	31.8	18.78	49.09	31.8	16.51	11.74
11.09	-11.04		6.21	-6.12		20.26	+20.24		7.73	+7.66		18.51	-18.49	
5 ^h 45 ^m	51 ^s .396		6 ^h 46 ^m	48 ^s .653		7 ^h 3 ^m	2 ^s .335		7 ^h 14 ^m	7 ^s .912		7 ^h 15 ^m	39 ^s .691	
-84° 49'	44'' .27		-80° 43'	46'' .14		+87° 10'	43'' .86		+82° 34'	17'' .32		-86° 54'	19'' .75	

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamæleontis. Mag. 5.2			80 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Sept.	h m 8 17	° ' " +88 52	Sept.	h m 9 8	° ' " -85 20	Sept.	h m 9 25	° ' " +81 40	Sept.	h m 9 36	° ' " -80 34	Sept.	h m 10 21	° ' " +82 57
	s "	"		s "	"		s "	"		s "	"		s "	"
0.9	41.97	13.22	0.9	21.52	37.17	0.9	37.79	48.31	0.9	11.27	52.40	0.9	14.81	58.66
1.9	42.78	12.91	1.9	21.62	36.91	1.9	37.86	47.95	1.9	11.31	52.12	1.9	14.85	58.27
2.9	43.64	12.60	2.9	21.72	36.64	2.9	37.94	47.61	2.9	11.34	51.84	2.9	14.88	57.88
3.9	44.53	12.31	3.9	21.81	36.38	3.9	38.02	47.26	3.9	11.38	51.56	3.9	14.93	57.50
4.9	45.47	12.03	4.9	21.89	36.10	4.9	38.12	46.91	4.9	11.41	51.28	4.9	14.99	57.12
5.9	46.42	11.76	5.9	21.98	35.79	5.9	38.22	46.57	5.9	11.45	50.97	5.9	15.05	56.75
6.9	47.39	11.50	6.9	22.06	35.48	6.9	38.31	46.25	6.9	11.48	50.65	6.9	15.12	56.39
7.9	48.32	11.25	7.9	22.16	35.19	7.9	38.40	45.94	7.9	11.52	50.34	7.9	15.18	56.05
8.9	49.21	11.00	8.9	22.28	34.89	8.9	38.49	45.65	8.9	11.56	50.03	8.9	15.24	55.72
9.9	50.05	10.76	9.9	22.41	34.58	9.9	38.56	45.35	9.9	11.60	49.71	9.9	15.29	55.38
10.9	50.85	10.51	10.9	22.55	34.28	10.9	38.62	45.05	10.9	11.66	49.40	10.9	15.34	55.05
11.9	51.65	10.24	11.9	22.72	33.99	11.9	38.70	44.74	11.9	11.73	49.13	11.9	15.38	54.71
12.9	52.48	9.97	12.9	22.89	33.75	12.9	38.78	44.41	12.9	11.80	48.83	12.9	15.41	54.36
13.9	53.36	9.68	13.9	23.05	33.53	13.9	38.86	44.05	13.9	11.87	48.58	13.9	15.45	53.97
14.9	54.32	9.39	14.9	23.23	33.33	14.9	38.95	43.69	14.9	11.95	48.33	14.9	15.51	53.55
15.9	55.37	9.10	15.9	23.37	33.11	15.9	39.05	43.33	15.9	12.03	48.10	15.9	15.59	53.15
16.9	56.48	8.82	16.9	23.51	32.87	16.9	39.18	42.99	16.9	12.09	47.88	16.9	15.68	52.76
17.9	57.62	8.57	17.9	23.65	32.66	17.9	39.30	42.64	17.9	12.15	47.63	17.9	15.77	52.38
18.9	58.78	8.33	18.9	23.78	32.41	18.9	39.43	42.33	18.9	12.21	47.36	18.9	15.86	51.99
19.9	59.91	8.12	19.9	23.92	32.15	19.9	39.56	42.04	19.9	12.26	47.08	19.9	15.97	51.67
20.8	60.96	7.92	20.9	24.07	31.88	20.9	39.67	41.76	20.9	12.33	46.80	20.9	16.08	51.34
21.8	61.96	7.72	21.9	24.25	31.61	21.9	39.78	41.49	21.9	12.39	46.50	21.9	16.16	51.03
22.8	62.93	7.51	22.9	24.44	31.35	22.9	39.88	41.22	22.9	12.48	46.22	22.9	16.23	50.70
23.8	63.87	7.30	23.9	24.63	31.10	23.9	39.97	40.95	23.9	12.57	45.94	23.9	16.31	50.38
24.8	64.80	7.08	24.9	24.85	30.86	24.9	40.06	40.67	24.9	12.66	45.68	24.9	16.37	50.05
25.8	65.76	6.86	25.9	25.07	30.66	25.9	40.16	40.34	25.9	12.76	45.44	25.9	16.44	49.72
26.8	66.76	6.64	26.9	25.30	30.46	26.9	40.26	40.05	26.9	12.86	45.22	26.9	16.52	49.38
27.8	67.80	6.41	27.9	25.52	30.27	27.9	40.37	39.73	27.9	12.96	45.02	27.9	16.61	49.01
28.8	68.89	6.18	28.9	25.72	30.10	28.9	40.50	39.42	28.9	13.06	44.81	28.9	16.70	48.65
29.8	70.03	5.96	29.9	25.93	29.91	29.9	40.62	39.12	29.9	13.17	44.61	29.9	16.80	48.29
30.8	71.21	5.76	30.9	26.13	29.74	30.9	40.75	38.83	30.9	13.26	44.42	30.9	16.91	47.93
31.8	72.42	5.56	31.9	26.33	29.57	31.9	40.89	38.54	31.9	13.35	44.22	31.9	17.04	47.59
50.67	+50.66	12.32	-12.28	6.91	+6.84	6.11	-6.03	8.16	+8.10					
8 ^h 17 ^m	47 ^s .546	9 ^h 8 ^m	41 ^s .594	9 ^h 25 ^m	39 ^s .275	9 ^h 36 ^m	19 ^s .026	10 ^h 21 ^m	19 ^s .949					
+88° 52'	37'''.80	-85° 20'	26'''.78	+81° 41'	10'''.13	-80° 34'	39'''.26	+82° 58'	17'''.67					

APPARENT PLACES OF STARS, 1919.

291

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3			Bradley 1678. Mag. 6.3			ϵ Octantis. Mag. 5.4			32 H. Camelopard. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Sept.	h m ° ' "		Sept.	h m ° ' "		Sept.	h m ° ' "		Sept.	h m ° ' "		Sept.	h m ° ' "	
	10 59 -84 9			12 13 +88 8			12 46 -84 41			12 48 +83 50			13 27 -85 22	
1.0	44.63 51.37	1.1	45.69 45.86	1.1	16.82 30.02	1.1	19.47 64.92	1.1	34.14 48.87					
2.0	44.62 51.08	2.1	45.39 45.49	2.1	16.72 29.78	2.1	19.36 64.59	2.1	33.99 48.66					
3.0	44.61 50.80	3.1	45.11 45.12	3.1	16.61 29.53	3.1	19.26 64.25	3.1	33.84 48.45					
4.0	44.59 50.51	4.1	44.88 44.75	4.1	16.51 29.29	4.1	19.15 63.89	4.1	33.67 48.25					
5.0	44.56 50.21	5.1	44.68 44.38	5.1	16.39 29.05	5.1	19.06 63.53	5.1	33.50 48.03					
6.0	44.53 49.91	6.1	44.52 44.01	6.1	16.26 28.80	6.1	18.97 63.20	6.1	33.33 47.81					
6.9	44.52 49.61	7.0	44.37 43.63	7.1	16.14 28.54	7.1	18.91 62.86	7.1	33.15 47.59					
7.9	44.50 49.29	8.0	44.23 43.27	8.1	16.01 28.26	8.1	18.84 62.51	8.1	32.97 47.35					
8.9	44.49 48.96	9.0	44.09 42.93	9.1	15.90 27.97	9.1	18.76 62.19	9.1	32.79 47.08					
9.9	44.49 48.60	10.0	43.92 42.59	10.1	15.79 27.65	10.1	18.68 61.86	10.1	32.61 46.81					
10.9	44.50 48.26	11.0	43.74 42.26	11.1	15.69 27.34	11.1	18.59 61.55	11.1	32.47 46.53					
11.9	44.53 47.93	12.0	43.51 41.92	12.1	15.63 27.03	12.1	18.49 61.23	12.1	32.34 46.24					
12.9	44.57 47.61	13.0	43.26 41.55	13.1	15.57 26.72	13.1	18.39 60.90	13.1	32.23 45.96					
13.9	44.62 47.31	14.0	43.01 41.17	14.1	15.52 26.43	14.1	18.28 60.53	14.1	32.14 45.67					
14.9	44.68 47.04	15.0	42.80 40.77	15.0	15.49 26.16	15.1	18.19 60.17	15.1	32.06 45.42					
15.9	44.72 46.77	16.0	42.62 40.35	16.0	15.45 25.90	16.0	18.11 59.78	16.1	31.97 45.18					
16.9	44.76 46.50	17.0	42.50 39.92	17.0	15.39 25.63	17.0	18.05 59.37	17.1	31.87 44.95					
17.9	44.79 46.22	18.0	42.44 39.51	18.0	15.32 25.36	18.0	17.99 58.96	18.1	31.74 44.71					
18.9	44.81 45.94	19.0	42.40 39.12	19.0	15.26 25.09	19.0	17.94 58.58	19.1	31.62 44.46					
19.9	44.84 45.62	20.0	42.40 38.73	20.0	15.18 24.81	20.0	17.91 58.20	20.1	31.49 44.19					
20.9	44.87 45.30	21.0	42.40 38.37	21.0	15.10 24.49	21.0	17.88 57.84	21.1	31.36 43.92					
21.9	44.90 44.96	22.0	42.36 38.02	22.0	15.03 24.17	22.0	17.83 57.50	22.1	31.23 43.60					
22.9	44.95 44.62	23.0	42.31 37.68	23.0	14.97 23.84	23.0	17.79 57.17	23.1	31.12 43.28					
23.9	45.01 44.28	24.0	42.24 37.34	24.0	14.93 23.49	24.0	17.73 56.84	24.1	31.02 42.96					
24.9	45.10 43.96	24.9	42.15 36.98	25.0	14.92 23.14	25.0	17.68 56.50	25.1	30.94 42.64					
25.9	45.19 43.67	25.9	42.05 36.61	26.0	14.90 22.80	26.0	17.61 56.15	26.0	30.88 42.31					
26.9	45.29 43.38	26.9	41.96 36.24	27.0	14.90 22.48	27.0	17.55 55.78	27.0	30.83 41.98					
27.9	45.39 43.09	27.9	41.89 35.86	28.0	14.91 22.16	28.0	17.49 55.40	28.0	30.79 41.67					
28.9	45.49 42.81	28.9	41.83 35.47	29.0	14.91 21.86	29.0	17.45 55.02	29.0	30.75 41.38					
29.9	45.58 42.54	29.9	41.82 35.06	30.0	14.91 21.57	30.0	17.41 54.64	30.0	30.71 41.08					
30.9	45.67 42.28	30.9	41.82 34.65	31.0	14.92 21.27	31.0	17.39 54.23	31.0	30.67 40.80					
31.9	45.75 42.02	31.9	41.87 34.25	32.0	14.92 20.98	32.0	17.38 53.81	32.0	30.63 40.53					
9.83	-9.78	30.89	+30.87	10.81	-10.76	9.34	+9.28	12.41	-12.37					
10 ^h 59 ^m	54°.546	12 ^h 14 ^m	29°.190	12 ^h 46 ^m	19°.119	12 ^h 48 ^m	31°.308	13 ^h 27 ^m	32°.891					
-84° 9'	29".33	+88° 8'	56".19	-84° 41'	1".57	+83° 51'	11".30	-85° 22'	19".48					

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2233. Mag. 7.2			ρ Octantis. Mag. 5.7			ϵ Urae Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
Sept.	h m	° ' "	Sept.	h m	° ' "	Sept.	h m	° ' "	Sept.	h m	° ' "	Sept.	h m	° ' "
	14 13	-83 18		15 2	+87 32		15 24	-84 12		16 54	+82 10		17 16	-80 47
	s	"		s	"		s	"		s	"		s	"
1.1	51.56	23.35	1.2	28.39	50.24	1.2	34.84	21.71	1.3	7.41	39.83	1.3	30.17	30.80
2.1	51.44	23.18	2.2	27.84	50.06	2.2	34.67	21.63	2.3	7.22	39.84	2.3	30.06	30.84
3.1	51.32	23.03	3.2	27.31	49.87	3.2	34.51	21.54	3.3	7.04	39.84	3.3	29.96	30.80
4.1	51.19	22.87	4.2	26.78	49.67	4.2	34.33	21.46	4.3	6.85	39.83	4.3	29.86	30.86
5.1	51.05	22.71	5.2	26.27	49.45	5.2	34.15	21.37	5.2	6.66	39.80	5.3	29.74	31.00
6.1	50.91	22.54	6.2	25.79	49.23	6.2	33.97	21.28	6.2	6.48	39.76	6.3	29.63	31.06
7.1	50.77	22.36	7.2	25.32	49.00	7.2	33.77	21.19	7.2	6.30	39.70	7.3	29.50	31.13
8.1	50.62	22.18	8.2	24.87	48.77	8.2	33.57	21.10	8.2	6.13	39.65	8.3	29.37	31.20
9.1	50.47	21.96	9.2	24.43	48.57	9.2	33.37	20.97	9.2	5.96	39.61	9.3	29.23	31.23
10.1	50.32	21.73	10.2	23.98	48.37	10.2	33.16	20.83	10.2	5.80	39.58	10.3	29.09	31.25
11.1	50.18	21.48	11.2	23.52	48.20	11.2	32.96	20.66	11.2	5.63	39.55	11.2	28.94	31.25
12.1	50.07	21.22	12.2	23.03	48.02	12.2	32.77	20.48	12.2	5.46	39.54	12.2	28.81	31.21
13.1	49.96	20.97	13.1	22.52	47.84	13.2	32.61	20.30	13.2	5.28	39.53	13.2	28.67	31.16
14.1	49.87	20.74	14.1	21.99	47.63	14.2	32.46	20.13	14.2	5.09	39.51	14.2	28.57	31.11
15.1	49.79	20.50	15.1	21.45	47.40	15.2	32.33	19.95	15.2	4.89	39.48	15.2	28.46	31.07
16.1	49.71	20.29	16.1	20.93	47.16	16.2	32.19	19.80	16.2	4.70	39.44	16.2	28.37	31.03
17.1	49.62	20.09	17.1	20.44	46.89	17.2	32.05	19.66	17.2	4.51	39.35	17.2	28.26	31.02
18.1	49.52	19.89	18.1	19.97	46.60	18.2	31.90	19.53	18.2	4.32	39.25	18.2	28.16	31.03
19.1	49.39	19.67	19.1	19.54	46.32	19.1	31.72	19.39	19.2	4.14	39.12	19.2	28.03	31.03
20.1	49.27	19.44	20.1	19.14	46.04	20.1	31.54	19.24	20.2	3.97	39.00	20.2	27.90	31.02
21.1	49.15	19.20	21.1	18.76	45.76	21.1	31.36	19.06	21.2	3.80	38.89	21.2	27.77	31.01
22.1	49.02	18.92	22.1	18.37	45.51	22.1	31.17	18.88	22.2	3.63	38.78	22.2	27.63	30.97
23.1	48.92	18.63	23.1	17.99	45.27	23.1	30.98	18.65	23.2	3.47	38.69	23.2	27.49	30.89
24.1	48.82	18.34	24.1	17.57	45.04	24.1	30.81	18.41	24.2	3.30	38.60	24.2	27.35	30.81
25.1	48.73	18.04	25.1	17.15	44.82	25.1	30.66	18.16	25.2	3.14	38.52	25.2	27.20	30.71
26.1	48.64	17.74	26.1	16.72	44.58	26.1	30.51	17.92	26.2	2.96	38.45	26.2	27.07	30.60
27.1	48.58	17.44	27.1	16.29	44.33	27.1	30.37	17.67	27.2	2.79	38.37	27.2	26.96	30.49
28.1	48.52	17.14	28.1	15.83	44.06	28.1	30.24	17.43	28.2	2.62	38.28	28.2	26.85	30.38
29.1	48.45	16.86	29.1	15.40	43.79	29.1	30.12	17.20	29.2	2.44	38.18	29.2	26.74	30.25
30.1	48.40	16.59	30.1	14.97	43.51	30.1	30.01	16.97	30.2	2.25	38.04	30.2	26.63	30.14
31.1	48.34	16.33	31.1	14.56	43.20	31.1	29.90	16.77	31.2	2.07	37.90	31.2	26.52	30.04
32.1	48.28	16.07	32.1	14.18	42.88	32.1	29.77	16.56	32.2	1.90	37.73	32.2	26.41	29.94
8.58 -8.52			23.36 +23.34			9.90 -9.85			7.35 +7.28			6.25 -6.17		
14 ^h 13 ^m 46 ^s .350			15 ^h 3 ^m 2 ^s .510			15 ^h 24 ^m 23 ^s .351			16 ^h 54 ^m 12 ^s .991			17 ^h 16 ^m 17 ^s .234		
-83° 17' 54".52			+87° 32' 42".66			-84° 11' 55".43			+82° 10' 21".42			-80° 47' 14".27		

APPARENT PLACES OF STARS, 1919.

293

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.
h m	° '		h m	° '		h m	° '		h m	° '		h m	° '	
17 57	+86 37	Sept.	18 7	-87 40	Sept.	18 59	+89 1	Sept.	19 32	-89 19	Sept.	20 48	+82 14	
1.3	71.56	13.29	1.3	71.25	2.83	1.3	54.59	37.21	1.4	80.90	14.71	1.4	38.03	22.12
1.3	71.14	13.41	2.3	70.83	2.94	2.3	53.29	37.43	2.4	79.91	14.92	2.4	37.94	22.46
1.3	70.72	13.51	3.3	70.41	3.05	3.3	51.96	37.63	3.4	78.96	15.13	3.4	37.85	22.80
1.3	70.28	13.61	4.3	70.00	3.16	4.3	50.58	37.81	4.4	78.01	15.35	4.4	37.74	23.13
1.3	69.85	13.68	5.3	69.57	3.29	5.3	49.19	37.99	5.4	77.04	15.57	5.4	37.64	23.45
1.3	69.43	13.73	6.3	69.12	3.42	6.3	47.81	38.18	6.4	76.04	15.79	6.4	37.53	23.75
1.3	69.01	13.77	7.3	68.66	3.56	7.3	46.45	38.27	7.4	74.95	16.02	7.4	37.42	24.04
1.3	68.62	13.81	8.3	68.17	3.69	8.3	45.14	38.41	8.3	73.78	16.26	8.4	37.30	24.31
1.3	68.23	13.87	9.3	67.65	3.79	9.3	43.88	38.56	9.3	72.52	16.49	9.4	37.19	24.59
1.3	67.84	13.95	10.3	67.10	3.88	10.3	42.66	38.73	10.3	71.18	16.68	10.4	37.09	24.88
1.3	67.45	14.03	11.3	66.55	3.94	11.3	41.44	38.90	11.3	69.78	16.86	11.4	36.99	25.17
1.3	67.05	14.11	12.3	66.03	4.00	12.3	40.19	39.07	12.3	68.38	17.02	12.4	36.89	25.49
1.3	66.64	14.21	13.3	65.52	4.03	13.3	38.89	39.27	13.3	67.01	17.15	13.4	36.79	25.81
1.3	66.21	14.30	14.3	65.05	4.04	14.3	37.51	39.46	14.3	65.72	17.27	14.4	36.68	26.14
1.3	65.75	14.39	15.3	64.61	4.07	15.3	36.04	39.64	15.3	64.50	17.39	15.4	36.58	26.47
1.3	65.29	14.44	16.3	64.18	4.10	16.3	34.51	39.79	16.3	63.36	17.52	16.4	36.45	26.79
1.3	64.82	14.45	17.3	63.76	4.15	17.3	32.96	39.93	17.3	62.24	17.67	17.4	36.32	27.09
1.3	64.36	14.46	18.3	63.31	4.21	18.3	31.40	40.04	18.3	61.09	17.84	18.4	36.18	27.38
1.3	63.93	14.45	19.3	62.84	4.30	19.3	29.87	40.14	19.3	59.88	18.01	19.4	36.03	27.63
1.3	63.50	14.44	20.3	62.33	4.37	20.3	28.43	40.22	20.3	58.57	18.17	20.4	35.90	27.87
1.2	63.08	14.42	21.3	61.78	4.43	21.3	27.04	40.30	21.3	57.15	18.34	21.4	35.76	28.11
1.2	62.70	14.41	22.3	61.22	4.45	22.3	25.71	40.37	22.3	55.83	18.49	22.4	35.63	28.33
1.2	62.29	14.42	23.3	60.65	4.46	23.3	24.39	40.47	23.3	54.04	18.63	23.4	35.51	28.56
1.2	61.89	14.43	24.2	60.08	4.45	24.3	23.08	40.58	24.3	52.42	18.74	24.4	35.38	28.81
1.2	61.49	14.45	25.2	59.51	4.41	25.3	21.74	40.70	25.3	50.81	18.84	25.4	35.26	29.08
1.2	61.08	14.47	26.2	58.97	4.37	26.3	20.38	40.81	26.3	49.21	18.91	26.4	35.14	29.34
1.2	60.66	14.48	27.2	58.45	4.32	27.3	18.96	40.93	27.3	47.66	18.97	27.4	35.01	29.61
1.2	60.23	14.49	28.2	57.95	4.26	28.3	17.51	41.05	28.3	46.16	19.04	28.3	34.89	29.88
1.2	59.78	14.49	29.2	57.46	4.22	29.3	16.01	41.15	29.3	44.71	19.12	29.3	34.75	30.13
1.2	59.33	14.48	30.2	56.98	4.19	30.3	14.46	41.24	30.3	43.29	19.20	30.3	34.61	30.38
1.2	58.89	14.44	31.2	56.51	4.15	31.3	12.91	41.33	31.3	41.89	19.28	31.3	34.45	30.62
1.2	58.44	14.39	32.2	56.04	4.11	32.3	11.33	41.38	32.3	40.50	19.35	32.3	34.29	30.85
16.96	+16.94		24.57	-24.55		58.93	+58.92		73.60	-73.59		7.41	+7.34	
17 ^h 58 ^m 22 ^s .311			18 ^h 7 ^m 23 ^s .343			19 ^h 0 ^m 15 ^s .079			19 ^h 30 ^m 50 ^s .769			20 ^h 48 ^m 32 ^s .146		
86° 36' 51".04			-87° 39' 50".89			+89° 1' 12".80			-89° 13' 13".35			+82° 13' 58".82		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Sept.	h m 21 38	° ' " -83 5	Sept.	h m 22 16	° ' " -86 22	Sept.	h m 22 38	° ' " -81 48	Sept.	h m 23 28	° ' " +86 51	Sept.	h m 23 47	° ' " -82 27
1.5	56.12	18.90	1.5	61.03	31.83	1.5	4.76	3.00	1.5	10.96	54.10	1.5	34.04	41.25
2.5	56.09	19.18	2.5	61.02	32.10	2.5	4.77	3.28	2.5	11.06	54.50	2.5	34.10	41.52
3.5	56.06	19.45	3.5	61.01	32.38	3.5	4.78	3.55	3.5	11.12	54.91	3.5	34.15	41.78
4.4	56.03	19.71	4.5	61.01	32.66	4.5	4.80	3.83	4.5	11.17	55.31	4.5	34.21	42.03
5.4	56.02	19.99	5.5	61.01	32.94	5.5	4.82	4.12	5.5	11.20	55.69	5.5	34.27	42.30
6.4	55.99	20.30	6.5	61.01	33.26	6.5	4.84	4.43	6.5	11.21	56.08	6.5	34.34	42.57
7.4	55.96	20.61	7.5	61.01	33.57	7.5	4.85	4.74	7.5	11.22	56.47	7.5	34.40	42.87
8.4	55.92	20.93	8.5	60.97	33.89	8.5	4.85	5.06	8.5	11.22	56.84	8.5	34.45	43.18
9.4	55.87	21.25	9.5	60.93	34.22	9.5	4.85	5.39	9.5	11.23	57.18	9.5	34.50	43.51
10.4	55.79	21.57	10.5	60.85	34.56	10.5	4.83	5.72	10.5	11.26	57.52	10.5	34.54	43.83
11.4	55.71	21.85	11.5	60.75	34.88	11.5	4.80	6.04	11.5	11.30	57.88	11.5	34.55	44.16
12.4	55.62	22.13	12.5	60.62	35.17	12.5	4.76	6.36	12.5	11.35	58.24	12.5	34.56	44.48
13.4	55.53	22.38	13.4	60.49	35.46	13.5	4.72	6.64	13.5	11.41	58.62	13.5	34.56	44.78
14.4	55.45	22.63	14.4	60.38	35.73	14.5	4.68	6.92	14.5	11.46	59.03	14.5	34.56	45.07
15.4	55.38	22.87	15.4	60.28	35.97	15.5	4.65	7.18	15.5	11.50	59.46	15.5	34.57	45.34
16.4	55.32	23.09	16.4	60.19	36.21	16.5	4.63	7.43	16.5	11.50	59.89	16.5	34.59	45.61
17.4	55.26	23.33	17.4	60.11	36.48	17.5	4.62	7.69	17.5	11.47	60.32	17.5	34.62	45.88
18.4	55.21	23.60	18.4	60.06	36.77	18.5	4.61	7.97	18.5	11.42	60.74	18.5	34.65	46.16
19.4	55.16	23.87	19.4	59.98	37.08	19.4	4.59	8.27	19.5	11.35	61.12	19.5	34.68	46.45
20.4	55.08	24.14	20.4	59.89	37.39	20.4	4.56	8.58	20.5	11.27	61.49	20.5	34.70	46.77
21.4	55.00	24.43	21.4	59.77	37.72	21.4	4.52	8.89	21.5	11.19	61.85	21.5	34.71	47.10
22.4	54.89	24.73	22.4	59.63	38.04	22.4	4.48	9.22	22.5	11.14	62.19	22.5	34.72	47.44
23.4	54.76	25.01	23.4	59.47	38.34	23.4	4.42	9.55	23.5	11.09	62.53	23.5	34.70	47.79
24.4	54.64	25.29	24.4	59.29	38.63	24.4	4.35	9.86	24.5	11.05	62.89	24.5	34.67	48.13
25.4	54.52	25.53	25.4	59.10	38.91	25.4	4.29	10.16	25.5	11.02	63.25	25.5	34.64	48.47
26.4	54.40	25.77	26.4	58.90	39.18	26.4	4.20	10.45	26.5	10.99	63.62	26.5	34.60	48.79
27.4	54.27	25.99	27.4	58.69	39.44	27.4	4.12	10.72	27.5	10.95	63.99	27.5	34.57	49.11
28.4	54.16	26.21	28.4	58.50	39.68	28.4	4.06	10.99	28.5	10.92	64.40	28.5	34.54	49.40
29.4	54.05	26.43	29.4	58.32	39.93	29.4	4.00	11.25	29.5	10.85	64.79	29.5	34.51	49.69
30.4	53.94	26.64	30.4	58.14	40.18	30.4	3.93	11.50	30.5	10.77	65.18	30.5	34.49	49.98
31.4	53.83	26.85	31.4	57.97	40.42	31.4	3.87	11.76	31.5	10.67	65.57	31.5	34.46	50.27
32.4	53.72	27.07	32.4	57.80	40.67	32.4	3.81	12.02	32.4	10.54	65.96	32.5	34.44	50.56
8.31	-8.25		15.82	-15.79		7.01	-6.94		18.29	+18.27		7.62	-7.56	
21 ^h 38 ^m	38° 54' 8"		22 ^h 16 ^m	33° 21' 2"		22 ^h 37 ^m	51° 6' 24"		23 ^h 27 ^m	43° 5' 71"		23 ^h 47 ^m	23° 6' 37"	
-83° 5'	34'' 33		-86° 22'	50'' 92		-81° 48'	24'' 80		+86° 51'	38'' 62		-82° 28'	8'' 42	

APPARENT PLACES OF STARS, 1919.

295

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursa Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Oct.	h m	s	Oct.	h m	s	Oct.	h m	s	Oct.	h m	s	Oct.	h m	s
	0 57	+85 49		1 32	+88 52		1 42	-85 10		4 11	+85 20		5 36	+85 9
0.5	53.60	41.37	0.5	57.87	32.96	0.5	1.99	22.09	0.6	6.54	19.69	0.7	13.57	14.68
1.5	53.67	41.76	1.5	58.31	33.34	1.5	2.07	22.38	1.6	6.84	19.92	1.7	13.89	14.76
2.5	53.73	42.16	2.5	58.69	33.73	2.5	2.15	22.66	2.6	7.12	20.14	2.7	14.21	14.85
3.5	53.77	42.55	3.5	59.02	34.11	3.5	2.24	22.95	3.6	7.39	20.39	3.7	14.52	14.96
4.5	53.80	42.94	4.5	59.29	34.50	4.5	2.32	23.24	4.6	7.63	20.63	4.7	14.81	15.09
5.5	53.81	43.31	5.5	59.52	34.88	5.5	2.40	23.55	5.6	7.87	20.87	5.7	15.10	15.20
6.5	53.82	43.69	6.5	59.76	35.24	6.5	2.46	23.88	6.6	8.11	21.10	6.7	15.37	15.31
7.5	53.85	44.03	7.5	60.01	35.58	7.5	2.53	24.22	7.6	8.34	21.29	7.7	15.64	15.41
8.5	53.88	44.38	8.5	60.31	35.92	8.5	2.57	24.57	8.6	8.57	21.50	8.7	15.92	15.50
9.5	53.92	44.72	9.5	60.66	36.25	9.5	2.58	24.91	9.6	8.82	21.70	9.7	16.19	15.56
10.5	53.98	45.09	10.5	61.04	36.60	10.5	2.59	25.25	10.6	9.08	21.90	10.7	16.47	15.62
11.5	54.04	45.46	11.5	61.46	36.97	11.5	2.58	25.59	11.6	9.36	22.12	11.7	16.80	15.70
12.5	54.10	45.86	12.5	61.85	37.35	12.5	2.57	25.90	12.6	9.64	22.35	12.7	17.12	15.79
13.5	54.14	46.27	13.5	62.19	37.76	13.5	2.57	26.19	13.6	9.93	22.58	13.7	17.45	15.91
14.5	54.16	46.70	14.5	62.46	38.18	14.5	2.57	26.47	14.6	10.21	22.85	14.7	17.77	16.05
15.5	54.17	47.12	15.5	62.63	38.61	15.5	2.59	26.75	15.6	10.46	23.14	15.7	18.09	16.23
16.5	54.14	47.53	16.5	62.73	39.01	16.5	2.62	27.04	16.6	10.70	23.44	16.7	18.39	16.39
17.5	54.09	47.91	17.5	62.76	39.39	17.5	2.65	27.35	17.6	10.91	23.73	17.7	18.67	16.56
18.5	54.04	48.29	18.5	62.76	39.77	18.5	2.66	27.67	18.6	11.11	24.01	18.7	18.92	16.73
19.5	54.00	48.63	19.5	62.77	40.14	19.5	2.67	28.01	19.6	11.31	24.28	19.7	19.17	16.87
20.5	53.96	48.96	20.5	62.81	40.48	20.5	2.66	28.37	20.6	11.50	24.53	20.7	19.41	17.05
21.5	53.94	49.29	21.5	62.90	40.82	21.5	2.63	28.74	21.6	11.69	24.78	21.7	19.65	17.20
22.5	53.93	49.62	22.5	63.00	41.17	22.5	2.60	29.11	22.6	11.89	25.00	22.6	19.91	17.34
23.5	53.92	49.98	23.5	63.14	41.53	23.5	2.56	29.45	23.6	12.09	25.23	23.6	20.17	17.46
24.5	53.91	50.32	24.5	63.27	41.89	24.5	2.49	29.80	24.6	12.32	25.49	24.6	20.44	17.60
25.4	53.88	50.69	25.5	63.37	42.25	25.5	2.43	30.13	25.6	12.53	25.76	25.6	20.72	17.74
26.4	53.85	51.06	26.5	63.47	42.62	26.5	2.36	30.45	26.6	12.75	26.03	26.6	20.99	17.92
27.4	53.82	51.44	27.5	63.52	43.00	27.5	2.30	30.77	27.6	12.97	26.31	27.6	21.27	18.09
28.4	53.78	51.82	28.5	63.50	43.39	28.5	2.24	31.06	28.6	13.19	26.62	28.6	21.55	18.27
29.4	53.72	52.21	29.5	63.44	43.80	29.5	2.19	31.36	29.6	13.39	26.93	29.6	21.83	18.47
30.4	53.63	52.59	30.5	63.32	44.19	30.5	2.14	31.65	30.6	13.58	27.24	30.6	22.10	18.70
31.4	53.53	52.96	31.5	63.14	44.58	31.5	2.09	31.94	31.6	13.76	27.58	31.6	22.35	18.94
13.75	+13.72		51.04	+51.03		11.89	-11.84		12.31	+12.27		11.84	+11.80	
0 ^h 57 ^m	24 ^s .633		1 ^h 31 ^m	11 ^s .709		1 ^h 41 ^m	54 ^s .846		4 ^h 10 ^m	37 ^s .831		5 ^h 35 ^m	50 ^s .330	
+85° 49'	24'' .14		+88° 52'	20'' .55		-85° 10'	45'' .22		+85° 20'	28'' .86		+85° 9'	34'' .55	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensæ. Mag. 6.2			† Mensæ. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Oct.	h m s	° ' "	Oct.	h m s	° ' "	Oct.	h m s	° ' "	Oct.	h m s	° ' "	Oct.	h m s	° ' "
0.7	41.93	28.30	0.8	43.42	34.83	0.8	27.13	15.69	0.8	18.55	49.19	0.8	16.15	11.79
1.7	42.15	28.37	1.8	43.54	34.80	1.8	27.67	15.62	1.8	18.78	49.09	1.8	16.51	11.74
2.7	42.37	28.43	2.8	43.68	34.77	2.8	28.23	15.56	2.8	18.99	49.02	2.8	16.87	11.69
3.7	42.59	28.49	3.7	43.81	34.76	3.8	28.76	15.52	3.8	19.19	48.96	3.8	17.25	11.64
4.7	42.82	28.54	4.7	43.95	34.74	4.8	29.29	15.51	4.8	19.40	48.91	4.8	17.62	11.57
5.7	43.06	28.62	5.7	44.08	34.73	5.8	29.81	15.49	5.8	19.60	48.86	5.8	18.03	11.50
6.7	43.31	28.71	6.7	44.22	34.73	6.8	30.29	15.46	6.8	19.79	48.82	6.8	18.44	11.45
7.7	43.56	28.81	7.7	44.37	34.76	7.7	30.77	15.42	7.8	19.97	48.76	7.8	18.86	11.44
8.7	43.81	28.94	8.7	44.51	34.81	8.7	31.24	15.38	8.8	20.15	48.68	8.8	19.29	11.44
9.7	44.04	29.09	9.7	44.66	34.89	9.7	31.71	15.32	9.8	20.33	48.60	9.8	19.72	11.47
10.7	44.26	29.27	10.7	44.80	34.97	10.7	32.21	15.23	10.7	20.52	48.52	10.8	20.15	11.51
11.7	44.47	29.45	11.7	44.94	35.08	11.7	32.75	15.17	11.7	20.72	48.42	11.7	20.56	11.56
12.7	44.67	29.62	12.7	45.08	35.18	12.7	33.30	15.11	12.7	20.94	48.33	12.7	20.94	11.62
13.7	44.85	29.77	13.7	45.19	35.27	13.7	33.87	15.07	13.7	21.17	48.28	13.7	21.31	11.68
14.7	45.05	29.92	14.7	45.31	35.36	14.7	34.47	15.06	14.7	21.40	48.23	14.7	21.66	11.72
15.7	45.24	30.06	15.7	45.44	35.42	15.7	35.04	15.06	15.7	21.63	48.22	15.7	22.02	11.74
16.7	45.44	30.19	16.7	45.56	35.47	16.7	35.61	15.09	16.7	21.84	48.23	16.7	22.38	11.75
17.7	45.66	30.32	17.7	45.70	35.53	17.7	36.13	15.13	17.7	22.05	48.25	17.7	22.76	11.76
18.7	45.88	30.46	18.7	45.83	35.60	18.7	36.62	15.17	18.7	22.25	48.27	18.7	23.17	11.79
19.7	46.11	30.63	19.7	45.97	35.69	19.7	37.10	15.21	19.7	22.43	48.28	19.7	23.59	11.82
20.7	46.33	30.81	20.7	46.12	35.81	20.7	37.57	15.24	20.7	22.61	48.28	20.7	24.03	11.88
21.7	46.55	31.03	21.7	46.26	35.94	21.7	38.02	15.25	21.7	22.78	48.28	21.7	24.47	11.97
22.7	46.77	31.25	22.7	46.40	36.08	22.7	38.49	15.26	22.7	22.96	48.27	22.7	24.89	12.07
23.7	46.97	31.48	23.7	46.53	36.26	23.7	38.97	15.27	23.7	23.14	48.25	23.7	25.31	12.20
24.6	47.16	31.71	24.7	46.67	36.43	24.7	39.47	15.27	24.7	23.34	48.23	24.7	25.72	12.32
25.6	47.34	31.95	25.7	46.80	36.60	25.7	39.98	15.28	25.7	23.54	48.22	25.7	26.11	12.45
26.6	47.52	32.19	26.7	46.93	36.77	26.7	40.50	15.31	26.7	23.74	48.23	26.7	26.48	12.58
27.6	47.69	32.43	27.7	47.05	36.96	27.7	41.05	15.35	27.7	23.95	48.25	27.7	26.84	12.71
28.6	47.86	32.66	28.7	47.17	37.12	28.7	41.59	15.39	28.7	24.17	48.28	28.7	27.21	12.84
29.6	48.03	32.89	29.7	47.28	37.27	29.7	42.12	15.47	29.7	24.39	48.33	29.7	27.55	12.95
30.6	48.20	33.10	30.7	47.39	37.42	30.7	42.65	15.55	30.7	24.59	48.39	30.7	27.91	13.05
31.6	48.37	33.30	31.7	47.52	37.56	31.7	43.17	15.66	31.7	24.80	48.48	31.7	28.27	13.16
11.09	-11.04		6.21	-6.12		20.26	+20.24		7.73	+7.66		18.51	-18.48	
5 ^h 45 ^m	51 ^s .396		6 ^h 46 ^m	48 ^s .653		7 ^h 3 ^m	2 ^s .335		7 ^h 14 ^m	7 ^s .912		7 ^h 15 ^m	39 ^s .691	
-84° 49'	44'' .27		-80° 43'	46'' .14		+87° 10'	43'' .86		+82° 34'	17'' .32		-86° 54'	19'' .75	

APPARENT PLACES OF STARS, 1919.

297

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamæleonis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Oct.	h m s	° ' "	Oct.	h m s	° ' "	Oct.	h m s	° ' "	Oct.	h m s	° ' "	Oct.	h m s	° ' "
	8 18	+88 52		9 8	-85 20		9 25	+81 40		9 36	-80 34		10 21	+82 57
0.8	11.21	5.76	0.9	26.13	29.74	0.9	40.75	38.83	0.9	13.26	44.42	0.9	16.91	47.93
1.8	12.42	5.56	1.9	26.33	29.57	1.9	40.89	38.54	1.9	13.35	44.22	1.9	17.04	47.59
2.8	13.65	5.38	2.8	26.53	29.39	2.9	41.04	38.25	2.9	13.44	43.99	2.9	17.17	47.26
3.8	14.89	5.23	3.8	26.72	29.19	3.9	41.19	37.98	3.9	13.53	43.77	3.9	17.30	46.93
4.8	16.11	5.08	4.8	26.93	28.99	4.9	41.33	37.74	4.9	13.62	43.55	4.9	17.44	46.61
5.8	17.29	4.94	5.8	27.13	28.79	5.9	41.46	37.51	5.9	13.72	43.33	5.9	17.56	46.32
6.8	18.42	4.80	6.8	27.36	28.58	6.9	41.59	37.28	6.9	13.82	43.10	6.9	17.67	46.03
7.8	19.50	4.65	7.8	27.60	28.40	7.8	41.72	37.05	7.9	13.93	42.87	7.9	17.78	45.74
8.8	20.56	4.48	8.8	27.87	28.25	8.8	41.82	36.80	8.9	14.06	42.69	8.9	17.88	45.44
9.8	21.62	4.31	9.8	28.13	28.09	9.8	41.95	36.54	9.8	14.18	42.51	9.9	17.99	45.13
10.8	22.72	4.13	10.8	28.39	27.98	10.8	42.08	36.27	10.8	14.31	42.37	10.9	18.10	44.81
11.8	23.88	3.94	11.8	28.64	27.89	11.8	42.21	35.99	11.8	14.44	42.24	11.9	18.23	44.47
12.8	25.13	3.76	12.8	28.89	27.81	12.8	42.35	35.71	12.8	14.56	42.13	12.9	18.35	44.09
13.8	26.44	3.60	13.8	29.13	27.73	13.8	42.51	35.43	13.8	14.67	42.03	13.9	18.49	43.75
14.8	27.81	3.45	14.8	29.36	27.63	14.8	42.68	35.17	14.8	14.78	41.90	14.9	18.66	43.42
15.8	29.17	3.33	15.8	29.58	27.52	15.8	42.86	34.93	15.8	14.89	41.77	15.9	18.83	43.11
16.8	30.51	3.23	16.8	29.81	27.39	16.8	43.03	34.72	16.8	15.00	41.62	16.9	18.98	42.82
17.8	31.80	3.14	17.8	30.03	27.27	17.8	43.18	34.53	17.8	15.11	41.47	17.9	19.14	42.55
18.8	33.03	3.06	18.8	30.28	27.14	18.8	43.34	34.34	18.8	15.24	41.31	18.9	19.29	42.31
19.8	34.20	2.98	19.8	30.55	27.01	19.8	43.48	34.16	19.8	15.36	41.15	19.9	19.44	42.06
20.8	35.31	2.90	20.8	30.82	26.90	20.8	43.62	33.98	20.8	15.49	41.00	20.9	19.58	41.81
21.8	36.42	2.82	21.8	31.10	26.81	21.8	43.76	33.80	21.8	15.63	40.90	21.8	19.71	41.56
22.8	37.54	2.72	22.8	31.39	26.74	22.8	43.89	33.60	22.8	15.77	40.79	22.8	19.83	41.30
23.8	38.69	2.62	23.8	31.69	26.68	23.8	44.03	33.39	23.8	15.91	40.71	23.8	19.96	41.04
24.8	39.85	2.52	24.8	31.98	26.64	24.8	44.17	33.18	24.8	16.05	40.64	24.8	20.09	40.76
25.8	41.07	2.41	25.8	32.26	26.63	25.8	44.32	32.97	25.8	16.19	40.58	25.8	20.24	40.47
26.7	42.34	2.31	26.8	32.54	26.61	26.8	44.48	32.76	26.8	16.32	40.53	26.8	20.40	40.19
27.7	43.64	2.22	27.8	32.80	26.60	27.8	44.65	32.56	27.8	16.46	40.48	27.8	20.57	39.92
28.7	44.97	2.15	28.8	33.05	26.57	28.8	44.82	32.37	28.8	16.60	40.42	28.8	20.74	39.65
29.7	46.32	2.09	29.8	33.30	26.54	29.8	45.01	32.19	29.8	16.73	40.37	29.8	20.93	39.40
30.7	47.67	2.06	30.8	33.55	26.51	30.8	45.19	32.04	30.8	16.86	40.32	30.8	21.11	39.15
31.7	48.99	2.03	31.8	33.82	26.49	31.8	45.37	31.90	31.8	16.99	40.26	31.8	21.30	38.92
50.60	+50.59		12.31	-12.27		6.91	+6.84		6.11	-6.03		8.16	+8.10	
8 ^h 17 ^m	47 ^s .546		9 ^h 8 ^m	41 ^s .594		9 ^h 25 ^m	39 ^s .275		9 ^h 36 ^m	19 ^s .026		10 ^h 21 ^m	19 ^s .949	
+88° 52'	37'' .80		-85° 20'	26'' .78		+81° 41'	10'' .13		-80° 34'	39'' .26		+82° 58'	17'' .87	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

γ Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ε Octantis. Mag. 5.4			32 H. Camelopard. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Oct.	h m	° ' "	Oct.	h m	° ' "	Oct.	h m	° ' "	Oct.	h m	° ' "	Oct.	h m	° ' "
	10 59	-84 9		12 13	+88 8		12 46	-84 41		12 48	+83 50		13 27	-85 22
	s	"		s	"		s	"		s	"		s	"
0.9	45.67	42.28	0.9	41.82	34.65	1.0	14.92	21.27	1.0	17.39	54.23	1.0	30.67	40.80
1.9	45.75	42.02	1.9	41.87	34.25	2.0	14.92	20.98	2.0	17.38	53.81	2.0	30.63	40.53
2.9	45.84	41.75	2.9	41.96	33.86	3.0	14.91	20.69	3.0	17.37	53.41	3.0	30.58	40.24
3.9	45.92	41.48	3.9	42.07	33.47	3.9	14.90	20.37	3.9	17.37	53.02	4.0	30.52	39.95
4.9	46.01	41.19	4.9	42.20	33.09	4.9	14.88	20.07	4.9	17.38	52.64	5.0	30.45	39.64
5.9	46.10	40.89	5.9	42.33	32.72	5.9	14.88	19.76	5.9	17.38	52.26	6.0	30.39	39.33
6.9	46.20	40.59	6.9	42.44	32.35	6.9	14.88	19.42	6.9	17.38	51.89	7.0	30.34	38.99
7.9	46.30	40.30	7.9	42.53	31.99	7.9	14.90	19.08	7.9	17.37	51.53	8.0	30.31	38.65
8.9	46.44	40.01	8.9	42.58	31.64	8.9	14.93	18.74	8.9	17.36	51.17	9.0	30.30	38.30
9.9	46.58	39.74	9.9	42.62	31.28	9.9	14.98	18.40	9.9	17.34	50.82	10.0	30.31	37.96
10.9	46.73	39.48	10.9	42.64	30.91	10.9	15.06	18.06	10.9	17.32	50.46	11.0	30.35	37.62
11.9	46.89	39.25	11.9	42.68	30.49	11.9	15.14	17.76	11.9	17.30	50.06	12.0	30.39	37.31
12.9	47.04	39.05	12.9	42.76	30.08	12.9	15.22	17.48	12.9	17.29	49.65	13.0	30.44	37.00
13.9	47.19	38.85	13.9	42.89	29.66	13.9	15.29	17.21	13.9	17.30	49.23	13.9	30.48	36.73
14.9	47.32	38.66	14.9	43.07	29.24	14.9	15.35	16.95	14.9	17.32	48.80	14.9	30.50	36.47
15.9	47.44	38.44	15.9	43.30	28.85	15.9	15.40	16.69	15.9	17.36	48.39	15.9	30.51	36.19
16.9	47.57	38.21	16.9	43.55	28.47	16.9	15.45	16.41	16.9	17.41	47.97	16.9	30.52	35.89
17.9	47.69	37.96	17.9	43.82	28.11	17.9	15.49	16.10	17.9	17.46	47.58	17.9	30.52	35.58
18.9	47.82	37.71	18.9	44.09	27.76	18.9	15.54	15.78	18.9	17.51	47.20	18.9	30.53	35.25
19.9	47.97	37.45	19.9	44.33	27.42	19.9	15.60	15.46	19.9	17.55	46.86	19.9	30.54	34.92
20.9	48.14	37.21	20.9	44.54	27.08	20.9	15.68	15.13	20.9	17.58	46.52	20.9	30.58	34.57
21.9	48.31	36.97	21.9	44.73	26.74	21.9	15.77	14.79	21.9	17.61	46.19	21.9	30.63	34.22
22.9	48.48	36.75	22.9	44.90	26.40	22.9	15.87	14.46	22.9	17.63	45.85	22.9	30.71	33.88
23.9	48.67	36.55	23.9	45.08	26.05	23.9	16.00	14.16	23.9	17.66	45.48	23.9	30.80	33.56
24.9	48.86	36.35	24.9	45.27	25.69	24.9	16.12	13.87	24.9	17.68	45.11	24.9	30.89	33.24
25.9	49.05	36.17	25.9	45.49	25.33	25.9	16.25	13.58	25.9	17.72	44.74	25.9	30.99	32.93
26.9	49.25	36.00	26.9	45.72	24.97	26.9	16.38	13.32	26.9	17.77	44.35	26.9	31.09	32.63
27.9	49.43	35.85	27.9	46.01	24.61	27.9	16.50	13.06	27.9	17.81	43.96	27.9	31.19	32.35
28.9	49.60	35.70	28.9	46.32	24.24	28.9	16.62	12.81	28.9	17.88	43.57	28.9	31.28	32.07
29.9	49.77	35.55	29.9	46.65	23.87	29.9	16.74	12.56	29.9	17.96	43.17	29.9	31.38	31.80
30.9	49.95	35.37	30.9	47.03	23.51	30.9	16.85	12.31	30.9	18.05	42.78	30.9	31.47	31.53
31.8	50.12	35.20	31.9	47.42	23.16	31.9	16.96	12.04	31.9	18.14	42.40	31.9	31.55	31.25
9.83	-9.78		30.83	+30.82		10.80	-10.76		9.33	+9.28		12.41	-12.37	
10 ^h 59 ^m 54 ^s .546			12 ^h 14 ^m 29 ^s .190			12 ^h 46 ^m 19 ^s .119			12 ^h 48 ^m 31 ^s .308			13 ^h 27 ^m 32 ^s .891		
-84° 9' 29".33			+88° 8' 56".19			-84° 41' 1".57			+83° 51' 11".30			-85° 22' 19".48		

APPARENT PLACES OF STARS, 1919.

299

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2333. Mag. 7.2			ρ Octantis. Mag. 5.7			ϵ Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Oct.	h m s	° ' "	Oct.	h m s	° ' "	Oct.	h m s	° ' "	Oct.	h m s	° ' "	Oct.	h m s	° ' "
1.1	48.34	16.33	1.1	14.56	43.20	1.1	29.90	16.77	1.2	62.07	37.90	1.2	26.52	30.04
2.1	48.28	16.07	2.1	14.18	42.88	2.1	29.77	16.56	2.2	61.90	37.73	2.2	26.41	29.94
3.1	48.21	15.80	3.1	13.81	42.55	3.1	29.64	16.34	3.2	61.72	37.55	3.2	26.30	29.85
4.1	48.13	15.52	4.1	13.47	42.22	4.1	29.50	16.12	4.2	61.57	37.37	4.2	26.18	29.77
5.1	48.05	15.25	5.1	13.14	41.90	5.1	29.37	15.90	5.2	61.41	37.19	5.2	26.07	29.67
6.1	47.99	14.94	6.1	12.83	41.59	6.1	29.22	15.66	6.2	61.26	37.01	6.2	25.94	29.57
7.1	47.92	14.63	7.1	12.53	41.29	7.1	29.07	15.40	7.2	61.10	36.82	7.2	25.80	29.44
8.0	47.86	14.30	8.1	12.21	41.02	8.1	28.94	15.12	8.2	60.95	36.67	8.2	25.67	29.29
9.0	47.81	13.97	9.1	11.88	40.74	9.1	28.83	14.81	9.2	60.80	36.53	9.2	25.55	29.11
10.0	47.78	13.64	10.1	11.51	40.46	10.1	28.72	14.50	10.2	60.63	36.39	10.2	25.44	28.91
11.0	47.77	13.30	11.1	11.14	40.17	11.1	28.64	14.21	11.2	60.46	36.25	11.2	25.34	28.71
12.0	47.76	12.99	12.1	10.75	39.85	12.1	28.58	13.92	12.1	60.29	36.07	12.2	25.24	28.52
13.0	47.76	12.71	13.1	10.38	39.54	13.1	28.52	13.65	13.1	60.11	35.89	13.2	25.15	28.34
14.0	47.76	12.45	14.1	10.02	39.20	14.1	28.46	13.40	14.1	59.95	35.69	14.2	25.08	28.17
15.0	47.76	12.18	15.1	9.70	38.83	15.1	28.39	13.16	15.1	59.78	35.46	15.2	25.00	28.02
16.0	47.73	11.91	16.1	9.42	38.44	16.1	28.31	12.92	16.1	59.63	35.23	16.2	24.91	27.88
17.0	47.70	11.64	17.1	9.17	38.06	17.1	28.22	12.67	17.1	59.48	34.96	17.1	24.82	27.74
18.0	47.67	11.34	18.1	8.94	37.72	18.1	28.12	12.40	18.1	59.34	34.71	18.1	24.71	27.58
19.0	47.64	11.01	19.1	8.74	37.39	19.1	28.03	12.11	19.1	59.22	34.47	19.1	24.60	27.40
20.0	47.60	10.68	20.0	8.52	37.06	20.1	27.92	11.79	20.1	59.08	34.24	20.1	24.48	27.21
21.0	47.59	10.34	21.0	8.29	36.74	21.1	27.83	11.48	21.1	58.94	34.03	21.1	24.37	26.99
22.0	47.60	10.00	22.0	8.06	36.43	22.1	27.77	11.15	22.1	58.81	33.83	22.1	24.26	26.75
23.0	47.61	9.65	23.0	7.81	36.12	23.1	27.70	10.81	23.1	58.67	33.64	23.1	24.16	26.51
24.0	47.63	9.30	24.0	7.54	35.80	24.1	27.66	10.47	24.1	58.53	33.44	24.1	24.07	26.26
25.0	47.66	8.97	25.0	7.28	35.48	25.1	27.62	10.14	25.1	58.39	33.22	25.1	23.98	26.00
25.9	47.69	8.65	26.0	7.03	35.14	26.0	27.58	9.81	26.1	58.25	32.99	26.1	23.90	25.76
26.9	47.72	8.33	27.0	6.79	34.78	27.0	27.57	9.50	27.1	58.11	32.74	27.1	23.84	25.52
27.9	47.77	8.04	28.0	6.56	34.42	28.0	27.55	9.21	28.1	57.97	32.47	28.1	23.78	25.28
28.9	47.81	7.75	29.0	6.37	34.05	29.0	27.53	8.92	29.1	57.84	32.20	29.1	23.71	25.04
29.9	47.84	7.47	30.0	6.18	33.67	30.0	27.50	8.64	30.1	57.71	31.92	30.1	23.64	24.83
30.9	47.87	7.19	31.0	6.03	33.28	31.0	27.47	8.37	31.1	57.58	31.60	31.1	23.57	24.63
31.9	47.88	6.90	32.0	5.90	32.89	32.0	27.44	8.08	32.1	57.47	31.31	32.1	23.49	24.40
8.58	-8.52		23.34	+23.32		9.90	-9.85		7.35	+7.28		6.25	-6.17	
14 ^h 13 ^m	46 ^s .350		15 ^h 3 ^m	2 ^s .510		15 ^h 24 ^m	23 ^s .351		16 ^h 54 ^m	12 ^s .991		17 ^h 16 ^m	17 ^s .234	
-83° 17'	54'' .52		+87° 32'	42'' .66		-84° 11'	55'' .43		+82° 10'	21'' .42		-80° 47'	14'' .27	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursa Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursa Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			τ Ursa Minoris. Mag. 5.7		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ' "		h m	° ' "		h m	° ' "		h m	° ' "		h m	° ' "
Oct.	17 57	+86 37	Oct.	18 7	-87 40	Oct.	18 58	+89 1	Oct.	19 31	-89 18	Oct.	20 48	+82 2
	s	"		s	"		s	"		s	"		s	"
1.2	58.89	14.44	1.2	56.51	4.15	1.3	72.91	41.33	1.3	101.89	19.28	1.3	34.45	30.2
2.2	58.44	14.39	2.2	56.04	4.11	2.3	71.33	41.38	2.3	100.50	19.35	2.3	34.29	30.5
3.2	58.00	14.33	3.2	55.57	4.09	3.3	69.77	41.42	3.3	99.11	19.43	3.3	34.14	31.0
4.2	57.57	14.24	4.2	55.07	4.08	4.3	68.23	41.43	4.3	97.67	19.52	4.3	33.98	31.2
5.2	57.15	14.16	5.2	54.55	4.04	5.3	66.73	41.45	5.3	96.16	19.60	5.3	33.82	31.4
6.2	56.75	14.06	6.2	54.01	4.00	6.3	65.28	41.45	6.3	94.58	19.67	6.3	33.66	31.6
7.2	56.36	13.98	7.2	53.46	3.95	7.2	63.90	41.48	7.3	92.91	19.72	7.3	33.52	31.9
8.2	55.97	13.92	8.2	52.91	3.86	8.2	62.51	41.51	8.3	91.20	19.77	8.3	33.37	32.0
9.2	55.57	13.87	9.2	52.36	3.74	9.2	61.14	41.55	9.3	89.48	19.78	9.3	33.23	32.2
10.2	55.16	13.84	10.2	51.84	3.60	10.2	59.73	41.62	10.3	87.79	19.78	10.3	33.09	32.4
11.2	54.74	13.80	11.2	51.36	3.46	11.2	58.25	41.68	11.3	86.18	19.74	11.3	32.94	32.6
12.2	54.31	13.74	12.2	50.92	3.32	12.2	56.70	41.74	12.3	84.66	19.70	12.3	32.79	32.8
13.2	53.85	13.66	13.2	50.49	3.20	13.2	55.09	41.79	13.3	83.24	19.67	13.3	32.62	33.0
14.2	53.39	13.57	14.2	50.09	3.07	14.2	53.44	41.79	14.3	81.88	19.66	14.3	32.45	33.2
15.2	52.95	13.45	15.2	49.69	2.96	15.2	51.78	41.79	15.2	80.54	19.64	15.3	32.28	33.4
16.2	52.52	13.31	16.2	49.26	2.86	16.2	50.17	41.75	16.2	79.14	19.63	16.3	32.10	33.6
17.2	52.10	13.16	17.2	48.80	2.77	17.2	48.62	41.70	17.2	77.67	19.64	17.3	31.93	33.7
18.2	51.72	13.01	18.2	48.32	2.67	18.2	47.15	41.65	18.2	76.11	19.65	18.3	31.76	33.9
19.2	51.34	12.86	19.2	47.81	2.55	19.2	45.73	41.60	19.2	74.45	19.66	19.3	31.58	34.1
20.2	50.97	12.73	20.2	47.29	2.42	20.2	44.38	41.55	20.2	72.73	19.64	20.3	31.43	34.3
21.2	50.61	12.60	21.2	46.77	2.26	21.2	43.04	41.51	21.2	70.98	19.60	21.3	31.27	34.5
22.2	50.25	12.49	22.2	46.26	2.08	22.2	41.70	41.47	22.2	69.24	19.52	22.3	31.12	34.7
23.2	49.88	12.38	23.2	45.78	1.88	23.2	40.34	41.46	23.2	67.53	19.42	23.3	30.96	34.9
24.2	49.50	12.27	24.2	45.32	1.67	24.2	38.94	41.44	24.2	65.88	19.32	24.3	30.82	35.1
25.2	49.11	12.14	25.2	44.90	1.45	25.2	37.50	41.41	25.2	64.30	19.22	25.3	30.65	35.3
26.2	48.72	12.02	26.2	44.48	1.24	26.2	36.01	41.38	26.2	62.78	19.13	26.3	30.48	35.5
27.2	48.31	11.87	27.2	44.10	1.04	27.2	34.51	41.33	27.2	61.32	19.04	27.3	30.31	35.6
28.1	47.92	11.69	28.2	43.72	0.85	28.2	32.99	41.28	28.2	59.90	18.95	28.3	30.14	35.8
29.1	47.53	11.51	29.2	43.35	0.66	29.2	31.46	41.20	29.2	58.50	18.87	29.3	29.96	35.9
30.1	47.14	11.33	30.2	42.99	0.48	30.2	29.95	41.11	30.2	57.12	18.78	30.3	29.78	36.0
31.1	46.77	11.13	31.1	42.61	0.31	31.2	28.47	41.00	31.2	55.74	18.70	31.3	29.59	36.1
32.1	46.41	10.90	32.1	42.22	0.12	32.2	27.02	40.87	32.2	54.30	18.62	32.3	29.41	36.2
16.96	+16.93		24.57	-24.55		58.97	+58.96		73.66	-73.65		7.41	+7.34	
17 ^h 58 ^m 22 ^s .311			18 ^h 7 ^m 23 ^s .343			19 ^h 0 ^m 15 ^s .079			19 ^h 30 ^m 50 ^s .760			20 ^h 48 ^m 32 ^s .146		
+86° 36' 51".04			-87° 39' 50".89			+89° 1' 12".80			-89° 13' 13".35			+82° 13' 56".82		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
ash. can- me.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Oct.	h m ° ' "		Oct.	h m ° ' "		Oct.	h m ° ' "		Oct.	h m ° ' "		Oct.	h m ° ' "	
1.4	53.83	26.85	1.4	57.97	40.42	1.4	3.87	11.76	1.5	10.67	5.57	1.5	34.46	50.27
2.4	53.72	27.07	2.4	57.80	40.67	2.4	3.81	12.02	2.4	10.54	5.96	2.5	34.44	50.56
3.4	53.62	27.29	3.4	57.63	40.92	3.4	3.76	12.28	3.4	10.40	6.34	3.5	34.43	50.86
4.4	53.51	27.53	4.4	57.47	41.18	4.4	3.69	12.56	4.4	10.25	6.71	4.5	34.40	51.16
5.4	53.38	27.76	5.4	57.29	41.44	5.4	3.63	12.84	5.4	10.09	7.05	5.5	34.38	51.48
6.4	53.26	28.00	6.4	57.09	41.71	6.4	3.55	13.12	6.4	9.94	7.39	6.5	34.34	51.79
7.4	53.12	28.23	7.4	56.86	41.97	7.4	3.46	13.41	7.4	9.79	7.73	7.4	34.29	52.12
8.4	52.98	28.45	8.4	56.62	42.23	8.4	3.36	13.70	8.4	9.67	8.07	8.4	34.23	52.46
9.4	52.82	28.64	9.4	56.34	42.47	9.4	3.25	13.96	9.4	9.57	8.43	9.4	34.15	52.77
0.4	52.66	28.82	10.4	56.06	42.69	10.4	3.14	14.19	10.4	9.47	8.79	10.4	34.07	53.07
1.3	52.50	28.96	11.4	55.79	42.89	11.4	3.04	14.41	11.4	9.37	9.16	11.4	33.99	53.35
2.3	52.35	29.10	12.4	55.53	43.07	12.4	2.94	14.61	12.4	9.25	9.54	12.4	33.92	53.63
3.3	52.21	29.22	13.4	55.29	43.24	13.4	2.84	14.80	13.4	9.11	9.93	13.4	33.86	53.87
4.3	52.08	29.35	14.4	55.06	43.41	14.4	2.75	15.00	14.4	8.93	10.33	14.4	33.80	54.11
5.3	51.96	29.48	15.4	54.84	43.60	15.4	2.67	15.20	15.4	8.74	10.71	15.4	33.74	54.38
6.3	51.84	29.66	16.4	54.63	43.80	16.4	2.60	15.43	16.4	8.51	11.06	16.4	33.69	54.65
7.3	51.70	29.83	17.4	54.40	44.01	17.4	2.51	15.66	17.4	8.28	11.40	17.4	33.63	54.94
8.3	51.56	30.00	18.4	54.16	44.23	18.4	2.41	15.90	18.4	8.04	11.72	18.4	33.57	55.23
9.3	51.39	30.19	19.4	53.89	44.46	19.4	2.29	16.15	19.4	7.81	12.02	19.4	33.49	55.53
0.3	51.23	30.37	20.3	53.60	44.69	20.4	2.17	16.39	20.4	7.61	12.33	20.4	33.41	55.84
1.3	51.05	30.52	21.3	53.28	44.90	21.4	2.05	16.64	21.4	7.42	12.63	21.4	33.31	56.15
2.3	50.87	30.66	22.3	52.95	45.09	22.4	1.91	16.85	22.4	7.24	12.94	22.4	33.20	56.44
3.3	50.69	30.78	23.3	52.62	45.27	23.4	1.77	17.04	23.4	7.05	13.26	23.4	33.08	56.71
4.3	50.50	30.88	24.3	52.30	45.41	24.4	1.64	17.23	24.4	6.87	13.58	24.4	32.97	56.98
5.3	50.33	30.97	25.3	51.98	45.55	25.4	1.52	17.40	25.4	6.69	13.90	25.4	32.86	57.24
6.3	50.16	31.04	26.3	51.66	45.68	26.3	1.39	17.55	26.4	6.47	14.21	26.4	32.75	57.48
7.3	49.99	31.12	27.3	51.37	45.80	27.3	1.26	17.70	27.4	6.25	14.54	27.4	32.65	57.71
8.3	49.84	31.20	28.3	51.07	45.92	28.3	1.15	17.85	28.4	6.01	14.87	28.4	32.54	57.93
9.3	49.69	31.28	29.3	50.79	46.04	29.3	1.03	18.01	29.4	5.74	15.20	29.4	32.44	58.15
0.3	49.54	31.36	30.3	50.51	46.16	30.3	0.91	18.16	30.4	5.47	15.52	30.4	32.35	58.38
1.3	49.39	31.45	31.3	50.24	46.29	31.3	0.80	18.33	31.4	5.17	15.83	31.4	32.26	58.60
2.3	49.24	31.53	32.3	49.95	46.41	32.3	0.68	18.50	32.4	4.87	16.11	32.4	32.16	58.83
8.31	-8.25		15.83	-15.80		7.02	-6.94		18.31	+18.29		7.63	-7.56	
21 ^h 38 ^m	38°.548		22 ^h 16 ^m	33°.212		22 ^h 37 ^m	51°.624		23 ^h 27 ^m	43°.571		23 ^h 47 ^m	23°.637	
83° 5'	34''.33		-86° 22'	50''.92		-81° 48'	24''.80		+86° 51'	38''.62		-82° 28'	8''.42	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge Mag. 6.1	
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.
Nov.	h m s	° ' "	Nov.	h m s	° ' "	Nov.	h m s	° ' "	Nov.	h m s	° ' "	Nov.	h m s
	0 57	+85 49		1 32	+88 52		1 41	-85 10		4 11	+85 20		5 36
0.4	53.53	52.96	0.5	63.14	44.58	0.5	62.09	31.94	0.6	13.76	27.58	0.6	22.35
1.4	53.43	53.31	1.5	62.92	44.95	1.5	62.03	32.26	1.6	13.91	27.91	1.6	22.59
2.4	53.32	53.65	2.4	62.68	45.32	2.5	61.98	32.57	2.6	14.06	28.22	2.6	22.82
3.4	53.21	53.98	3.4	62.44	45.66	3.5	61.91	32.90	3.6	14.20	28.52	3.6	23.02
4.4	53.10	54.30	4.4	62.25	45.99	4.5	61.82	33.22	4.6	14.34	28.81	4.6	23.24
5.4	53.02	54.62	5.4	62.10	46.31	5.4	61.72	33.56	5.6	14.49	29.09	5.6	23.46
6.4	52.96	54.94	6.4	62.00	46.65	6.4	61.59	33.89	6.5	14.66	29.35	6.6	23.69
7.4	52.90	55.27	7.4	61.92	47.01	7.4	61.46	34.21	7.5	14.83	29.62	7.6	23.93
8.4	52.84	55.63	8.4	61.85	47.39	8.4	61.32	34.49	8.5	15.03	29.93	8.6	24.19
9.4	52.76	56.00	9.4	61.74	47.78	9.4	61.18	34.77	9.5	15.22	30.24	9.6	24.46
10.4	52.66	56.37	10.4	61.57	48.18	10.4	61.04	35.05	10.5	15.40	30.57	10.6	24.72
11.4	52.54	56.74	11.4	61.30	48.57	11.4	60.94	35.27	11.5	15.58	30.94	11.6	24.97
12.4	52.41	57.11	12.4	60.93	48.96	12.4	60.82	35.52	12.5	15.72	31.29	12.6	25.21
13.4	52.24	57.44	13.4	60.50	49.33	13.4	60.72	35.79	13.5	15.84	31.65	13.6	25.42
14.4	52.07	57.77	14.4	60.03	49.67	14.4	60.61	36.07	14.5	15.95	32.01	14.6	25.62
15.4	51.90	58.07	15.4	59.55	50.00	15.4	60.48	36.36	15.5	16.04	32.35	15.6	25.81
16.4	51.75	58.35	16.4	59.09	50.32	16.4	60.36	36.67	16.5	16.12	32.68	16.6	25.97
17.4	51.59	58.62	17.4	58.67	50.64	17.4	60.21	36.98	17.5	16.20	32.98	17.6	26.14
18.4	51.46	58.89	18.4	58.29	50.94	18.4	60.06	37.27	18.5	16.29	33.27	18.6	26.31
19.4	51.32	59.16	19.4	57.92	51.25	19.4	59.88	37.57	19.5	16.38	33.57	19.6	26.48
20.4	51.18	59.44	20.4	57.56	51.56	20.4	59.70	37.86	20.5	16.48	33.86	20.6	26.66
21.4	51.04	59.73	21.4	57.19	51.88	21.4	59.51	38.13	21.5	16.59	34.17	21.6	26.85
22.4	50.91	60.03	22.4	56.82	52.20	22.4	59.32	38.37	22.5	16.70	34.49	22.6	27.04
23.4	50.76	60.32	23.4	56.40	52.52	23.4	59.14	38.61	23.5	16.81	34.82	23.6	27.24
24.4	50.59	60.62	24.4	55.91	52.85	24.4	58.96	38.83	24.5	16.91	35.16	24.6	27.43
25.4	50.41	60.93	25.4	55.38	53.18	25.4	58.78	39.05	25.5	17.01	35.51	25.6	27.62
26.4	50.22	61.23	26.4	54.79	53.52	26.4	58.60	39.25	26.5	17.07	35.87	26.6	27.79
27.4	50.02	61.51	27.4	54.16	53.85	27.4	58.43	39.46	27.5	17.13	36.25	27.5	27.95
28.4	49.79	61.79	28.4	53.48	54.16	28.4	58.26	39.68	28.5	17.18	36.61	28.5	28.10
29.4	49.57	62.04	29.4	52.77	54.45	29.4	58.10	39.91	29.5	17.21	36.95	29.5	28.24
30.3	49.34	62.28	30.4	52.05	54.74	30.4	57.92	40.14	30.5	17.22	37.29	30.5	28.35
31.3	49.13	62.51	31.4	51.36	55.00	31.4	57.73	40.39	31.5	17.24	37.61	31.5	28.46
13.76	+13.73		51.19	+51.18		11.89	-11.85		12.31	+12.27		11.84	+
0 ^h 57 ^m 24 ^s .633			1 ^h 31 ^m 11 ^s .709			1 ^h 41 ^m 54 ^s .846			4 ^h 10 ^m 37 ^s .831			5 ^h 35 ^m	
+85° 49' 24".14			+88° 52' 20".55			-85° 10' 45".22			+85° 20' 28".88			+85° 9'	

APPARENT PLACES OF STARS, 1919.

303

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Menese. Mag. 6.2			{ Menese. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '
	5 45	-84 49		6 46	-80 43		7 3	+87 10		7 14	+82 33		7 15	-86 54
	s	"		s	"		s	"		s	"		s	"
0.6	48.37	33.30	0.7	47.52	37.56	0.7	43.17	15.66	0.7	24.80	48.48	0.7	28.27	13.16
1.6	48.54	33.53	1.7	47.64	37.72	1.7	43.66	15.76	1.7	25.00	48.56	1.7	28.63	13.29
2.6	48.71	33.76	2.7	47.76	37.88	2.7	44.14	15.87	2.7	25.18	48.65	2.7	29.00	13.42
3.6	48.89	34.00	3.7	47.89	38.07	3.7	44.60	15.98	3.7	25.36	48.73	3.7	29.39	13.56
4.6	49.07	34.27	4.7	48.01	38.29	4.7	45.03	16.08	4.7	25.53	48.79	4.7	29.79	13.72
5.6	49.24	34.55	5.7	48.13	38.51	5.7	45.48	16.17	5.7	25.70	48.85	5.7	30.18	13.90
6.6	49.39	34.87	6.7	48.26	38.74	6.7	45.93	16.22	6.7	25.89	48.89	6.7	30.56	14.11
7.6	49.53	35.18	7.7	48.36	39.02	7.7	46.40	16.29	7.7	26.07	48.93	7.7	30.91	14.34
8.6	49.66	35.49	8.6	48.47	39.30	8.7	46.91	16.37	8.7	26.27	48.96	8.7	31.24	14.57
9.6	49.77	35.81	9.6	48.57	39.54	9.7	47.44	16.45	9.7	26.48	49.01	9.7	31.55	14.79
10.6	49.88	36.10	10.6	48.67	39.78	10.7	47.99	16.54	10.7	26.71	49.10	10.7	31.84	15.00
11.6	49.99	36.38	11.6	48.77	40.02	11.7	48.52	16.67	11.7	26.92	49.23	11.7	32.13	15.20
12.6	50.10	36.62	12.6	48.86	40.25	12.7	49.03	16.83	12.7	27.12	49.35	12.7	32.41	15.39
13.6	50.23	36.89	13.6	48.95	40.47	13.6	49.52	17.01	13.7	27.32	49.50	13.7	32.72	15.56
14.6	50.36	37.15	14.6	49.05	40.69	14.6	49.97	17.20	14.7	27.50	49.65	14.7	33.03	15.74
15.6	50.50	37.43	15.6	49.16	40.92	15.6	50.40	17.37	15.7	27.67	49.80	15.7	33.35	15.94
16.6	50.63	37.74	16.6	49.26	41.18	16.6	50.79	17.54	16.6	27.82	49.95	16.6	33.69	16.14
17.6	50.76	38.05	17.6	49.37	41.44	17.6	51.17	17.69	17.6	27.98	50.08	17.6	34.05	16.37
18.6	50.87	38.38	18.6	49.47	41.73	18.6	51.56	17.84	18.6	28.13	50.20	18.6	34.39	16.61
19.6	50.98	38.72	19.6	49.57	42.05	19.6	51.97	17.98	19.6	28.28	50.32	19.6	34.71	16.89
20.6	51.08	39.08	20.6	49.66	42.37	20.6	52.37	18.12	20.6	28.46	50.43	20.6	35.01	17.17
21.6	51.17	39.44	21.6	49.76	42.69	21.6	52.79	18.26	21.6	28.63	50.54	21.6	35.30	17.45
22.6	51.23	39.79	22.6	49.85	43.00	22.6	53.23	18.41	22.6	28.80	50.67	22.6	35.58	17.74
23.6	51.30	40.12	23.6	49.92	43.32	23.6	53.67	18.58	23.6	28.98	50.80	23.6	35.83	18.02
24.6	51.37	40.45	24.6	50.00	43.64	24.6	54.12	18.75	24.6	29.16	50.95	24.6	36.07	18.30
25.6	51.44	40.78	25.6	50.06	43.92	25.6	54.56	18.95	25.6	29.34	51.13	25.6	36.30	18.56
26.6	51.50	41.10	26.6	50.13	44.22	26.6	54.99	19.17	26.6	29.53	51.31	26.6	36.53	18.81
27.6	51.55	41.41	27.6	50.20	44.51	27.6	55.41	19.40	27.6	29.70	51.51	27.6	36.76	19.06
28.6	51.62	41.72	28.6	50.27	44.79	28.6	55.79	19.63	28.6	29.85	51.71	28.6	36.98	19.32
29.6	51.68	42.03	29.6	50.35	45.07	29.6	56.17	19.86	29.6	30.00	51.92	29.6	37.22	19.57
30.5	51.75	42.35	30.6	50.43	45.38	30.6	56.51	20.10	30.6	30.15	52.13	30.6	37.46	19.84
31.5	51.82	42.67	31.6	50.49	45.69	31.6	56.83	20.34	31.6	30.28	52.34	31.6	37.71	20.12
11.09	-11.05		6.21	-6.13		20.26	+20.24		7.73	+7.66		18.52	-18.49	
5 ^h 45 ^m	51° 39'		6 ^h 46 ^m	48° 53'		7 ^h 3 ^m	2° 33'		7 ^h 14 ^m	7° 9'		7 ^h 15 ^m	39° 69'	
-84° 49'	44'' .27		-80° 43'	46'' .14		+87° 10'	43'' .86		+82° 34'	17'' .32		-86° 54'	19'' .75	

304 APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamaeleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Nov.	h m 8 18	° ' +88 52	Nov.	h m 9 8	° ' -85 20	Nov.	h m 9 25	° ' +81 40	Nov.	h m 9 36	° ' -80 34	Nov.	h m 10 21	° ' +82 57
	s	"		s	"		s	"		s	"		s	"
0.7	48.99	2.03	0.8	33.82	26.49	0.8	45.37	31.90	0.8	16.99	40.26	0.8	21.30	38.92
1.7	50.28	2.02	1.8	34.08	26.45	1.8	45.54	31.77	1.8	17.11	40.19	1.8	21.48	38.73
2.7	51.52	2.01	2.8	34.35	26.41	2.8	45.69	31.65	2.8	17.24	40.12	2.8	21.66	38.54
3.7	52.70	2.00	3.8	34.62	26.40	3.8	45.85	31.53	3.8	17.37	40.06	3.8	21.82	38.34
4.7	53.83	2.00	4.8	34.91	26.40	4.8	46.01	31.39	4.8	17.52	40.02	4.8	21.98	38.15
5.7	54.96	1.97	5.8	35.20	26.42	5.8	46.15	31.26	5.8	17.67	40.01	5.8	22.13	37.95
6.7	56.12	1.94	6.8	35.52	26.47	6.8	46.30	31.12	6.8	17.82	40.04	6.8	22.29	37.72
7.7	57.32	1.88	7.8	35.82	26.53	7.8	46.46	30.97	7.8	17.97	40.07	7.8	22.44	37.50
8.7	58.58	1.82	8.7	36.10	26.61	8.8	46.63	30.80	8.8	18.13	40.12	8.8	22.62	37.27
9.7	59.92	1.78	9.7	36.38	26.69	9.8	46.81	30.63	9.8	18.28	40.19	9.8	22.81	37.02
10.7	61.30	1.77	10.7	36.62	26.78	10.8	47.00	30.48	10.8	18.42	40.26	10.8	23.00	36.78
11.7	62.69	1.77	11.7	36.87	26.85	11.8	47.20	30.35	11.8	18.55	40.30	11.8	23.23	36.57
12.7	64.06	1.82	12.7	37.11	26.90	12.8	47.39	30.25	12.8	18.68	40.34	12.8	23.43	36.38
13.7	65.39	1.88	13.7	37.36	26.95	13.7	47.58	30.18	13.8	18.81	40.35	13.8	23.63	36.23
14.7	66.65	1.94	14.7	37.62	26.99	14.7	47.76	30.12	14.8	18.94	40.37	14.8	23.83	36.09
15.7	67.83	2.00	15.7	37.89	27.03	15.7	47.94	30.07	15.7	19.07	40.40	15.8	24.02	35.96
16.7	68.95	2.07	16.7	38.17	27.08	16.7	48.09	30.02	16.7	19.21	40.43	16.8	24.19	35.83
17.7	70.03	2.14	17.7	38.46	27.18	17.7	48.24	29.98	17.7	19.37	40.48	17.8	24.36	35.71
18.7	71.11	2.19	18.7	38.75	27.27	18.7	48.40	29.92	18.7	19.52	40.54	18.8	24.53	35.57
19.7	72.19	2.23	19.7	39.05	27.40	19.7	48.55	29.86	19.7	19.67	40.62	19.8	24.71	35.43
20.7	73.31	2.27	20.7	39.34	27.53	20.7	48.70	29.79	20.7	19.82	40.71	20.8	24.88	35.29
21.7	74.46	2.32	21.7	39.61	27.69	21.7	48.87	29.71	21.7	19.97	40.83	21.8	25.06	35.15
22.7	75.65	2.36	22.7	39.89	27.85	22.7	49.05	29.63	22.7	20.12	40.96	22.8	25.24	34.99
23.7	76.86	2.42	23.7	40.14	27.99	23.7	49.22	29.57	23.7	20.26	41.09	23.8	25.45	34.85
24.7	78.10	2.50	24.7	40.39	28.14	24.7	49.40	29.53	24.7	20.40	41.22	24.8	25.65	34.72
25.7	79.35	2.58	25.7	40.64	28.30	25.7	49.59	29.49	25.7	20.53	41.35	25.8	25.85	34.60
26.7	80.60	2.68	26.7	40.87	28.45	26.7	49.78	29.47	26.7	20.66	41.49	26.8	26.06	34.49
27.7	81.82	2.80	27.7	41.11	28.60	27.7	49.97	29.46	27.7	20.79	41.60	27.7	26.28	34.39
28.7	83.00	2.93	28.7	41.34	28.75	28.7	50.15	29.48	28.7	20.91	41.71	28.7	26.50	34.34
29.7	84.13	3.07	29.7	41.58	28.88	29.7	50.32	29.51	29.7	21.04	41.82	29.7	26.70	34.28
30.7	85.19	3.21	30.7	41.83	29.02	30.7	50.47	29.54	30.7	21.18	41.94	30.7	26.88	34.23
31.7	86.20	3.35	31.7	42.09	29.19	31.7	50.63	29.57	31.7	21.31	42.08	31.7	27.07	34.18
50.58 +50.57			12.31 -12.27			6.91 +6.83			6.11 -6.03			8.16 +8.10		
8 ^h 17 ^m 47 ^s .546			9 ^h 8 ^m 41 ^s .594			9 ^h 25 ^m 39 ^s .275			9 ^h 36 ^m 19 ^s .026			10 ^h 21 ^m 19 ^s .949		
+88° 52' 37".80			-85° 20' 26".78			+81° 41' 10".13			-80° 34' 39".26			+82° 58' 17".67		

APPARENT PLACES OF STARS, 1919.

305

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Nov.	h m 10 59	° ' " -84 9 "	Nov.	h m 12 13	° ' " +88 8 "	Nov.	h m 12 46	° ' " -84 41 "	Nov.	h m 12 48	° ' " +83 50 "	Nov.	h m 13 27	° ' " -85 22 "
0.8	50.12	35.20	0.9	47.42	23.16	0.9	16.96	12.04	0.9	18.14	42.40	0.9	31.55	31.25
1.8	50.29	35.03	1.9	47.82	22.83	1.9	17.06	11.78	1.9	18.24	42.04	1.9	31.63	30.96
2.8	50.47	34.86	2.9	48.21	22.62	2.9	17.19	11.50	2.9	18.32	41.70	2.9	31.72	30.65
3.8	50.65	34.68	3.9	48.59	22.23	3.9	17.32	11.22	3.9	18.41	41.37	3.9	31.82	30.34
4.8	50.86	34.51	4.9	48.93	21.93	4.9	17.46	10.93	4.9	18.48	41.04	4.9	31.94	30.01
5.8	51.08	34.38	5.9	49.25	21.62	5.9	17.63	10.65	5.9	18.56	40.71	5.9	32.08	29.70
6.8	51.30	34.24	6.9	49.54	21.30	6.9	17.80	10.41	6.9	18.62	40.37	6.9	32.25	29.41
7.8	51.54	34.14	7.9	49.84	20.96	7.9	18.00	10.18	7.9	18.68	40.04	7.9	32.43	29.14
8.8	51.76	34.08	8.9	50.16	20.62	8.9	18.19	9.97	8.9	18.76	39.66	8.9	32.62	28.88
9.8	51.98	34.02	9.9	50.53	20.25	9.9	18.39	9.76	9.9	18.85	39.28	9.9	32.80	28.64
10.8	52.18	33.96	10.9	50.95	19.91	10.9	18.57	9.57	10.9	18.95	38.89	10.9	32.98	28.43
11.8	52.38	33.90	11.9	51.42	19.56	11.9	18.75	9.40	11.9	19.07	38.50	11.9	33.14	28.21
12.8	52.57	33.81	12.9	51.93	19.23	12.9	18.89	9.22	12.9	19.20	38.14	12.9	33.28	27.98
13.8	52.76	33.73	13.9	52.46	18.93	13.9	19.04	9.02	13.9	19.34	37.80	13.9	33.42	27.74
14.8	52.96	33.63	14.9	52.99	18.65	14.9	19.21	8.79	14.9	19.47	37.47	14.9	33.56	27.50
15.8	53.17	33.53	15.9	53.49	18.39	15.9	19.38	8.56	15.9	19.60	37.16	15.9	33.71	27.22
16.8	53.39	33.43	16.9	53.96	18.15	16.9	19.55	8.33	16.9	19.73	36.87	16.9	33.88	26.95
17.8	53.61	33.34	17.9	54.40	17.90	17.9	19.74	8.11	17.9	19.83	36.59	17.9	34.06	26.68
18.8	53.84	33.27	18.9	54.83	17.63	18.9	19.94	7.88	18.9	19.94	36.30	18.9	34.25	26.40
19.8	54.08	33.22	19.8	55.26	17.37	19.9	20.17	7.67	19.9	20.05	36.01	19.9	34.48	26.15
20.8	54.33	33.19	20.8	55.70	17.11	20.9	20.39	7.47	20.9	20.16	35.71	20.9	34.70	25.90
21.8	54.58	33.18	21.8	56.15	16.83	21.9	20.62	7.31	21.9	20.28	35.42	21.9	34.93	25.68
22.8	54.81	33.18	22.8	56.61	16.55	22.9	20.85	7.16	22.9	20.41	35.10	22.9	35.16	25.48
23.8	55.05	33.19	23.8	57.12	16.27	23.9	21.07	7.01	23.9	20.55	34.77	23.9	35.39	25.28
24.8	55.28	33.20	24.8	57.66	16.00	24.9	21.29	6.87	24.9	20.69	34.45	24.9	35.62	25.09
25.8	55.50	33.20	25.8	58.22	15.75	25.9	21.51	6.74	25.9	20.84	34.14	25.9	35.82	24.92
26.8	55.69	33.21	26.8	58.82	15.50	26.9	21.71	6.61	26.9	21.01	33.83	26.9	36.03	24.74
27.8	55.90	33.22	27.8	59.43	15.25	27.8	21.92	6.48	27.8	21.18	33.54	27.9	36.24	24.57
28.8	56.11	33.22	28.8	60.06	15.03	28.8	22.11	6.34	28.8	21.35	33.26	28.9	36.44	24.39
29.8	56.33	33.21	29.8	60.68	14.83	29.8	22.31	6.19	29.8	21.53	33.01	29.9	36.65	24.19
30.8	56.55	33.21	30.8	61.29	14.62	30.8	22.53	6.05	30.8	21.69	32.76	30.9	36.87	23.99
31.8	56.78	33.21	31.8	61.85	14.43	31.8	22.75	5.90	31.8	21.84	32.52	31.9	37.10	23.79
9.83	-9.78		30.78	+30.77		10.80	-10.75		9.32	+9.27		12.40	-12.36	
10 ^h 59 ^m 54 ^s .546			12 ^h 14 ^m 29 ^s .190			12 ^h 46 ^m 19 ^s .119			12 ^h 48 ^m 31 ^s .308			13 ^h 27 ^m 32 ^s .891		
-84° 9' 29".33			+88° 8' 56".19			-84° 41' 1".57			+83° 51' 11".30			-85° 22' 19".48		

5934°—1919—20

FOR THE UPPER TRANSIT AT WASHINGTON

δ Octantis. Mag. 4.1			Greenwich 2233. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apollis. Mag. 5.9		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '
	14 13	-83 17		15 2	+87 32		15 24	-84 11		16 53	+82 16		17 16	-80 4
	"	"		"	"		"	"		"	"		"	"
0.9	47.88	66.90	1.0	5.90	32.89	1.0	27.44	68.06	1.1	57.47	31.81	1.1	23.49	24.1
1.9	47.91	66.59	2.0	5.80	32.53	2.0	27.40	67.78	2.1	57.36	31.61	2.1	23.41	24.1
2.9	47.94	66.28	3.0	5.70	32.17	3.0	27.36	67.46	3.1	57.25	30.72	3.1	23.33	24.1
3.9	47.97	65.96	4.0	5.60	31.83	4.0	27.33	67.12	4.1	57.15	30.45	4.1	23.25	24.1
4.9	48.01	65.64	5.0	5.47	31.49	5.0	27.32	66.78	5.1	57.04	30.18	5.1	23.17	24.1
5.9	48.07	65.30	6.0	5.33	31.15	6.0	27.32	66.44	6.1	56.93	29.92	6.1	23.11	24.1
6.9	48.15	64.97	6.9	5.18	30.83	7.0	27.35	66.09	7.1	56.82	29.67	7.1	23.05	24.1
7.9	48.25	64.65	7.9	5.00	30.48	8.0	27.38	65.76	8.1	56.69	29.42	8.1	23.00	24.1
8.9	48.35	64.37	8.9	4.84	30.11	9.0	27.43	65.44	9.1	56.57	29.15	9.1	22.97	24.1
9.9	48.45	64.10	9.9	4.69	29.74	10.0	27.49	65.14	10.1	56.46	28.85	10.1	22.95	24.1
10.9	48.55	63.85	10.9	4.57	29.33	11.0	27.54	64.85	11.1	56.35	28.58	11.1	22.92	24.1
11.9	48.64	63.61	11.9	4.48	28.92	12.0	27.58	64.59	12.1	56.24	28.19	12.1	22.90	24.1
12.9	48.70	63.38	12.9	4.44	28.52	12.9	27.61	64.31	13.1	56.14	27.85	13.1	22.86	24.1
13.9	48.77	63.11	13.9	4.43	28.13	13.9	27.63	64.04	14.1	56.06	27.50	14.1	22.82	24.1
14.9	48.84	62.85	14.9	4.44	27.74	14.9	27.64	63.74	15.1	55.98	27.15	15.1	22.78	24.1
15.9	48.90	62.56	15.9	4.45	27.40	15.9	27.65	63.42	16.1	55.91	26.82	16.1	22.72	24.1
16.9	48.99	62.25	16.9	4.47	27.05	16.9	27.68	63.08	17.0	55.83	26.52	17.1	22.67	24.1
17.9	49.08	61.93	17.9	4.47	26.72	17.9	27.71	62.74	18.0	55.77	26.23	18.1	22.62	24.1
18.9	49.19	61.62	18.9	4.46	26.40	18.9	27.76	62.39	19.0	55.69	25.93	19.1	22.58	24.1
19.9	49.32	61.33	19.9	4.43	26.07	19.9	27.84	62.04	20.0	55.61	25.64	20.1	22.55	24.1
20.9	49.44	61.04	20.9	4.40	25.73	20.9	27.92	61.71	21.0	55.54	25.35	21.1	22.54	24.1
21.9	49.56	60.77	21.9	4.39	25.38	21.9	28.00	61.39	22.0	55.46	25.03	22.1	22.52	24.1
22.9	49.70	60.53	22.9	4.38	25.01	22.9	28.10	61.10	23.0	55.38	24.71	23.0	22.51	24.1
23.9	49.83	60.29	23.9	4.39	24.65	23.9	28.20	60.80	24.0	55.31	24.38	24.0	22.51	17.9
24.9	49.96	60.06	24.9	4.42	24.27	24.9	28.29	60.51	25.0	55.24	24.02	25.0	22.52	17.9
25.9	50.10	59.83	25.9	4.47	23.90	25.9	28.39	60.24	26.0	55.18	23.65	26.0	22.52	17.9
26.9	50.22	59.64	26.9	4.55	23.51	26.9	28.48	59.97	27.0	55.13	23.28	27.0	22.51	18.9
27.9	50.35	59.41	27.9	4.65	23.12	27.9	28.57	59.71	28.0	55.08	22.90	28.0	22.51	18.9
28.9	50.47	59.19	28.9	4.78	22.75	28.9	28.65	59.44	29.0	55.04	22.52	29.0	22.50	18.9
29.9	50.59	58.97	29.9	4.92	22.39	29.9	28.72	59.16	30.0	55.00	22.15	30.0	22.49	18.9
30.9	50.71	58.73	30.9	5.07	22.06	30.9	28.81	58.87	31.0	54.97	21.82	31.0	22.48	18.9
31.9	50.83	58.48	31.9	5.20	21.73	31.9	28.90	58.56	32.0	54.94	21.48	32.0	22.47	18.9
8.57	-8.51		23.31	+23.29		9.90	-9.85		7.34	+7.28		6.25	-6.17	
14 ^h 13 ^m	46° 35'0"		15 ^h 2 ^m	2° 5'10"		15 ^h 24 ^m	23° 35'1"		16 ^h 54 ^m	12° 9'1"		17 ^h 16 ^m	17° 2'2"	
-83° 17'	54° 52'		+87° 32'	42° 66'		-84° 11'	55° 43'		+82° 10'	21° 42'		-80° 47'	14° 5'	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursa Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursa Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '
	17 57	+86 37		18 7	-87 39		18 57	+89 1		19 31	-89 13		20 48	+82 14
	s	"		s	"		s	"		s	"		s	"
1.1	46.41	10.90	1.1	42.22	60.12	1.2	87.02	40.87	1.2	54.30	18.62	1.3	29.41	35.40
2.1	46.07	10.68	2.1	41.81	59.93	2.2	85.64	40.73	2.2	52.81	18.53	2.3	29.24	35.45
3.1	45.74	10.46	3.1	41.39	59.74	3.2	84.32	40.60	3.2	51.24	18.42	3.3	29.07	35.48
4.1	45.42	10.26	4.1	40.96	59.51	4.2	83.05	40.50	4.2	49.65	18.30	4.2	28.90	35.51
5.1	45.10	10.07	5.1	40.54	59.25	5.2	81.79	40.40	5.2	48.04	18.16	5.2	28.75	35.56
6.1	44.78	9.90	6.1	40.15	58.98	6.2	80.51	40.30	6.2	46.47	17.98	6.2	28.59	35.62
7.1	44.44	9.73	7.1	39.80	58.70	7.2	79.19	40.25	7.2	44.98	17.79	7.2	28.43	35.70
8.1	44.08	9.56	8.1	39.49	58.41	8.2	77.81	40.17	8.2	43.59	17.58	8.2	28.26	35.79
9.1	43.72	9.39	9.1	39.23	58.12	9.2	76.37	40.08	9.2	42.34	17.39	9.2	28.09	35.85
10.1	43.34	9.17	10.1	38.99	57.87	10.2	74.88	39.97	10.2	41.17	17.20	10.2	27.91	35.91
11.1	42.98	8.93	11.1	38.77	57.63	11.2	73.37	39.83	11.2	40.05	17.01	11.2	27.73	35.96
12.1	42.63	8.66	12.1	38.54	57.40	12.1	71.90	39.66	12.2	38.93	16.84	12.2	27.55	35.98
13.1	42.30	8.39	13.1	38.27	57.17	13.1	70.51	39.48	13.2	37.77	16.69	13.2	27.36	35.97
14.1	42.00	8.11	14.1	37.98	56.93	14.1	69.19	39.29	14.2	36.52	16.53	14.2	27.18	35.94
15.1	41.72	7.83	15.1	37.66	56.69	15.1	67.96	39.09	15.2	35.18	16.38	15.2	27.00	35.90
16.1	41.45	7.57	16.1	37.33	56.41	16.1	66.81	38.90	16.2	33.79	16.20	16.2	26.83	35.86
17.1	41.21	7.32	17.1	37.00	56.13	17.1	65.69	38.73	17.2	32.37	16.01	17.2	26.68	35.82
18.1	40.95	7.09	18.1	36.70	55.84	18.1	64.59	38.58	18.2	30.95	15.79	18.2	26.52	35.80
19.1	40.69	6.87	19.1	36.41	55.52	19.1	63.49	38.43	19.2	29.58	15.55	19.2	26.37	35.79
20.1	40.42	6.65	20.1	36.15	55.20	20.1	62.37	38.28	20.2	28.27	15.32	20.2	26.21	35.76
21.1	40.16	6.42	21.1	35.91	54.88	21.1	61.21	38.11	21.1	27.04	15.07	21.2	26.06	35.74
22.1	39.88	6.18	22.1	35.71	54.56	22.1	60.02	37.94	22.1	25.89	14.80	22.2	25.89	35.73
23.1	39.61	5.92	23.1	35.54	54.24	23.1	58.81	37.77	23.1	24.83	14.55	23.2	25.72	35.72
24.1	39.34	5.64	24.1	35.39	53.93	24.1	57.59	37.58	24.1	23.82	14.30	24.2	25.56	35.68
25.1	39.06	5.36	25.1	35.24	53.63	25.1	56.37	37.36	25.1	22.86	14.06	25.2	25.39	35.63
26.1	38.79	5.05	26.1	35.11	53.34	26.1	55.17	37.14	26.1	21.93	13.82	26.2	25.21	35.54
27.1	38.55	4.74	27.1	34.97	53.06	27.1	54.00	36.90	27.1	21.00	13.58	27.2	25.04	35.46
28.1	38.32	4.43	28.1	34.82	52.78	28.1	52.87	36.65	28.1	20.07	13.35	28.2	24.87	35.36
29.1	38.11	4.11	29.1	34.64	52.50	29.1	51.82	36.40	29.1	19.10	13.11	29.2	24.70	35.25
30.1	37.91	3.79	30.1	34.47	52.21	30.1	50.83	36.15	30.1	18.07	12.87	30.2	24.55	35.12
31.1	37.73	3.48	31.1	34.29	51.89	31.1	49.90	35.90	31.1	17.00	12.61	31.2	24.39	34.99
32.1	37.55	3.19	32.1	34.11	51.57	32.1	49.02	35.66	32.1	15.92	12.33	32.2	24.24	34.88
16.96	+16.93		24.55	-24.53		58.92	+58.91		73.57	-73.57		7.41	+7.34	
17 ^h 58 ^m 22 ^s .311			18 ^h 7 ^m 23 ^s .343			19 ^h 0 ^m 15 ^s .079			19 ^h 30 ^m 50 ^s .769			20 ^h 48 ^m 32 ^s .146		
+86° 36' 51".04			-87° 39' 50".89			+89° 1' 12".80			-89° 13' 13".35			+82° 13' 56".82		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Nov.	h m	° ' "	Nov.	h m	° ' "	Nov.	h m	° ' "	Nov.	h m	° ' "	Nov.	h m	° ' "
	21 38	-83 5		22 16	-86 22		22 37	-81 48		23 27	+86 52		23 47	-82 27
	s	"		s	"		s	"		s	"		s	"
1.3	49.24	31.53	1.3	49.95	46.41	1.3	60.68	18.50	1.4	64.87	16.11	1.4	32.16	58.83
2.3	49.07	31.62	2.3	49.64	46.54	2.3	60.56	18.67	2.4	64.57	16.38	2.4	32.05	59.08
3.3	48.88	31.72	3.3	49.32	46.68	3.3	60.43	18.84	3.4	64.28	16.64	3.4	31.93	59.34
4.3	48.70	31.80	4.3	48.99	46.81	4.3	60.28	19.01	4.4	64.01	16.88	4.4	31.80	59.59
5.3	48.51	31.85	5.3	48.62	46.91	5.3	60.14	19.15	5.4	63.74	17.14	5.4	31.67	59.83
6.3	48.32	31.89	6.3	48.25	47.00	6.3	59.98	19.28	6.4	63.51	17.41	6.4	31.52	60.06
7.3	48.12	31.89	7.3	47.88	47.06	7.3	59.82	19.38	7.3	63.27	17.70	7.4	31.38	60.25
8.3	47.94	31.88	8.3	47.54	47.09	8.3	59.67	19.46	8.3	63.01	17.99	8.4	31.24	60.42
9.3	47.77	31.84	9.3	47.20	47.10	9.3	59.54	19.51	9.3	62.75	18.30	9.4	31.10	60.57
10.3	47.62	31.82	10.3	46.87	47.12	10.3	59.41	19.57	10.3	62.46	18.60	10.4	30.96	60.72
11.3	47.47	31.81	11.3	46.59	47.14	11.3	59.29	19.62	11.3	62.14	18.89	11.4	30.84	60.85
12.3	47.32	31.80	12.3	46.30	47.17	12.3	59.17	19.69	12.3	61.79	19.17	12.3	30.73	60.99
13.3	47.17	31.81	13.3	46.02	47.22	13.3	59.04	19.78	13.3	61.43	19.41	13.3	30.63	61.16
14.3	47.01	31.82	14.3	45.71	47.28	14.3	58.92	19.87	14.3	61.06	19.64	14.3	30.50	61.34
15.3	46.84	31.83	15.3	45.38	47.34	15.3	58.79	19.97	15.3	60.70	19.84	15.3	30.36	61.53
16.2	46.66	31.85	16.3	45.03	47.40	16.3	58.63	20.07	16.3	60.37	20.03	16.3	30.22	61.71
17.2	46.46	31.85	17.3	44.67	47.46	17.3	58.48	20.16	17.3	60.04	20.22	17.3	30.07	61.90
18.2	46.27	31.82	18.3	44.29	47.48	18.3	58.30	20.23	18.3	59.73	20.42	18.3	29.90	62.08
19.2	46.08	31.78	19.3	43.91	47.49	19.3	58.14	20.28	19.3	59.43	20.62	19.3	29.73	62.26
20.2	45.89	31.72	20.3	43.53	47.49	20.3	57.97	20.32	20.3	59.13	20.82	20.3	29.57	62.39
21.2	45.70	31.66	21.3	43.15	47.46	21.3	57.82	20.33	21.3	58.82	21.03	21.3	29.40	62.52
22.2	45.52	31.57	22.3	42.79	47.43	22.3	57.67	20.34	22.3	58.50	21.24	22.3	29.25	62.62
23.2	45.35	31.48	23.3	42.45	47.40	23.3	57.52	20.34	23.3	58.17	21.45	23.3	29.10	62.72
24.2	45.19	31.39	24.3	42.12	47.36	24.3	57.38	20.33	24.3	57.82	21.66	24.3	28.94	62.81
25.2	45.04	31.29	25.3	41.80	47.31	25.3	57.24	20.32	25.3	57.46	21.86	25.3	28.80	62.90
26.2	44.89	31.20	26.2	41.49	47.26	26.3	57.11	20.31	26.3	57.08	22.05	26.3	28.65	62.98
27.2	44.75	31.12	27.2	41.18	47.21	27.3	56.98	20.31	27.3	56.67	22.23	27.3	28.52	63.06
28.2	44.59	31.04	28.2	40.88	47.18	28.3	56.85	20.31	28.3	56.27	22.39	28.3	28.38	63.14
29.2	44.44	30.96	29.2	40.57	47.15	29.3	56.71	20.32	29.3	55.87	22.53	29.3	28.24	63.24
30.2	44.27	30.88	30.2	40.24	47.12	30.3	56.57	20.33	30.3	55.48	22.67	30.3	28.09	63.34
31.2	44.11	30.81	31.2	39.89	47.09	31.2	56.41	20.33	31.3	55.10	22.79	31.3	27.92	63.44
32.2	43.93	30.71	32.2	39.53	47.04	32.2	56.26	20.32	32.3	54.74	22.90	32.3	27.75	63.54
8.31	-8.25		15.84	-15.80		7.02	-6.94		18.33	+18.30		7.63	-7.56	
21 ^h 38 ^m	38° 54'		22 ^h 16 ^m	33° 21'		22 ^h 37 ^m	51° 62'		23 ^h 27 ^m	43° 57'		23 ^h 47 ^m	23° 63'	
-83° 5'	34'' 33		-86° 22'	50'' 92		-81° 48'	24'' 80		+86° 51'	38'' 62		-82° 28'	8'' 42	

APPARENT PLACES OF STARS, 1919.

309

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Dec.	h m 0 57 s	° ' " +85 50 "	Dec.	h m 1 32 s	° ' " +88 52 "	Dec.	h m 1 41 s	° ' " -85 10 "	Dec.	h m 4 11 s	° ' " +85 20 "	Dec.	h m 5 36 s	° ' " +85 9 "
0.3	49.34	2.28	0.4	52.05	54.74	0.4	57.92	40.14	0.5	17.22	37.29	0.5	28.35	26.50
1.3	49.13	2.51	1.4	51.36	55.00	1.4	57.73	40.39	1.5	17.24	37.61	1.5	28.46	26.80
2.3	48.93	2.73	2.4	50.72	55.26	2.4	57.52	40.63	2.5	17.27	37.92	2.5	28.57	27.08
3.3	48.74	2.94	3.4	50.13	55.54	3.4	57.29	40.86	3.5	17.30	38.22	3.5	28.69	27.35
4.3	48.56	3.16	4.4	49.57	55.77	4.4	57.06	41.07	4.5	17.34	38.51	4.5	28.82	27.61
5.3	48.39	3.40	5.4	49.02	56.04	5.4	56.81	41.27	5.5	17.39	38.83	5.5	28.96	27.87
6.3	48.21	3.66	6.4	48.47	56.33	6.4	56.56	41.43	6.5	17.46	39.15	6.5	29.11	28.15
7.3	48.02	3.93	7.4	47.87	56.65	7.4	56.32	41.58	7.5	17.53	39.49	7.5	29.26	28.43
8.3	47.81	4.18	8.4	47.18	56.96	8.4	56.09	41.71	8.5	17.58	39.85	8.5	29.41	28.76
9.3	47.57	4.43	9.3	46.41	57.27	9.4	55.89	41.84	9.5	17.59	40.22	9.5	29.56	29.10
10.3	47.31	4.68	10.3	45.55	57.56	10.4	55.67	41.98	10.5	17.60	40.58	10.5	29.67	29.45
11.3	47.04	4.90	11.3	44.66	57.82	11.4	55.48	42.13	11.5	17.58	40.95	11.5	29.77	29.80
12.3	46.77	5.09	12.3	43.73	58.06	12.3	55.27	42.31	12.5	17.54	41.28	12.5	29.83	30.15
13.3	46.50	5.26	13.3	42.82	58.27	13.3	55.05	42.48	13.4	17.49	41.62	13.5	29.89	30.48
14.3	46.25	5.41	14.3	41.95	58.46	14.3	54.82	42.65	14.4	17.44	41.92	14.5	29.94	30.77
15.3	46.01	5.56	15.3	41.11	58.66	15.3	54.58	42.82	15.4	17.40	42.22	15.5	29.99	31.07
16.3	45.77	5.70	16.3	40.32	58.86	16.3	54.31	42.99	16.4	17.35	42.50	16.5	30.03	31.36
17.3	45.54	5.85	17.3	39.54	59.05	17.3	54.05	43.14	17.4	17.32	42.79	17.5	30.08	31.64
18.3	45.31	6.01	18.3	38.76	59.25	18.3	53.78	43.28	18.4	17.29	43.07	18.5	30.14	31.93
19.3	45.09	6.17	19.3	37.98	59.46	19.3	53.51	43.39	19.4	17.27	43.39	19.5	30.21	32.23
20.3	44.85	6.33	20.3	37.16	59.66	20.3	53.24	43.50	20.4	17.24	43.70	20.5	30.28	32.54
21.3	44.61	6.49	21.3	36.31	59.89	21.3	52.98	43.59	21.4	17.21	44.01	21.5	30.35	32.85
22.3	44.34	6.65	22.3	35.42	60.10	22.3	52.73	43.66	22.4	17.16	44.33	22.5	30.41	33.17
23.3	44.07	6.81	23.3	34.47	60.31	23.3	52.48	43.72	23.4	17.11	44.65	23.5	30.46	33.50
24.3	43.79	6.96	24.3	33.45	60.51	24.3	52.23	43.78	24.4	17.05	45.00	24.5	30.50	33.85
25.3	43.49	7.10	25.3	32.40	60.69	25.3	51.99	43.85	25.4	16.96	45.33	25.5	30.52	34.20
26.3	43.19	7.21	26.3	31.33	60.87	26.3	51.76	43.93	26.4	16.86	45.66	26.5	30.53	34.55
27.3	42.89	7.31	27.3	30.24	61.01	27.3	51.52	44.01	27.4	16.75	45.95	27.5	30.52	34.90
28.3	42.60	7.40	28.3	29.18	61.15	28.3	51.26	44.09	28.4	16.62	46.24	28.5	30.48	35.23
29.3	42.31	7.46	29.3	28.16	61.28	29.3	51.00	44.17	29.4	16.50	46.51	29.5	30.47	35.52
30.3	42.04	7.51	30.3	27.20	61.38	30.3	50.72	44.25	30.4	16.39	46.76	30.5	30.45	35.81
31.3	41.79	7.56	31.3	26.29	61.49	31.3	50.43	44.31	31.4	16.29	47.01	31.5	30.43	36.10
13.77	+13.73		51.90	+51.29		11.90	-11.86		12.32	+12.28		11.85	+11.81	
0 ^h 57 ^m 24 ^s .633			1 ^h 31 ^m 11 ^s .709			1 ^h 41 ^m 54 ^s .846			4 ^h 16 ^m 37 ^s .831			5 ^h 35 ^m 50 ^s .330		
+85° 49' 24".14			+88° 52' 20".55			-85° 10' 45".22			+85° 20' 28".88			+85° 9' 34".51		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Menasse. Mag. 6.2			5 Menasse. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelopard. Mag. 5.1			7 G. Oriole. Mag. 6.4		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Dec.	h m 5 45	° -84 49	Dec.	h m 6 46	° -80 43	Dec.	h m 7 3	° +87 10	Dec.	h m 7 14	° +52 33	Dec.	h m 7 15	° -86 54
	s "	"		s "	"		s "	"		s "	"		s "	"
0.5	51.75	42.35	0.6	50.43	45.38	0.6	56.51	20.10	0.6	30.15	52.13	0.6	37.46	19.24
1.5	51.82	42.67	1.6	50.49	45.69	1.6	56.83	20.34	1.6	30.23	52.34	1.6	37.71	20.12
2.5	51.87	43.03	2.6	50.56	46.02	2.6	57.15	20.54	2.6	30.41	52.54	2.6	37.97	20.63
3.5	51.92	43.42	3.6	50.63	46.38	3.6	57.47	20.75	3.6	30.54	52.72	3.6	38.22	20.75
4.5	51.96	43.81	4.6	50.69	46.76	4.6	57.81	20.95	4.6	30.68	52.87	4.6	38.43	21.19
5.5	51.97	44.19	5.6	50.74	47.14	5.6	58.18	21.13	5.6	30.82	53.04	5.6	38.61	21.46
6.5	51.97	44.57	6.6	50.80	47.51	6.6	58.56	21.32	6.6	30.99	53.21	6.6	38.77	21.82
7.5	51.96	44.92	7.6	50.84	47.87	7.6	58.97	21.55	7.6	31.16	53.39	7.6	38.91	22.18
8.5	51.94	45.26	8.6	50.87	48.23	8.6	59.36	21.78	8.6	31.33	53.61	8.6	39.03	22.6
9.5	51.93	45.58	9.6	50.90	48.55	9.6	59.75	22.05	9.6	31.49	53.84	9.6	39.15	22.79
10.5	51.92	45.89	10.6	50.94	48.86	10.6	60.09	22.34	10.6	31.64	54.11	10.6	39.28	23.08
11.5	51.92	46.20	11.6	50.98	49.17	11.6	60.42	22.63	11.6	31.77	54.39	11.6	39.41	23.37
12.5	51.92	46.51	12.6	51.02	49.50	12.6	60.69	22.92	12.6	31.89	54.65	12.6	39.56	23.6
13.5	51.93	46.85	13.6	51.06	49.82	13.6	60.94	23.20	13.6	31.99	54.90	13.6	39.73	23.97
14.5	51.93	47.21	14.6	51.10	50.18	14.6	61.18	23.48	14.6	32.09	55.14	14.6	39.90	24.39
15.5	51.93	47.57	15.6	51.14	50.55	15.6	61.41	23.72	15.6	32.18	55.38	15.6	40.05	24.6
16.5	51.92	47.96	16.6	51.18	50.93	16.6	61.63	23.97	16.6	32.28	55.61	16.6	40.19	25.01
17.5	51.89	48.34	17.6	51.21	51.32	17.6	61.87	24.21	17.6	32.38	55.84	17.6	40.33	25.37
18.5	51.85	48.72	18.6	51.24	51.71	18.6	62.11	24.45	18.6	32.48	56.07	18.6	40.43	25.74
19.5	51.81	49.10	19.6	51.25	52.10	19.6	62.36	24.70	19.6	32.59	56.28	19.6	40.53	26.12
20.5	51.76	49.47	20.6	51.26	52.48	20.6	62.63	24.97	20.6	32.71	56.52	20.6	40.59	26.50
21.5	51.69	49.81	21.6	51.28	52.85	21.6	62.89	25.25	21.6	32.82	56.78	21.6	40.65	26.87
22.5	51.62	50.16	22.6	51.28	53.22	22.6	63.15	25.54	22.6	32.94	57.04	22.6	40.70	27.29
23.5	51.55	50.48	23.6	51.29	53.57	23.6	63.40	25.85	23.6	33.05	57.32	23.6	40.73	27.53
24.5	51.48	50.79	24.6	51.29	53.91	24.6	63.64	26.17	24.6	33.15	57.63	24.6	40.76	27.86
25.5	51.41	51.11	25.6	51.29	54.24	25.6	63.84	26.49	25.6	33.25	57.94	25.6	40.79	28.19
26.5	51.35	51.43	26.6	51.29	54.58	26.6	64.03	26.82	26.6	33.34	58.24	26.6	40.82	28.52
27.5	51.29	51.74	27.6	51.29	54.92	27.6	64.17	27.15	27.6	33.40	58.56	27.6	40.86	28.85
28.5	51.23	52.07	28.6	51.30	55.27	28.6	64.31	27.47	28.6	33.46	58.84	28.6	40.91	29.19
29.5	51.15	52.43	29.6	51.30	55.63	29.6	64.42	27.77	29.6	33.51	59.12	29.6	40.96	29.55
30.5	51.07	52.79	30.6	51.30	56.00	30.6	64.53	28.06	30.6	33.57	59.39	30.6	41.00	29.92
31.5	50.98	53.15	31.6	51.29	56.41	31.6	64.66	28.33	31.6	33.63	59.64	31.6	41.02	30.33
11.10	-11.05		6.21	-6.13		20.28	+20.25		7.73	+7.66		18.53	-18.51	
5 ^h 45 ^m	51°.396		6 ^h 46 ^m	48°.653		7 ^h 3 ^m	2°.335		7 ^h 14 ^m	7°.912		7 ^h 15 ^m	39°.091	
-84° 49'	44'' 27		-80° 43'	46'' 14		+87° 10'	43'' 80		+82° 34'	17'' 32		-86° 54'	19'' 75	

APPARENT PLACES OF STARS, 1919.

311

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamaeleontis. Mag. 5.2			30 H. Camelopard. Mag. 5.3		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Dec.	h m s	° ' "	Dec.	h m s	° ' "	Dec.	h m s	° ' "	Dec.	h m s	° ' "	Dec.	h m s	° ' "
0.7	25.19	3.21	0.7	41.83	29.02	0.7	50.47	29.54	0.7	21.18	41.94	0.7	26.88	34.23
1.7	26.20	3.35	1.7	42.09	29.19	1.7	50.63	29.57	1.7	21.31	42.08	1.7	27.07	34.18
2.6	27.18	3.48	2.7	42.36	29.37	2.7	50.78	29.58	2.7	21.45	42.25	2.7	27.25	34.13
3.6	28.15	3.59	3.7	42.63	29.59	3.7	50.93	29.59	3.7	21.60	42.42	3.7	27.42	34.08
4.6	29.16	3.70	4.7	42.87	29.82	4.7	51.09	29.58	4.7	21.74	42.61	4.7	27.60	33.99
5.6	30.21	3.81	5.7	43.13	30.07	5.7	51.26	29.58	5.7	21.88	42.84	5.7	27.79	33.90
6.6	31.33	3.90	6.7	43.36	30.34	6.7	51.43	29.58	6.7	22.02	43.08	6.7	27.99	33.81
7.6	32.50	4.03	7.7	43.57	30.59	7.7	51.62	29.58	7.7	22.15	43.33	7.7	28.19	33.73
8.6	33.09	4.17	8.7	43.76	30.84	8.7	51.80	29.60	8.7	22.26	43.56	8.7	28.42	33.67
9.6	34.88	4.34	9.7	43.96	31.08	9.7	51.99	29.64	9.7	22.37	43.77	9.7	28.64	33.62
10.6	36.01	4.51	10.7	44.15	31.30	10.7	52.17	29.72	10.7	22.48	43.97	10.7	28.87	33.60
11.6	37.07	4.71	11.7	44.35	31.50	11.7	52.34	29.81	11.7	22.59	44.16	11.7	29.08	33.61
12.6	38.05	4.94	12.7	44.55	31.70	12.7	52.52	29.91	12.7	22.70	44.35	12.7	29.27	33.65
13.6	38.95	5.16	13.7	44.77	31.92	13.7	52.66	30.01	13.7	22.83	44.55	13.7	29.47	33.69
14.6	39.79	5.36	14.7	44.99	32.16	14.7	52.80	30.11	14.7	22.95	44.78	14.7	29.65	33.72
15.6	40.59	5.56	15.6	45.22	32.40	15.7	52.94	30.22	15.7	23.08	45.01	15.7	29.82	33.75
16.6	41.39	5.75	16.6	45.45	32.67	16.7	53.08	30.33	16.7	23.21	45.24	16.7	29.99	33.76
17.6	42.22	5.94	17.6	45.67	32.95	17.7	53.22	30.42	17.7	23.34	45.50	17.7	30.16	33.78
18.6	43.06	6.12	18.6	45.87	33.27	18.7	53.36	30.50	18.7	23.46	45.78	18.7	30.34	33.80
19.6	43.93	6.31	19.6	46.07	33.57	19.6	53.50	30.59	19.7	23.58	46.06	19.7	30.52	33.82
20.6	44.82	6.50	20.6	46.25	33.88	20.6	53.65	30.67	20.7	23.69	46.35	20.7	30.70	33.83
21.6	45.74	6.69	21.6	46.43	34.19	21.6	53.81	30.77	21.7	23.80	46.64	21.7	30.90	33.86
22.6	46.66	6.91	22.6	46.59	34.49	22.6	53.98	30.89	22.6	23.90	46.94	22.7	31.10	33.89
23.6	47.56	7.14	23.6	46.74	34.78	23.6	54.14	31.02	23.6	23.99	47.22	23.7	31.31	33.93
24.6	48.46	7.41	24.6	46.88	35.07	24.6	54.29	31.16	24.6	24.08	47.49	24.7	31.51	33.99
25.6	49.31	7.67	25.6	47.03	35.35	25.6	54.45	31.31	25.6	24.17	47.77	25.7	31.71	34.08
26.6	50.09	7.94	26.6	47.18	35.64	26.6	54.60	31.49	26.6	24.26	48.04	26.7	31.90	34.19
27.6	50.80	8.21	27.6	47.33	35.92	27.6	54.74	31.68	27.6	24.36	48.30	27.7	32.09	34.30
28.6	51.45	8.49	28.6	47.50	36.20	28.6	54.87	31.86	28.6	24.46	48.57	28.7	32.26	34.43
29.6	52.05	8.75	29.6	47.67	36.49	29.6	54.97	32.04	29.6	24.55	48.86	29.7	32.41	34.56
30.6	52.61	8.99	30.6	47.84	36.81	30.6	55.09	32.21	30.6	24.65	49.17	30.7	32.57	34.67
31.6	53.19	9.22	31.6	47.99	37.17	31.6	55.20	32.36	31.6	24.76	49.49	31.7	32.72	34.76
50.63	+50.62		12.31	-12.27		6.91	+6.83		6.11	-6.03		8.16	+8.10	
8 ^h 17 ^m 47 ^s .546			9 ^h 8 ^m 41 ^s .594			9 ^h 25 ^m 39 ^s .275			9 ^h 36 ^m 19 ^s .026			10 ^h 21 ^m 19 ^s .949		
+88° 52' 37".80			-85° 20' 26".78			+81° 41' 10".13			-80° 34' 39".26			+82° 58' 17".67		

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Dec.	h m 10 59	° ' " -84 9	Dec.	h m 12 14	° ' " +88 8	Dec.	h m 12 46	° ' " -84 41	Dec.	h m 12 48	° ' " +83 50	Dec.	h m 13 27	° ' " -85 22
	s 56.55	" 33.21		s 1.29	" 14.62		s 22.53	" 6.05		s 21.69	" 32.76		s 36.87	" 23.99
0.8	56.55	33.21	0.8	1.29	14.62	0.8	22.53	6.05	0.8	21.69	32.76	0.9	36.87	23.99
1.8	56.78	33.21	1.8	1.85	14.43	1.8	22.75	5.90	1.8	21.84	32.52	1.9	37.10	23.79
2.8	57.02	33.23	2.8	2.39	14.26	2.8	22.99	5.76	2.8	21.99	32.30	2.9	37.34	23.59
3.8	57.27	33.27	3.8	2.91	14.06	3.8	23.26	5.63	3.8	22.14	32.07	3.9	37.61	23.40
4.8	57.53	33.34	4.8	3.41	13.85	4.8	23.52	5.53	4.8	22.28	31.83	4.9	37.90	23.24
5.8	57.78	33.43	5.8	3.93	13.65	5.8	23.80	5.44	5.8	22.43	31.56	5.9	38.19	23.10
6.7	58.01	33.54	6.8	4.49	13.42	6.8	24.08	5.39	6.8	22.59	31.29	6.9	38.48	22.98
7.7	58.25	33.67	7.8	5.08	13.19	7.8	24.33	5.35	7.8	22.76	31.01	7.8	38.77	22.87
8.7	58.48	33.78	8.8	5.75	12.97	8.8	24.58	5.32	8.8	22.95	30.74	8.8	39.04	22.78
9.7	58.68	33.89	9.8	6.44	12.77	9.8	24.81	5.29	9.8	23.14	30.47	9.8	39.29	22.69
10.7	58.88	33.99	10.8	7.15	12.59	10.8	25.04	5.27	10.8	23.34	30.23	10.8	39.54	22.60
11.7	59.08	34.08	11.8	7.86	12.44	11.8	25.26	5.23	11.8	23.54	30.02	11.8	39.78	22.50
12.7	59.29	34.16	12.8	8.55	12.31	12.8	25.49	5.17	12.8	23.75	29.82	12.8	40.02	22.36
13.7	59.51	34.25	13.8	9.21	12.20	13.8	25.72	5.08	13.8	23.94	29.64	13.8	40.27	22.24
14.7	59.74	34.34	14.8	9.83	12.10	14.8	25.96	5.00	14.8	24.13	29.49	14.8	40.54	22.11
15.7	59.97	34.43	15.8	10.45	11.99	15.8	26.23	4.93	15.8	24.31	29.33	15.8	40.82	21.98
16.7	60.21	34.55	16.8	11.04	11.88	16.8	26.50	4.87	16.8	24.48	29.16	16.8	41.12	21.87
17.7	60.45	34.69	17.8	11.62	11.75	17.8	26.77	4.85	17.8	24.65	28.99	17.8	41.43	21.77
18.7	60.69	34.84	18.8	12.22	11.62	18.8	27.06	4.84	18.8	24.82	28.82	18.8	41.74	21.69
19.7	60.92	35.01	19.8	12.83	11.49	19.8	27.34	4.84	19.8	25.01	28.64	19.8	42.05	21.63
20.7	61.15	35.20	20.8	13.47	11.36	20.8	27.61	4.86	20.8	25.19	28.47	20.8	42.36	21.58
21.7	61.38	35.38	21.8	14.13	11.25	21.8	27.88	4.89	21.8	25.39	28.30	21.8	42.65	21.54
22.7	61.57	35.56	22.8	14.83	11.14	22.8	28.13	4.92	22.8	25.59	28.12	22.8	42.95	21.53
23.7	61.77	35.75	23.8	15.54	11.04	23.8	28.38	4.96	23.8	25.81	27.96	23.8	43.24	21.50
24.7	61.96	35.94	24.8	16.28	10.95	24.8	28.63	5.00	24.8	26.04	27.81	24.8	43.51	21.47
25.7	62.15	36.12	25.7	17.02	10.88	25.8	28.86	5.03	25.8	26.26	27.67	25.8	43.79	21.44
26.7	62.34	36.29	26.7	17.76	10.82	26.8	29.10	5.06	26.8	26.48	27.55	26.8	44.05	21.41
27.7	62.54	36.47	27.7	18.48	10.79	27.8	29.34	5.07	27.8	26.70	27.45	27.8	44.32	21.38
28.7	62.73	36.63	28.7	19.18	10.76	28.8	29.59	5.10	28.8	26.90	27.36	28.8	44.60	21.35
29.7	62.95	36.81	29.7	19.83	10.73	29.8	29.85	5.13	29.8	27.10	27.28	29.8	44.90	21.31
30.7	63.17	37.01	30.7	20.44	10.70	30.8	30.12	5.16	30.8	27.29	27.22	30.8	45.22	21.28
31.7	63.39	37.24	31.7	21.04	10.67	31.8	30.42	5.21	31.8	27.48	27.14	31.8	45.54	21.27
9.83	-9.78		30.75	+30.74		10.79	-10.75		9.32	+9.27		12.40	-12.35	
10 ^h 59 ^m 54 ^s .546			12 ^h 14 ^m 29 ^s .190			12 ^h 46 ^m 19 ^s .119			12 ^h 48 ^m 31 ^s .308			13 ^h 27 ^m 32 ^s .891		
-84° 9' 29".33			+88° 8' 56".19			-84° 41' 1".57			+83° 51' 11".30			-85° 22' 19".48		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 3383. Mag. 7.2			ρ Octantis. Mag. 5.7			ϵ Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Dec.	h m 14 13	° ' -83 17	Dec.	h m 15 2	° ' +87 32	Dec.	h m 15 24	° ' -84 11	Dec.	h m 16 53	° ' +82 10	Dec.	h m 17 16	° ' -80 47
	s "	"		s "	"		s "	"		s "	"		s "	"
0.9	50.71	58.73	0.9	5.07	22.06	0.9	28.81	58.87	1.0	54.97	21.82	1.0	22.48	15.79
1.9	50.83	58.48	1.9	5.20	21.73	1.9	28.90	58.56	2.0	54.94	21.48	2.0	22.47	15.46
2.9	50.97	58.23	2.9	5.31	21.42	2.9	29.00	58.24	3.0	54.91	21.17	3.0	22.47	15.13
3.9	51.14	57.99	3.9	5.41	21.11	3.9	29.14	57.92	4.0	54.87	20.86	4.0	22.47	14.76
4.9	51.32	57.77	4.9	5.49	20.80	4.9	29.28	57.64	5.0	54.83	20.55	5.0	22.51	14.41
5.9	51.51	57.57	5.9	5.58	20.47	5.9	29.44	57.35	5.9	54.79	20.22	6.0	22.55	14.08
6.9	51.70	57.39	6.9	5.66	20.10	6.9	29.61	57.10	6.9	54.75	19.89	7.0	22.59	13.76
7.9	51.89	57.25	7.9	5.78	19.74	7.9	29.78	56.85	7.9	54.71	19.52	8.0	22.65	13.47
8.9	52.06	57.11	8.9	5.92	19.37	8.9	29.94	56.64	8.9	54.68	19.15	9.0	22.70	13.18
9.9	52.23	56.97	9.9	6.11	18.99	9.9	30.09	56.42	9.9	54.65	18.76	10.0	22.75	12.91
10.9	52.38	56.82	10.9	6.34	18.62	10.9	30.23	56.20	10.9	54.64	18.35	10.9	22.78	12.65
11.9	52.53	56.65	11.9	6.58	18.29	11.9	30.36	55.98	11.9	54.64	17.95	11.9	22.81	12.38
12.9	52.68	56.48	12.9	6.85	17.97	12.9	30.48	55.74	12.9	54.64	17.57	12.9	22.84	12.09
13.9	52.84	56.30	13.9	7.10	17.67	13.9	30.61	55.46	13.9	54.66	17.23	13.9	22.86	11.78
14.9	53.01	56.11	14.9	7.35	17.38	14.9	30.75	55.19	14.9	54.67	16.89	14.9	22.89	11.46
15.9	53.18	55.93	15.9	7.58	17.11	15.9	30.92	54.92	15.9	54.68	16.55	15.9	22.92	11.14
16.9	53.36	55.75	16.9	7.82	16.83	16.9	31.09	54.66	16.9	54.68	16.25	16.9	22.96	10.80
17.9	53.56	55.59	17.9	8.04	16.56	17.9	31.27	54.41	17.9	54.69	15.94	17.9	23.01	10.47
18.9	53.77	55.45	18.9	8.27	16.29	18.9	31.45	54.16	18.9	54.69	15.62	18.9	23.06	10.14
19.8	53.98	55.31	19.9	8.49	15.97	19.9	31.64	53.93	19.9	54.71	15.28	19.9	23.13	9.81
20.8	54.18	55.19	20.9	8.73	15.67	20.9	31.84	53.73	20.9	54.72	14.93	20.9	23.21	9.51
21.8	54.38	55.09	21.9	8.99	15.36	21.9	32.05	53.53	21.9	54.73	14.57	21.9	23.30	9.23
22.8	54.58	55.01	22.9	9.27	15.05	22.9	32.25	53.36	22.9	54.74	14.21	22.9	23.38	8.94
23.8	54.78	54.94	23.9	9.58	14.76	23.9	32.44	53.18	23.9	54.78	13.83	23.9	23.44	8.68
24.8	54.97	54.86	24.9	9.90	14.46	24.9	32.63	53.02	24.9	54.81	13.46	24.9	23.51	8.43
25.8	55.15	54.77	25.9	10.26	14.16	25.9	32.81	52.85	25.9	54.85	13.08	25.9	23.57	8.18
26.8	55.33	54.69	26.9	10.63	13.88	26.9	32.99	52.67	26.9	54.90	12.71	26.9	23.64	7.93
27.8	55.51	54.60	27.9	11.01	13.60	27.9	33.16	52.49	27.9	54.95	12.37	27.9	23.70	7.66
28.8	55.69	54.49	28.9	11.38	13.37	28.9	33.33	52.29	28.9	55.00	12.04	28.9	23.76	7.38
29.8	55.89	54.39	29.9	11.73	13.15	29.9	33.53	52.10	29.9	55.05	11.72	29.9	23.85	7.07
30.8	56.11	54.30	30.9	12.07	12.92	30.9	33.73	51.90	30.9	55.10	11.43	30.9	23.92	6.75
31.8	56.33	54.21	31.8	12.39	12.71	31.9	33.96	51.70	31.9	55.15	11.14	31.9	24.01	6.44
8.57	-8.51		23.28	+23.26		9.89	-9.84		7.34	+7.27		6.25	-6.17	
14 ^h 13 ^m 46 ^s .350			15 ^h 3 ^m 2 ^s .510			15 ^h 24 ^m 23 ^s .351			16 ^h 54 ^m 12 ^s .991			17 ^h 16 ^m 17 ^s .234		
-83° 17' 54".52			+87° 32' 42".66			-84° 11' 55".43			+82° 10' 21".42			-80° 47' 14".27		

APPARENT PLACES OF STARS, 1919.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '
	17 57	+86 36		18 7	-87 39		18 57	+89 1		19 31	-89 13		20 48	+82 14
	s	"		s	"		s	"		s	"		s	"
1.1	37.73	63.48	1.1	34.29	51.89	1.1	49.90	35.90	1.1	17.00	12.61	1.2	24.39	34.99
2.1	37.55	63.19	2.1	34.11	51.57	2.1	49.02	35.66	2.1	15.92	12.33	2.2	24.24	34.88
3.1	37.38	62.91	3.1	33.97	51.22	3.1	48.14	35.45	3.1	14.88	12.02	3.2	24.10	34.79
4.0	37.20	62.65	4.1	33.86	50.85	4.1	47.26	35.25	4.1	13.92	11.70	4.2	23.96	34.71
5.0	37.00	62.38	5.1	33.78	50.47	5.1	46.30	35.05	5.1	13.07	11.37	5.2	23.82	34.62
6.0	36.80	62.11	6.0	33.77	50.10	6.1	45.29	34.83	6.1	12.34	11.05	6.2	23.67	34.53
7.0	36.57	61.83	7.0	33.80	49.77	7.1	44.23	34.61	7.1	11.75	10.73	7.2	23.52	34.44
8.0	36.36	61.50	8.0	33.83	49.44	8.1	43.16	34.37	8.1	11.23	10.41	8.2	23.36	34.34
9.0	36.16	61.16	9.0	33.86	49.12	9.1	42.11	34.08	9.1	10.76	10.11	9.2	23.20	34.21
10.0	35.98	60.79	10.0	33.88	48.84	10.1	41.12	33.80	10.1	10.26	9.82	10.1	23.03	34.04
11.0	35.83	60.43	11.0	33.88	48.56	11.1	40.22	33.50	11.1	9.72	9.55	11.1	22.86	33.86
12.0	35.70	60.08	12.0	33.84	48.25	12.1	39.42	33.18	12.1	9.08	9.28	12.1	22.71	33.67
13.0	35.60	59.74	13.0	33.81	47.93	13.1	38.71	32.87	13.1	8.38	9.01	13.1	22.57	33.47
14.0	35.50	59.42	14.0	33.76	47.60	14.1	38.06	32.58	14.1	7.64	8.70	14.1	22.44	33.27
15.0	35.42	59.10	15.0	33.71	47.24	15.1	37.46	32.30	15.1	6.92	8.38	15.1	22.32	33.07
16.0	35.34	58.81	16.0	33.69	46.88	16.1	36.87	32.02	16.1	6.23	8.05	16.1	22.19	32.91
17.0	35.25	58.51	17.0	33.71	46.51	17.1	36.26	31.78	17.1	5.60	7.69	17.1	22.07	32.74
18.0	35.15	58.21	18.0	33.76	46.14	18.1	35.62	31.53	18.1	5.06	7.32	18.1	21.94	32.57
19.0	35.06	57.91	19.0	33.84	45.77	19.0	34.97	31.26	19.1	4.61	6.95	19.1	21.83	32.39
20.0	34.97	57.60	20.0	33.93	45.41	20.0	34.30	31.00	20.1	4.25	6.59	20.1	21.71	32.22
21.0	34.87	57.27	21.0	34.06	45.07	21.0	33.63	30.71	21.1	3.96	6.24	21.1	21.58	32.04
21.9	34.78	56.94	22.0	34.20	44.72	22.0	32.96	30.40	22.1	3.75	5.90	22.1	21.45	31.84
22.9	34.70	56.60	23.0	34.35	44.39	23.0	32.31	30.09	23.1	3.56	5.56	23.1	21.31	31.61
23.9	34.63	56.24	23.9	34.49	44.10	24.0	31.69	29.76	24.1	3.40	5.24	24.1	21.18	31.38
24.9	34.57	55.87	24.9	34.64	43.80	25.0	31.11	29.42	25.1	3.23	4.93	25.1	21.05	31.14
25.9	34.54	55.50	25.9	34.77	43.51	26.0	30.61	29.08	26.1	3.07	4.62	26.1	20.94	30.87
26.9	34.52	55.13	26.9	34.88	43.20	27.0	30.20	28.75	27.0	2.84	4.30	27.1	20.83	30.61
27.9	34.52	54.78	27.9	34.99	42.89	28.0	29.85	28.43	28.0	2.56	3.99	28.1	20.72	30.35
28.9	34.54	54.44	28.9	35.10	42.55	29.0	29.56	28.11	29.0	2.27	3.65	29.1	20.61	30.10
29.9	34.56	54.11	29.9	35.23	42.21	30.0	29.28	27.79	30.0	2.00	3.28	30.1	20.52	29.85
30.9	34.57	53.80	30.9	35.39	41.85	31.0	29.04	27.51	31.0	1.79	2.91	31.1	20.43	29.61
31.9	34.58	53.51	31.9	35.57	41.48	32.0	28.75	27.25	32.0	1.66	2.53	32.1	20.34	29.38
16.94	+16.91		24.52	-24.50		58.81	+58.80		73.36	-73.36		7.41	+7.34	
17 ^h 58 ^m 22 ^s .311			18 ^h 7 ^m 23 ^s .343			19 ^h 0 ^m 15 ^s .079			19 ^h 30 ^m 50 ^s .769			20 ^h 48 ^m 32 ^s .146		
+86° 36' 51".04			-87° 39' 50".89			+89° 1' 12".80			-89° 13' 13".35			+82° 13' 56".82		

APPARENT PLACES OF STARS, 1919.

315

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			ν Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Octantis. Mag. 5.1		
Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
Dec.	h m	° ' "	Dec.	h m	° ' "	Dec.	h m	° ' "	Dec.	h m	° ' "	Dec.	h m	° ' "
	21 38	-83 5		22 16	-86 22		22 37	-81 48		23 27	+86 52		23 47	-82 28
	s	"		s	"		s	"		s	"		s	"
1.2	44.11	30.81	1.2	39.89	47.09	1.2	56.41	20.33	1.3	55.10	22.79	1.3	27.92	3.44
2.2	43.93	30.71	2.2	39.53	47.04	2.2	56.26	20.32	2.3	54.74	22.90	2.3	27.75	3.54
3.2	43.74	30.57	3.2	39.16	46.96	3.2	56.09	20.28	3.3	54.40	23.02	3.3	27.57	3.60
4.2	43.56	30.43	4.2	38.78	46.86	4.2	55.94	20.21	4.3	54.07	23.15	4.3	27.39	3.66
5.2	43.39	30.26	5.2	38.41	46.72	5.2	55.77	20.13	5.3	53.74	23.29	5.3	27.21	3.69
6.2	43.24	30.06	6.2	38.08	46.57	6.2	55.62	20.04	6.3	53.40	23.45	6.3	27.04	3.70
7.2	43.10	29.86	7.2	37.78	46.42	7.2	55.49	19.91	7.3	53.03	23.62	7.3	26.87	3.68
8.2	42.98	29.66	8.2	37.49	46.26	8.2	55.37	19.79	8.3	52.62	23.77	8.3	26.72	3.67
9.2	42.86	29.48	9.2	37.22	46.10	9.2	55.25	19.69	9.3	52.22	23.91	9.3	26.58	3.65
10.2	42.74	29.31	10.2	36.97	45.96	10.2	55.13	19.58	10.3	51.79	24.02	10.3	26.45	3.63
11.2	42.62	29.15	11.2	36.67	45.84	11.2	55.01	19.50	11.3	51.35	24.12	11.3	26.31	3.62
12.2	42.48	29.01	12.2	36.38	45.74	12.2	54.88	19.43	12.3	50.91	24.18	12.3	26.16	3.63
13.2	42.34	28.86	13.2	36.07	45.62	13.2	54.74	19.35	13.3	50.50	24.21	13.3	26.00	3.65
14.2	42.18	28.69	14.2	35.75	45.50	14.2	54.59	19.28	14.2	50.11	24.24	14.3	25.83	3.67
15.2	42.02	28.52	15.2	35.42	45.37	15.2	54.45	19.19	15.2	49.73	24.27	15.3	25.66	3.68
16.2	41.87	28.33	16.2	35.08	45.20	16.2	54.29	19.07	16.2	49.36	24.31	16.3	25.48	3.69
17.2	41.72	28.11	17.2	34.74	45.02	17.2	54.14	18.95	17.2	49.01	24.35	17.3	25.29	3.66
18.2	41.56	27.89	18.2	34.40	44.84	18.2	53.99	18.80	18.2	48.65	24.39	18.3	25.11	3.62
19.2	41.42	27.65	19.2	34.09	44.65	19.2	53.85	18.65	19.2	48.29	24.43	19.2	24.94	3.58
20.2	41.29	27.41	20.2	33.80	44.45	20.2	53.71	18.48	20.2	47.92	24.47	20.2	24.77	3.51
21.2	41.18	27.16	21.2	33.51	44.23	21.2	53.58	18.31	21.2	47.54	24.52	21.2	24.62	3.42
22.2	41.07	26.91	22.2	33.24	44.00	22.2	53.46	18.13	22.2	47.13	24.56	22.2	24.47	3.34
23.1	40.96	26.67	23.2	33.00	43.78	23.2	53.35	17.95	23.2	46.71	24.59	23.2	24.32	3.25
24.1	40.86	26.43	24.2	32.75	43.58	24.2	53.25	17.77	24.2	46.29	24.60	24.2	24.17	3.15
25.1	40.77	26.19	25.2	32.52	43.37	25.2	53.15	17.60	25.2	45.86	24.60	25.2	24.03	3.05
26.1	40.67	25.96	26.2	32.28	43.17	26.2	53.03	17.43	26.2	45.42	24.59	26.2	23.89	2.97
27.1	40.57	25.74	27.2	32.02	42.98	27.2	52.91	17.29	27.2	45.00	24.55	27.2	23.74	2.90
28.1	40.44	25.53	28.2	31.76	42.79	28.2	52.79	17.13	28.2	44.59	24.50	28.2	23.57	2.83
29.1	40.31	25.29	29.2	31.49	42.57	29.2	52.66	16.96	29.2	44.21	24.44	29.2	23.41	2.76
30.1	40.19	25.02	30.2	31.20	42.34	30.2	52.52	16.78	30.2	43.84	24.38	30.2	23.24	2.68
31.1	40.07	24.75	31.2	30.91	42.10	31.2	52.39	16.58	31.2	43.50	24.33	31.2	23.07	2.58
32.1	39.95	24.46	32.2	30.63	41.83	32.2	52.26	16.35	32.2	43.16	24.29	32.2	22.90	2.44
8.31	-8.25		15.83	-15.80		7.02	-6.94		18.33	+18.31		7.63	-7.56	
21 ^h 38 ^m	38 ^s .548		22 ^h 16 ^m	33 ^s .212		22 ^h 37 ^m	51 ^s .624		23 ^h 27 ^m	43 ^s .571		23 ^h 47 ^m	23 ^s .637	
-83° 5'	34''.33		-86° 22'	50''.92		-81° 48'	24''.80		+86° 51'	38''.62		-82° 28'	8''.42	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	33 Piscium. Mag. 4.7		α Andromedæ. (Alpheratz.) Mag. 2.2		β Cassiopeiæ. Mag. 2.4		ϵ Phœnicis. Mag. 3.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 0 1	° ' " - 6 9	h m 0 4	° ' " +28 38	h m 0 4	° ' " +58 42	h m 0 5	° ' " -46 11
	s	"	s	"	s	"	s	"
Jan. 0.2	12.204	35.30	12.785	50.91	51.872	34.24	18.724	48.95
10.2	12.094 ¹¹⁰	35.90 ⁶⁰	12.646 ¹³⁹	49.98 ⁹³	51.566 ³⁰⁶	33.49 ⁷⁵	18.518 ²⁰⁶	48.62 ³³
20.2	11.991 ¹⁰³	36.39 ⁴⁹	12.513 ¹³³	48.77 ¹²¹	51.270 ²⁹⁶	32.22 ¹²⁷	18.328 ¹⁹⁰	47.84 ⁷⁸
30.1	11.900 ⁹¹	36.74 ³⁵	12.393 ¹²⁰	47.37 ¹⁴⁰	50.999 ²⁷¹	30.49 ¹⁷³	18.160 ¹⁶⁸	46.61 ¹²³
Feb. 9.1	11.827 ⁷³	36.93 ¹⁹	12.289 ¹⁰⁴	45.81 ¹⁵⁶	50.763 ²³⁶	28.35 ²¹⁴	18.017 ¹⁴³	44.98 ¹⁶³
	55	3	78	165	186	243	109	200
19.1	11.772	36.96	12.211	44.16	50.577	25.92	17.908	42.98
Mar. 1.1	11.743 ²⁹	36.78 ¹⁸	12.163 ⁴⁸	42.51 ¹⁶⁵	50.450 ¹²⁷	23.26 ²⁶⁶	17.836 ⁷²	40.67 ²³¹
11.0	11.743 ⁰	36.40 ³⁸	12.152 ¹¹	40.92 ¹⁵⁹	50.392 ⁵⁸	20.52 ²⁷⁴	17.806 ³⁰	38.08 ²⁶⁹
21.0	11.777 ³⁴	35.78 ⁶²	12.182 ³⁰	39.47 ¹⁴⁵	50.408 ¹⁶	17.79 ²⁷³	17.822 ¹⁶	35.27 ²⁸¹
31.0	11.848 ⁷¹	34.93 ⁸⁵	12.258 ⁷⁶	38.24 ¹²³	50.504 ⁹⁶	15.21 ²⁵⁸	17.887 ⁶⁵	32.31 ²⁵⁶
	110	109	121	96	175	237	117	307
Apr. 10.0	11.958	33.84	12.379	37.28	50.679	12.84	18.004	29.24
19.9	12.107 ¹⁴⁹	32.52 ¹³²	12.547 ¹⁶⁸	36.66 ⁶²	50.931 ²⁵²	10.81 ²⁰³	18.172 ¹⁶⁸	26.13 ³¹¹
29.9	12.293 ¹⁸⁶	30.98 ¹⁵⁴	12.759 ²¹²	36.41 ²⁵	51.254 ³²³	9.19 ¹⁶²	18.390 ²¹⁸	23.05 ³⁰⁸
May 9.9	12.516 ²²³	29.25 ¹⁷³	13.010 ²⁵¹	36.54 ¹³	51.640 ³⁸⁶	8.03 ¹¹⁶	18.656 ²⁶⁶	20.07 ²⁹⁸
19.8	12.770 ²⁵⁴	27.38 ¹⁸⁷	13.298 ²⁸⁸	37.07 ⁵³	52.077 ⁴³⁷	7.37 ⁶⁶	18.964 ³⁰⁸	17.24 ²⁸³
	279	199	314	90	476	13	345	259
29.8	13.049	25.39	13.612	37.97	52.553	7.24	19.309	14.65
June 8.8	13.347 ²⁹⁸	23.35 ²⁰⁴	13.943 ³³¹	39.24 ¹²⁷	53.056 ⁵⁰³	7.64 ⁴⁰	19.680 ³⁷¹	12.33 ²³²
18.8	13.656 ³⁰⁹	21.29 ²⁰⁶	14.285 ³⁴²	40.84 ¹⁶⁰	53.571 ⁵¹⁵	8.56 ⁹²	20.069 ³⁸⁹	10.37 ¹⁹⁶
28.7	13.968 ³¹²	19.28 ²⁰¹	14.628 ³⁴³	42.72 ¹⁸⁸	54.085 ⁵¹⁴	9.96 ¹⁴⁰	20.468 ³⁹⁹	8.79 ¹⁵⁸
July 8.7	14.273 ³⁰⁵	17.37 ¹⁹¹	14.964 ³³⁶	44.83 ²¹¹	54.584 ⁴⁹⁹	11.83 ¹⁸⁷	20.863 ³⁹⁵	7.66 ¹¹³
	293	177	319	229	472	227	382	68
18.7	14.566	15.60	15.283	47.12	55.056	14.10	21.245	6.98
28.7	14.839 ²⁷³	14.04 ¹⁵⁶	15.577 ²⁹⁴	49.53 ²⁴¹	55.490 ⁴³⁴	16.71 ²⁶¹	21.603 ³⁵⁸	6.79 ¹⁹
Aug. 7.6	15.083 ²⁴⁴	12.69 ¹³⁵	15.841 ²⁶⁴	52.00 ²⁴⁷	55.878 ³⁸⁸	19.61 ²⁹⁰	21.928 ³²⁵	7.07 ²⁸
17.6	15.295 ²¹²	11.61 ¹⁰⁸	16.071 ²³⁰	54.49 ²⁴⁹	56.212 ³³⁴	22.73 ³¹²	22.211 ²⁸³	7.81 ⁷⁴
27.6	15.471 ¹⁷⁶	10.80 ⁸¹	16.261 ¹⁹⁰	56.93 ²⁴⁴	56.487 ²⁷⁵	26.01 ³²⁸	22.444 ²³³	9.00 ¹¹⁹
	138	55	150	235	212	336	180	158
Sept. 6.5	15.609	10.25	16.411	59.28	56.699	29.37	22.624	10.58
16.5	15.707 ⁹⁸	9.99 ²⁶	16.519 ¹⁰⁸	61.50 ²²²	56.848 ¹⁴⁹	32.75 ³³⁸	22.747 ¹²³	12.46 ¹⁸⁸
26.5	15.768 ⁶¹	9.97 ²	16.586 ⁶⁷	63.54 ²⁰⁴	56.931 ⁸³	36.09 ³³⁴	22.813 ⁶⁶	14.61 ²¹⁵
Oct. 6.5	15.791 ²³	10.19 ²²	16.615 ²⁹	65.38 ¹⁸⁴	56.953 ²²	39.30 ³²¹	22.822 ⁹	16.91 ²³⁰
16.4	15.781 ¹⁰	10.60 ⁴¹	16.610 ⁵	66.98 ¹⁶⁰	56.916 ³⁷	42.32 ³⁰²	22.779 ⁴³	19.28 ²³⁷
	38	57	38	135	94	278	91	234
26.4	15.743	11.17	16.572	68.33	56.822	45.10	22.688	21.62
Nov. 5.4	15.680 ⁶³	11.87 ⁷⁰	16.506 ⁶⁶	69.40 ¹⁰⁷	56.677 ¹⁴⁵	47.55 ²⁴⁵	22.556 ¹³²	23.82 ²²⁰
15.4	15.599 ⁸¹	12.64 ⁷⁷	16.418 ⁸⁸	70.18 ⁷⁸	56.487 ¹⁹⁰	49.63 ²⁰⁸	22.390 ¹⁶⁶	25.81 ¹⁹⁹
25.3	15.502 ⁹⁷	13.45 ⁸¹	16.311 ¹⁰⁷	70.65 ⁴⁷	56.256 ²³¹	51.28 ¹⁶⁵	22.200 ¹⁹⁰	27.50 ¹⁶⁹
Dec. 5.3	15.395 ¹⁰⁷	14.27 ⁸²	16.187 ¹²⁴	70.80 ¹⁵	55.992 ²⁶⁴	52.44 ¹¹⁶	21.991 ²⁰⁹	28.81 ¹³¹
	114	80	135	17	290	65	217	90
15.3	15.281	15.07	16.052	70.63	55.702	53.09	21.774	29.71
25.2	15.165 ¹¹⁶	15.82 ⁷⁵	15.911 ¹⁴¹	70.16 ⁴⁷	55.395 ³⁰⁷	53.21 ¹²	21.555 ²¹⁹	30.17 ⁴⁶
35.2	15.050 ¹¹⁵	16.48 ⁶⁶	15.767 ¹⁴⁴	69.36 ⁸⁰	55.083 ³¹²	52.77 ⁴⁴	21.341 ²¹⁴	30.15 ²
Mean Place	11.398	38.49	11.835	35.75	50.801	11.00	18.189	40.02
Sec δ , Tan δ	1.006	-0.108	1.140	+0.546	1.925	+1.645	1.445	-1.042
$D\psi\alpha$, $D\omega\alpha$	+0.06	+0.01	+0.06	-0.04	+0.06	-0.11	+0.06	+0.07
$D\psi\delta$, $D\omega\delta$	+0.4	0.0	+0.4	0.0	+0.4	0.0	+0.4	0.0

APPARENT PLACES OF STARS, 1919.

317

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	22 Andromedæ. Mag. 5.1		γ Pegasi. Mag. 2.9		σ Andromedæ. Mag. 4.5		ι Ceti. Mag. 3.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 0 6 s	° ' " +45 37 "	h m 0 9 s	° ' " +14 43 "	h m 0 14 s	° ' " +36 20 "	h m 0 15 s	° ' " - 9 15 "
Jan. 0.2	7.368 ²⁰²	37.67 ⁸⁷	4.702 ¹¹⁶	70.32 ⁸⁵	6.570 ¹⁶³	27.71 ⁸⁵	18.944 ¹¹⁴	80.36 ⁵⁸
10.2	7.166 ¹⁹⁴	36.80 ¹²⁹	4.586 ¹¹³	69.47 ⁹⁷	6.407 ¹⁵⁹	26.86 ¹¹⁹	18.830 ¹¹⁰	80.94 ⁴³
20.2	6.972 ¹⁸⁰	35.51 ¹⁶⁵	4.473 ¹⁰³	68.50 ¹⁰⁴	6.248 ¹⁴⁷	25.67 ¹⁴⁷	18.720 ¹⁰¹	81.37 ²⁵
30.2	6.792 ¹⁵⁴	33.86 ¹⁹⁴	4.370 ⁸⁹	67.46 ¹⁰⁷	6.101 ¹²⁷	24.20 ¹⁷⁰	18.619 ⁸⁷	81.62 ⁸
Feb. 9.1	6.638 ¹²¹	31.92 ²¹⁷	4.281 ⁶⁷	66.39 ¹⁰⁵	5.974 ¹⁰³	22.50 ¹⁸⁵	18.532 ⁶⁷	81.70 ¹¹
19.1	6.517 ⁸⁰	29.75 ²²⁹	4.214 ⁴¹	65.34 ⁹⁷	5.871 ⁶⁸	20.65 ¹⁹³	18.465 ⁴⁴	81.59 ³⁴
Mar. 1.1	6.437 ³²	27.46 ²³³	4.173 ¹⁰	64.37 ⁸⁴	5.803 ²¹⁷	18.72 ¹⁹²	18.421 ¹⁵	81.25 ⁵⁶
11.0	6.405 ²³	25.13 ²²⁵	4.163 ²⁷	63.53 ⁶⁶	5.774 ¹⁶	16.80 ¹⁸³	18.406 ¹⁹	80.69 ⁸⁰
21.0	6.428 ⁷⁰	22.88 ²⁰⁷	4.190 ⁶⁶	62.87 ⁴³	5.790 ⁶⁶	14.97 ¹⁶⁴	18.425 ⁵⁶	79.89 ¹⁰²
31.0	6.507 ¹⁴⁰	20.81 ¹⁸²	4.256 ¹⁰⁸	62.44 ¹⁶	5.856 ¹¹⁷	13.33 ¹³⁹	18.481 ⁹⁵	78.87 ¹²⁷
Apr. 10.0	6.647 ¹⁹⁷	18.99 ¹⁴⁸	4.364 ¹⁵⁰	62.28 ¹⁵	5.973 ¹⁶⁸	11.94 ¹⁰⁶	18.576 ¹³⁵	77.60 ¹⁴⁹
19.9	6.844 ²⁵¹	17.51 ¹⁰⁸	4.514 ¹⁹⁰	62.43 ⁴⁵	6.141 ²¹⁷	10.88 ⁶⁹	18.711 ¹⁷⁶	76.11 ¹⁶⁹
29.9	7.095 ³⁰⁰	16.43 ⁶⁵	4.704 ²²⁸	62.88 ⁷⁷	6.358 ²⁶¹	10.19 ²⁸	18.887 ²¹²	74.42 ¹⁸⁵
May 9.9	7.395 ³⁴²	15.78 ³⁰	4.932 ²⁶¹	63.65 ¹⁰⁸	6.619 ³⁰⁰	9.91 ¹⁴	19.099 ²⁴⁶	72.57 ¹⁹⁸
19.8	7.737 ³⁷³	15.61 ¹⁷	5.193 ²⁸⁷	64.73 ¹³⁵	6.919 ³²⁹	10.05 ⁵⁷	19.345 ²⁷²	70.59 ²⁰⁷
29.8	8.110 ³⁹⁵	15.91 ⁷⁸	5.480 ³⁰⁶	66.08 ¹⁶¹	7.248 ³⁵³	10.62 ⁹⁶	19.617 ²⁹⁴	68.52 ²¹¹
June 8.8	8.505 ⁴⁰⁶	16.69 ¹²²	5.786 ³¹⁸	67.69 ¹⁸²	7.601 ³⁶⁴	11.58 ¹³⁶	19.911 ³⁰⁸	66.41 ²⁰⁹
18.8	8.911 ⁴⁰⁷	17.91 ¹⁶⁴	6.104 ³²⁰	69.51 ¹⁹⁷	7.965 ³⁶⁶	12.94 ¹⁷²	20.219 ³¹²	64.32 ²⁰²
28.7	9.318 ³⁹⁶	19.55 ²⁰²	6.424 ³¹⁴	71.48 ²⁰⁷	8.331 ³⁵⁹	14.66 ²⁰¹	20.531 ³⁰⁹	62.30 ¹⁸⁹
July 8.7	9.714 ³⁷⁶	21.57 ²³²	6.738 ²⁹⁹	73.55 ²¹⁴	8.690 ³⁴³	16.67 ²²⁵	20.840 ²⁹⁸	60.41 ¹⁷¹
18.7	10.090 ³⁴⁷	23.89 ²⁵⁹	7.037 ²⁸⁰	75.69 ²¹³	9.033 ³¹⁹	18.92 ²⁴⁵	21.138 ²⁸¹	58.70 ¹⁵⁰
28.7	10.437 ³¹⁰	26.48 ²⁷⁸	7.317 ²⁵¹	77.82 ²⁰⁸	9.352 ²⁸⁸	21.37 ²⁶⁰	21.419 ²⁵⁴	57.20 ¹²⁴
Aug. 7.6	10.747 ²⁶⁸	29.26 ²⁹²	7.568 ¹⁹⁸	79.90 ¹⁸⁵	9.640 ²⁵²	23.97 ²⁶⁶	21.673 ²²³	55.96 ⁹⁷
17.6	11.015 ²²²	32.18 ³⁰⁰	7.788 ¹⁸⁵	81.88 ¹⁸⁵	9.892 ²¹¹	26.63 ²⁶⁸	21.896 ¹⁹⁰	54.99 ⁶⁷
27.6	11.237 ¹⁷⁴	35.18 ³⁰⁰	7.973 ¹⁴⁶	83.73 ¹⁶⁷	10.103 ¹⁶⁹	29.31 ²⁶⁴	22.086 ¹⁵¹	54.32 ³⁸
Sept. 6.5	11.411 ¹²⁵	38.18 ²⁹⁶	8.119 ¹⁰⁸	85.40 ¹⁴⁸	10.272 ¹²⁵	31.95 ²⁵⁵	22.237 ¹¹²	53.94 ⁸
16.5	11.536 ⁷⁵	41.14 ²⁸⁵	8.227 ⁷⁰	86.88 ¹²⁶	10.397 ⁸²	34.50 ²⁴³	22.349 ⁷⁴	53.86 ¹⁸
26.5	11.611 ²⁸	43.99 ²⁷⁰	8.297 ³⁴	88.14 ¹⁰⁴	10.479 ⁴⁰	36.93 ²²⁵	22.423 ³⁷	54.04 ⁴¹
Oct. 6.5	11.639 ¹⁵	46.69 ²⁴⁸	8.331 ³	89.18 ⁵⁸	10.519 ³	39.18 ¹⁷⁹	22.460 ²⁸	54.45 ⁷⁷
16.4	11.624 ⁵⁷	49.17 ²²¹	8.334 ²⁸	90.00 ⁵⁸	10.522 ³³	41.21 ²⁰³	22.464 ⁴	55.06 ⁶¹
26.4	11.567 ⁹¹	51.38 ¹⁹¹	8.306 ⁵²	90.58 ³⁶	10.489 ⁶⁵	43.00 ¹⁴⁹	22.436 ⁵²	55.83 ⁸⁸
Nov. 5.4	11.476 ¹²⁵	53.29 ¹⁵⁶	8.254 ⁷⁵	90.94 ¹⁴	10.424 ⁹¹	44.49 ¹¹⁷	22.384 ⁷⁴	56.71 ⁹⁴
15.4	11.351 ¹⁵¹	54.85 ¹¹⁶	8.179 ⁹⁰	91.08 ⁶	10.333 ¹¹⁶	45.66 ⁸⁴	22.310 ⁹¹	57.65 ⁹⁶
25.3	11.200 ¹⁷⁴	56.01 ⁷⁴	8.089 ¹⁰³	91.02 ²⁸	10.217 ¹³⁴	46.50 ⁴⁹	22.219 ¹⁰⁴	58.61 ⁹³
Dec. 5.3	11.026 ¹⁹⁰	56.75 ³⁰	7.986 ¹¹³	90.74 ⁴⁵	10.083 ¹⁵⁰	46.99 ¹⁰	22.115 ¹¹²	59.54 ⁸⁷
15.3	10.836 ²⁰¹	57.05 ¹⁶	7.873 ¹²¹	90.29 ⁶⁵	9.933 ¹⁶¹	47.09 ²⁸	22.003 ¹¹⁹	60.41 ⁷⁹
25.2	10.635 ²⁰⁷	56.89 ⁶⁰	7.752 ¹²²	89.64 ⁷⁸	9.772 ¹⁶⁷	46.81 ⁶⁵	21.884 ¹¹⁹	61.20 ⁶⁷
35.2	10.428	56.29	7.630	88.86	9.605	46.16	21.765	61.87
Mean Place	6.340	17.51	3.767	59.89	5.508	10.26	18.072	82.23
Sec δ, Tan δ	1.430	+1.022	1.034	+0.263	1.241	+0.736	1.013	-0.163
Dψα, Dωα	+0.06	-0.07	+0.06	-0.02	+0.06	-0.05	+0.06	+0.01
Dψδ, Dωδ	+0.4	0.0	+0.4	0.0	+0.4	+0.1	+0.4	+0.1

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Tucanæ. Mag. 4.3		44 Piscium. Mag. 6.0		β Hydri. Mag. 2.9		α Phœnicis Mag. 2.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 0 15	s -65 20	h m 0 21	s + 1 29	h m 0 21	s -77 42	h m 0 22	s -42
Jan. 0.2	51.98	74.22	15.941	33.61	30.46	51.40	17.744	53.58
10.2	51.57	73.45	15.829	32.89	29.54	50.40	17.548	53.52
20.2	51.19	72.12	15.719	32.21	28.67	48.81	17.363	53.01
30.2	50.83	70.28	15.617	31.59	27.88	46.69	17.194	52.08
Feb. 9.1	50.53	67.96	15.528	31.06	27.21	44.08	17.046	50.72
19.1	50.29	65.24	15.457	30.65	26.64	41.08	16.926	48.98
Mar. 1.1	50.11	62.18	15.409	30.40	26.20	37.75	16.839	46.91
11.0	50.00	58.86	15.390	30.32	25.91	34.16	16.789	44.55
21.0	49.97	55.34	15.404	30.46	25.77	30.43	16.782	41.93
31.0	50.02	51.71	15.456	30.83	25.78	26.61	16.823	39.12
Apr. 10.0	50.15	48.04	15.546	31.45	25.95	22.80	16.912	36.18
19.9	50.35	44.42	15.678	32.32	26.28	19.08	17.053	33.16
29.9	50.64	40.93	15.850	33.46	26.75	15.53	17.242	30.11
May 9.9	51.01	37.62	16.059	34.82	27.37	12.22	17.479	27.12
19.9	51.45	34.58	16.301	36.40	28.12	9.23	17.758	24.24
29.8	51.94	31.88	16.572	38.16	28.97	6.63	18.075	21.54
June 8.8	52.48	29.57	16.864	40.05	29.92	4.46	18.421	19.10
18.8	53.05	27.72	17.170	42.02	30.93	2.79	18.788	16.97
28.7	53.64	26.36	17.481	44.03	31.99	1.65	19.166	15.19
July 8.7	54.24	25.53	17.788	46.02	33.06	1.07	19.545	13.83
18.7	54.82	25.25	18.086	47.94	34.11	1.08	19.916	12.91
28.7	55.38	25.53	18.366	49.74	35.12	1.65	20.265	12.46
Aug. 7.6	55.88	26.36	18.621	51.37	36.05	2.79	20.587	12.48
17.6	56.33	27.69	18.846	52.81	36.86	4.44	20.872	12.97
27.6	56.69	29.50	19.038	54.02	37.56	6.56	21.113	13.90
Sept. 6.6	56.98	31.72	19.193	54.99	38.09	9.08	21.305	15.26
16.5	57.18	34.26	19.310	55.70	38.45	11.89	21.445	16.97
26.5	57.29	37.02	19.390	56.16	38.63	14.92	21.532	18.95
Oct. 6.5	57.29	39.90	19.436	56.39	38.62	18.03	21.567	21.15
16.4	57.21	42.79	19.448	56.41	38.42	21.11	21.551	23.45
26.4	57.03	45.57	19.431	56.22	38.04	24.04	21.490	25.77
Nov. 5.4	56.78	48.12	19.389	55.88	37.49	26.69	21.389	28.01
15.4	56.47	50.35	19.324	55.41	36.82	28.97	21.254	30.07
25.3	56.10	52.16	19.243	54.83	36.03	30.77	21.092	31.89
Dec. 5.3	55.70	53.48	19.148	54.17	35.15	32.03	20.910	33.37
15.3	55.27	54.26	19.042	53.44	34.22	32.69	20.716	34.48
25.3	54.84	54.46	18.930	52.70	33.27	32.72	20.515	35.16
35.2	54.41	54.07	18.815	51.96	32.32	32.13	20.315	35.40
Mean Place	51.774	61.61	14.985	28.06	31.014	37.54	17.060	45.11
Sec δ, Tan δ	2.397	-2.179	1.000	+0.026	4.697	-4.589	1.362	-0.924
D _{pa} , D _{wa}	+0.06	+0.15	+0.06	0.00	+0.05	+0.31	+0.06	+0.06
D _{pd} , D _{wd}	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1

APPARENT PLACES OF STARS, 1919.

319

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	13 Ceti. Mag. 6.0		13 Ceti. Mag. 5.2		ζ Cassiopeiæ. Mag. 3.7		π Andromedæ. Mag. 4.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 0 25	° ' " - 4 23	h m 0 31	° ' " - 4 1	h m 0 32	° ' " +53 27	h m 0 32	° ' " +33 16
	s	"	s	"	s	"	s	"
Jan. 0.2	55.276	73.43	5.678	75.23	28.440	26.52	34.218	41.40
10.2	55.162 ¹¹⁴	74.09 ⁶⁶	5.563 ¹¹⁵	75.90 ⁶⁷	28.184 ²⁵⁶	26.02 ⁵⁰	34.064 ¹⁵⁴	40.67 ⁷³
20.2	55.050 ¹¹²	74.65 ⁵⁶	5.451 ¹¹²	76.48 ⁵⁸	27.928 ²⁵⁶	25.03 ⁹⁹	33.910 ¹⁵⁴	39.66 ¹⁰¹
30.2	54.945 ¹⁰⁶	75.09 ⁴⁴	5.345 ¹⁰⁶	76.93 ⁴⁵	27.683 ²⁴⁵	23.61 ¹⁴²	33.762 ¹⁴⁸	38.36 ¹³⁰
Feb. 9.1	54.852 ⁹³	75.38 ²⁹	5.250 ⁹⁵	77.25 ³²	27.462 ²²¹	21.78 ¹⁸³	33.629 ¹³³	36.86 ¹⁵⁰
	74	13	78	14	187	214	111	167
19.1	54.778	75.51	5.172	77.39	27.275	19.64	33.518	35.19
Mar. 1.1	54.725 ⁵³	75.45 ⁶	5.116 ⁵⁶	77.35 ⁴	27.134 ¹⁴¹	17.28 ²³⁶	33.436 ⁸²	33.46 ¹⁷³
11.1	54.701 ²⁴	75.18 ²⁷	5.088 ²⁸	77.10 ²⁵	27.048 ⁸⁶	14.80 ²⁴⁸	33.389 ⁴⁷	31.72 ¹⁷⁴
21.0	54.710 ⁹	74.69 ⁴⁹	5.091 ³	76.63 ⁴⁷	27.024 ²⁴	12.30 ²⁵⁰	33.385 ⁴	30.07 ¹⁶⁵
31.0	54.755 ⁴⁵	73.96 ⁷³	5.132 ⁴¹	75.93 ⁷⁰	27.069 ⁴⁵	9.88 ²⁴²	33.430 ⁴⁵	28.58 ¹⁴⁹
	85	97	81	94	114	223	95	126
Apr. 10.0	54.840	72.99	5.213	74.99	27.183	7.65	33.525	27.32
19.9	54.966 ¹²⁶	71.78 ¹²¹	5.335 ¹²²	73.80 ¹¹⁹	27.369 ¹⁸⁶	5.70 ¹⁹⁵	33.670 ¹⁴⁵	26.35 ⁹⁷
29.9	55.133 ¹⁶⁷	70.35 ¹⁴³	5.497 ¹⁶²	72.40 ¹⁴⁰	27.621 ²⁵²	4.10 ¹⁶⁰	33.862 ¹⁹²	25.73 ⁶²
May 9.9	55.337 ²⁰⁴	68.70 ¹⁶⁵	5.698 ²⁰¹	70.78 ¹⁶²	27.935 ³¹⁴	2.92 ¹¹⁸	34.101 ²³⁹	25.48 ²⁵
19.9	55.575 ²³⁸	66.90 ¹⁸⁰	5.932 ²³⁴	68.99 ¹⁷⁹	28.300 ³⁶⁵	2.20 ⁷²	34.378 ²⁷⁷	25.63 ¹⁵
	267	194	265	192	408	24	312	54
29.8	55.842	64.96	6.197	67.07	28.708	1.96	34.690	26.17
June 8.8	56.131 ²⁸⁹	62.94 ²⁰²	6.484 ²⁸⁷	65.07 ²⁰⁰	29.147 ⁴³⁹	2.21 ²⁵	35.025 ³³⁵	27.08 ⁹¹
18.8	56.436 ³⁰⁵	60.89 ²⁰⁵	6.788 ³⁰⁴	63.03 ²⁰⁴	29.605 ⁴⁵⁸	2.94 ⁷³	35.377 ³⁵²	28.37 ¹²⁹
28.8	56.746 ³¹⁰	58.87 ²⁰²	7.099 ³¹¹	61.00 ²⁰³	30.069 ⁴⁶⁴	4.14 ¹²⁰	35.735 ³⁵⁸	29.98 ¹⁶¹
July 8.7	57.055 ³⁰⁹	56.91 ¹⁹⁶	7.409 ³¹⁰	59.04 ¹⁹⁶	30.529 ⁴⁶⁰	5.77 ¹⁶³	36.088 ³⁵³	31.86 ¹⁸⁸
	298	182	300	184	442	202	343	212
18.7	57.353	55.09	7.709	57.20	30.971	7.79	36.431	33.98
28.7	57.636 ²⁸³	53.44 ¹⁶⁵	7.994 ²⁸⁵	55.55 ¹⁶⁵	31.387 ⁴¹⁶	10.14 ²³⁵	36.753 ³²²	36.28 ²³⁰
Aug. 7.6	57.894 ²⁵⁸	52.00 ¹⁴⁴	8.255 ²⁶¹	54.09 ¹⁴⁶	31.768 ³⁸¹	12.78 ²⁶⁴	37.048 ²⁹⁵	38.70 ²⁴²
17.6	58.124 ²³⁰	50.81 ¹¹⁹	8.489 ²³⁴	52.88 ¹²¹	32.105 ³³⁷	15.63 ²⁸⁵	37.310 ²⁶²	41.18 ²⁴⁸
27.6	58.319 ¹⁹⁵	49.87 ⁹⁴	8.689 ²⁰⁰	51.93 ⁹⁵	32.395 ²⁹⁰	18.65 ³⁰²	37.536 ²²⁶	43.68 ²⁵⁰
	159	64	165	67	237	311	187	246
Sept. 6.6	58.478	49.23	8.854 ¹²⁸	51.26 ⁴⁰	32.632 ¹⁸³	21.76	37.723 ¹⁴⁵	46.14 ²³⁸
16.5	58.600 ⁸⁵	48.85 ¹¹	8.982 ⁹¹	50.86 ¹³	32.815 ¹²⁸	24.90 ³¹⁴	37.868 ¹⁰⁴	48.52 ²²⁵
26.5	58.685 ⁵⁰	48.74 ¹⁴	9.073 ⁵⁴	50.73 ¹¹	32.943 ⁷⁴	28.01 ³¹¹	37.972 ⁶⁵	50.77 ²⁰⁷
Oct. 6.5	58.735 ¹⁵	48.88 ³³	9.127 ²¹	50.84 ³³	33.017 ²²	31.03 ²⁸⁶	38.037 ²⁷	52.84 ¹⁸⁹
16.5	58.750 ¹⁵	49.21 ⁵²	9.148 ⁸	51.17 ⁵⁰	33.039 ²⁸	33.89 ²⁶⁵	38.064 ⁷	54.73 ¹⁶⁵
26.4	58.735	49.73	9.140	51.67	33.011	36.54	38.057	56.38
Nov. 5.4	58.695 ⁴⁰	50.38 ⁶⁵	9.104 ³⁶	52.32 ⁶⁵	32.936 ⁷⁵	38.93 ²³⁹	38.018 ³⁹	57.78 ¹⁴⁰
15.4	58.632 ⁶³	51.14 ⁷⁶	9.047 ⁵⁷	53.08 ⁷⁶	32.817 ¹¹⁹	40.99 ²⁰⁶	37.950 ⁶⁸	58.88 ¹¹⁰
25.3	58.551 ⁸¹	51.96 ⁸²	8.970 ⁷⁷	53.89 ⁸¹	32.659 ¹⁵⁸	42.66 ¹⁶⁷	37.857 ⁹³	59.68 ⁶⁰
Dec. 5.3	58.456 ⁹⁵	52.79 ⁸³	8.878 ⁹²	54.72 ⁸³	32.468 ¹⁹¹	43.92 ¹²⁶	37.743 ¹¹⁴	60.17 ⁴⁹
	106	83	103	83	222	78	132	14
15.3	58.350	53.62	8.775	55.55	32.246	44.70 ³⁰	37.611 ¹⁴⁶	60.31 ²⁰
25.3	58.236 ¹¹⁴	54.41 ⁷⁹	8.663 ¹¹²	56.35 ⁸⁰	32.004 ²⁴²	45.00 ²¹	37.465 ¹⁵⁵	60.11 ⁵⁵
35.2	58.118 ¹¹⁸	55.13 ⁷²	8.547 ¹¹⁶	57.08 ⁷³	31.746 ²⁶⁸	44.79	37.310	59.56
Mean Place	54.320	76.81	4.690	78.65	27.051	4.75	33.017	25.15
Sec δ, Tan δ	1.003	-0.077	1.002	-0.070	1.680	+1.349	1.196	+0.656
D _ψ α, D _ω α	+0.06	+0.01	+0.06	0.00	+0.07	-0.09	+0.06	-0.04
D _ψ δ, D _ω δ	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Andromedæ. Mag. 4.5		δ Andromedæ. Mag. 3.5		α Cassiopeiæ. (Schedr.) Var. 2.2-2.8		μ Phœnicis. Mag. 4.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 0 34 s	° ' " +28 52 "	h m 0 34 s	° ' " +30 25 "	h m 0 35 s	° ' " +56 5 "	h m 0 37 s	° ' " -46 31 "
Jan. 0.2	17.468	34.49	60.755	19.30	55.523	58.25	30.704	57.36
10.2	17.325 ¹⁴³	33.74 ⁷⁵	60.609 ¹⁴⁶	18.57 ⁷³	55.243 ²⁸⁰	57.83 ⁴²	30.481 ²²³	57.36 ⁰
20.2	17.182 ¹⁴³	32.75 ⁹⁹	60.462 ¹⁴⁷	17.58 ⁹⁹	54.962 ²⁸¹	56.90 ⁹³	30.267 ²¹⁴	56.87 ⁴⁹
30.2	17.044 ¹³⁸	31.52 ¹²³	60.321 ¹⁴¹	16.34 ¹²⁴	54.692 ²⁷⁰	55.51 ¹³⁹	30.066 ²⁰¹	55.93 ⁹⁴
Feb. 9.1	16.920 ¹²⁴	30.12 ¹⁴⁰	60.193 ¹²⁸	14.91 ¹⁴³	54.448 ²⁴⁴	53.69 ¹⁸²	29.886 ¹⁸⁰	54.53 ¹⁴⁰
	105	151	107	155	208	215	152	151
19.1	16.815	28.61	60.086	13.36	54.240	51.54	29.734	52.72
Mar. 1.1	16.738	27.05 ¹⁵⁶	60.007 ⁷⁹	11.74 ¹⁶²	54.080 ¹⁶⁰	49.15 ²³⁹	29.615 ¹¹⁹	50.55 ²¹⁷
11.1	16.693 ⁴⁵	25.52 ¹⁵³	59.961 ⁴⁶	10.14 ¹⁶⁰	53.979 ¹⁰¹	46.61 ²⁵⁴	29.535 ⁸⁰	48.06 ²⁴⁹
21.0	16.689 ⁴	24.08 ¹⁴⁴	59.956 ⁵	8.63 ¹⁵¹	53.945 ³⁴	44.02 ²⁵⁹	29.500 ³⁵	45.31 ²⁷⁵
31.0	16.730 ⁴¹	22.82 ¹²⁶	59.998 ⁴²	7.28 ¹³⁵	53.984 ³⁹	41.51 ²⁵¹	29.513 ¹³	42.35 ²⁹⁸
	89	103	89	110	113	235	65	311
Apr. 10.0	16.819	21.79 ⁷³	60.087	6.18 ⁸²	54.097	39.16 ²⁰⁷	29.578	39.24
19.9	16.955 ¹³⁶	21.06 ⁴²	60.226 ¹³⁹	5.36 ⁴⁹	54.287 ¹⁹⁰	37.09 ¹⁷³	29.698 ¹²⁰	36.06 ³¹³
29.9	17.139 ¹⁸⁴	20.64 ⁴	60.412 ¹⁸⁶	4.87 ¹²	54.547 ²⁸⁰	35.36 ²⁶¹	29.871 ¹⁷³	32.86 ³²⁰
May 9.9	17.367 ²²⁸	20.60 ³³	60.643 ²³¹	4.75 ⁶⁴	54.873 ³²⁶	34.04 ¹³²	30.096 ²²⁵	29.71 ³¹⁵
19.9	17.633 ²⁶⁶	20.93 ⁶⁹	60.913 ²⁷⁰	4.99 ²⁴	55.255 ³³²	33.18 ⁸⁶	30.369 ²⁷³	26.69 ³⁰²
	299	89	303	64	426	37	315	284
29.8	17.932	21.62	61.216	5.63	55.681	32.81	30.684	23.85
June 8.8	18.254 ³²²	22.67 ¹⁰⁵	61.543 ³²⁷	6.62 ⁹⁹	56.143 ⁴⁶²	32.93 ¹²	31.034 ³⁵⁰	21.28 ³⁵⁷
18.8	18.592 ³³⁸	24.04 ¹³⁷	61.885 ³⁴²	7.96 ¹³⁴	56.624 ⁴⁹¹	33.55 ⁶²	31.408 ³⁷⁴	19.04 ²²⁴
28.8	18.937 ³⁴⁵	25.71 ¹⁶⁷	62.235 ³⁵⁰	9.60 ¹⁶⁴	57.114 ⁴⁹⁰	34.65 ¹¹⁰	31.798 ³⁹⁰	17.16 ¹⁸³
July 8.7	19.280 ³⁴³	27.61 ¹⁹⁰	62.581 ³⁴⁶	11.48 ¹⁸⁸	57.600 ⁴⁸⁶	36.19 ¹⁵⁴	32.193 ³⁹⁵	15.72 ¹⁴⁴
	331	211	336	211	469	196	390	96
18.7	19.611	29.72	62.917	13.59	58.069	38.15	32.583	14.74 ⁴³
28.7	19.923 ³¹²	31.96 ²²⁴	63.235 ³¹⁸	15.84 ²²⁵	58.510 ⁴⁴¹	40.45 ²³⁰	32.957 ³⁷⁴	14.26 ³
Aug. 7.6	20.210 ²⁸⁷	34.28 ²³²	63.525 ²⁹⁰	18.19 ²³⁵	58.914 ⁴⁰⁴	43.06 ²⁶¹	33.303 ³⁴⁶	14.29 ³
17.6	20.465 ²⁵⁵	36.64 ²³⁶	63.784 ²⁵⁹	20.58 ²³⁹	59.274 ³⁶⁰	45.91 ²⁸⁵	33.614 ²⁸⁵	14.81 ⁵²
27.6	20.684 ²¹⁹	38.97 ²³³	64.007 ²²³	22.98 ²⁴⁰	59.584 ³¹⁰	48.95 ³⁰⁴	33.882 ²⁶⁸	15.81 ¹⁰⁰
	183	227	187	233	256	315	219	142
Sept. 6.6	20.867	41.24	64.194	25.31	59.840	52.10	34.101	17.23
16.5	21.009 ¹⁴²	43.39 ²¹⁵	64.339 ¹⁴⁵	27.55 ²²⁴	60.039 ¹⁹⁹	55.30 ³²⁰	34.266 ¹⁶⁵	19.04 ¹⁸¹
26.5	21.111 ¹⁰²	45.41 ²⁰²	64.444 ¹⁰⁵	29.64 ²⁰⁹	60.179 ¹⁴⁰	58.50 ³²⁰	34.374 ¹⁰⁸	21.17 ²¹³
Oct. 6.5	21.176 ⁶⁵	47.25 ¹⁸⁴	64.511 ⁶⁷	31.57 ¹⁹³	60.262 ⁸³	61.61 ³¹¹	34.427 ⁵³	23.51 ²³⁴
16.5	21.205 ²⁹	48.87 ¹⁶²	64.541 ³⁰	33.29 ¹⁷²	60.289 ²⁷	64.58 ²⁹⁷	34.424 ³	25.98 ²⁴⁷
	5	141	2	150	27	278	52	251
26.4	21.200	50.28	64.539	34.79	60.262	67.36	34.372	28.49
Nov. 5.4	21.165 ³⁵	51.42 ¹¹⁴	64.505 ³⁴	36.02 ¹²³	60.184 ⁷⁸	69.87 ²⁵¹	34.275 ⁹⁷	30.93 ²⁴⁴
15.4	21.103 ⁶²	52.31 ⁸⁹	64.443 ⁶²	37.00 ⁹⁸	60.059 ¹²⁵	72.05 ²¹⁸	34.138 ¹³⁷	33.19 ²²⁶
25.3	21.019 ⁸⁴	52.91 ⁶⁰	64.357 ⁸⁶	37.68 ⁶⁸	59.890 ¹⁶⁹	73.86 ¹⁸¹	33.968 ¹⁷⁰	35.17 ¹⁹⁸
Dec. 5.3	20.914 ¹⁰⁵	53.22 ³¹	64.251 ¹⁰⁶	38.06 ³⁸	59.683 ²⁰⁷	75.24 ¹³⁸	33.774 ¹⁹⁴	36.81 ¹⁶⁴
	122	1	125	7	238	91	212	125
15.3	20.792	53.23	64.126	38.13	59.445	76.15	33.562	38.06
25.3	20.657 ¹³⁵	52.93 ³⁰	63.989 ¹³⁷	37.87 ²⁶	59.181 ²⁶⁴	76.55 ⁴⁰	33.340 ²²²	38.86 ⁸⁰
35.2	20.513 ¹⁴⁴	52.35 ⁵⁸	63.842 ¹⁴⁷	37.32 ⁵⁵	58.901 ²⁸⁰	76.44 ¹¹	33.115 ²²⁵	39.17 ³¹
Mean Place	16.283	19.68	59.554	4.00	54.050	35.94	29.961	47.69
Sec δ, Tan δ	1.142	+0.552	1.160	+0.587	1.792	+1.488	1.453	-1.055
D _α δ, D _ω α	+0.06	-0.04	+0.06	-0.04	+0.07	-0.10	+0.06	+0.07
D _μ δ, D _ω δ	+0.4	+0.1	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2

APPARENT PLACES OF STARS, 1919.

321

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Ceti. Mag. 2.2		α Cassiopeiæ. Mag. 4.7		γ Cassiopeiæ. Mag. 5.6		ζ Andromedæ. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 0 39	° ' " -18 25	h m 0 40	° ' " +47 50	h m 0 40	° ' " +74 32	h m 0 43	° ' " +23 49
	s "	"	s "	"	s "	"	s "	"
Jan. 0.3	32.429	52.96 53	13.688	48.99 49	18.56	69.41 1	3.713	49.35 72
10.2	32.299 130	53.49 28	13.472 216	48.50 49	17.86 70	69.40 62	3.580 133	48.63 91
20.2	32.172 127	53.77 2	13.254 218	47.57 93	17.16 70	68.78 121	3.445 135	47.72 109
30.2	32.051 121	53.79 26	13.045 209	46.22 135	16.49 67	67.57 175	3.314 120	46.63 123
Feb. 9.1	31.941 93	53.53 51	12.851 194	44.52 197	15.88 53	65.82 222	3.194 104	45.40 129
19.1	31.848 71	53.02 80	12.687 127	42.55 218	15.35 41	63.60 259	3.090 79	44.11 131
Mar. 1.1	31.777 43	52.22 106	12.560 81	40.37 227	14.94 29	61.01 285	3.011 49	42.80 127
11.1	31.734 9	51.16 131	12.479 26	38.10 229	14.65 14	58.16 300	2.962 10	41.53 115
21.0	31.725 28	49.85 156	12.453 34	35.81 218	14.51 2	55.16 301	2.952 32	40.38 98
31.0	31.753 69	48.29 177	12.487 97	33.63 200	14.53 16	52.15 292	2.984 76	39.40 74
Apr. 10.0	31.822 111	46.52 197	12.584 159	31.63 173	14.69 32	49.23 271	3.060 124	38.66 48
20.0	31.933 153	44.55 214	12.743 220	29.90 140	15.01 47	46.52 241	3.184 169	38.18 16
29.9	32.086 193	42.41 225	12.963 276	28.50 99	15.48 59	44.11 201	3.353 213	38.02 18
May 9.9	32.279 230	40.16 233	13.239 325	27.51 56	16.07 78	42.10 155	3.566 251	38.20 51
19.9	32.509 284	37.83 235	13.564 366	26.95 10	16.78 104	40.55 104	3.817 283	38.71 85
29.8	32.773 287	35.48 232	13.930 396	26.85 35	17.56 87	39.51 51	4.100 308	39.56 117
June 8.8	33.060 307	33.16 222	14.326 414	27.20 82	18.43 90	39.00 6	4.408 325	40.73 144
18.8	33.367 317	30.94 206	14.740 424	28.02 124	19.33 92	39.06 59	4.733 333	42.17 170
28.8	33.684 319	28.88 187	15.164 420	29.26 163	20.25 91	39.65 113	5.066 333	43.87 189
July 8.7	34.003 311	27.01 161	15.584 407	30.89 199	21.16 80	40.78 162	5.399 324	45.76 204
18.7	34.314 297	25.40 130	15.991 385	32.88 228	22.05 83	42.40 209	5.723 306	47.80 215
28.7	34.611 276	24.10 99	16.376 354	35.16 254	22.88 77	44.49 250	6.029 284	49.95 218
Aug. 7.7	34.887 247	23.11 64	16.730 317	37.70 271	23.65 68	46.99 284	6.313 255	52.13 218
17.6	35.134 214	22.47 27	17.047 275	40.41 285	24.33 60	49.83 316	6.568 221	54.31 212
27.6	35.348 176	22.20 8	17.322 228	43.26 292	24.93 48	52.99 337	6.789 186	56.43 203
Sept. 6.6	35.524 140	22.28 40	17.550 181	46.18 293	25.41 37	56.36 354	6.975 147	58.46 190
16.5	35.664 99	22.68 72	17.731 131	49.11 288	25.78 26	59.90 362	7.122 110	60.36 174
26.5	35.763 60	23.40 96	17.862 84	51.99 278	26.04 15	63.52 364	7.232 74	62.10 154
Oct. 6.5	35.823 24	24.36 117	17.946 37	54.77 262	26.19 10	67.16 343	7.306 6	63.64 112
16.5	35.847 10	25.53 131	17.983 8	57.39 242	26.20 10	70.72 343	7.346 6	64.99 112
26.4	35.837 38	26.84 139	17.975 48	59.81 215	26.10 21	74.15 320	7.352 22	66.11 89
Nov. 5.4	35.799 64	28.23 139	17.927 88	61.96 185	25.89 33	77.35 289	7.330 48	67.00 65
15.4	35.735 86	29.62 136	17.839 123	63.81 149	25.56 42	80.24 251	7.282 73	67.65 40
25.4	35.649 103	30.98 125	17.716 154	65.30 110	25.14 53	82.75 206	7.209 92	68.05 15
Dec. 5.3	35.546 117	32.23 109	17.562 179	66.40 68	24.61 59	84.81 154	7.117 109	68.20 9
15.3	35.429 125	33.32 92	17.383 201	67.08 22	24.02 66	86.35 95	7.008 124	68.11 36
25.3	35.304 131	34.24 68	17.182 215	67.30 23	23.36 70	87.30 37	6.884 132	67.75 59
35.2	35.173	34.92	16.967	67.07	22.66	87.67	6.752	67.16
Mean Place	31.468	51.27	12.282	28.75	16.332	44.07	2.497	36.37
Sec δ , Tan δ	1.054	-0.333	1.490	+1.105	3.754	+3.618	1.093	+0.442
$D\delta\alpha$, $D\omega\alpha$	+0.06	+0.02	+0.07	-0.07	+0.08	-0.24	+0.06	-0.03
$D\delta\delta$, $D\omega\delta$	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	η Cassiopeiæ. Mag. 3.6		δ Piscium. Mag. 4.6		λ Hydri. Mag. 5.0		ϵ Ceti. Mag. 4.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 0 44	° ' " +57 23	h m 0 44	° ' " + 7 8	h m 0 45	° ' " -75 21	h m 0 48	° ' " - 1 34
	s	"	s	"	s	"	s	"
Jan. 0.3	13.030	36.35	29.818	47.37	47.56	64.45	53.109	57.36
10.2	12.740 ²⁹⁰	36.03 ³²	29.702 ¹¹⁶	46.64 ⁷³	46.76 ⁸⁰	63.87 ⁸⁸	52.991 ¹¹⁸	58.06 ⁷⁹
20.2	12.448 ²⁹²	35.20 ⁸³	29.585 ¹¹⁷	45.88 ⁷⁶	45.98 ⁷⁶	62.69 ¹¹⁸	52.874 ¹¹⁷	58.69 ⁸²
30.2	12.165 ²⁸³	33.88 ¹³²	29.471 ¹¹⁴	45.13 ⁷⁵	45.27 ⁷¹	60.95 ¹⁷⁴	52.759 ¹¹⁵	59.23 ⁸⁴
Feb. 9.1	11.907 ²⁵⁸	32.15 ¹⁷³	29.366 ¹⁰⁵	44.41 ⁷²	44.61 ⁶⁶	58.69 ²²⁶	52.653 ¹⁰⁶	59.64 ⁴¹
	222	210	91	64	57	271	92	28
19.1	11.685	30.05	29.275	43.77	44.04	55.98	52.561	59.90
Mar. 1.1	11.510 ¹⁷⁵	27.68 ²³⁷	29.207 ⁶⁸	43.23 ⁵⁴	43.58 ⁴⁶	52.89 ³⁰⁹	52.489 ⁷²	60.00 ¹⁰
11.1	11.393 ¹¹⁷	25.12 ²⁵⁶	29.164 ⁴³	42.84 ³⁹	43.22 ³⁶	49.50 ³³⁹	52.443 ⁴⁶	59.91 ⁹
21.0	11.346 ⁴⁷	22.51 ²⁶¹	29.156 ⁸	42.64 ²⁰	43.00 ²²	45.90 ³⁶⁰	52.430 ¹³	59.59 ²²
31.0	11.372 ²⁶	19.95 ²⁵⁶	29.185 ²⁹	42.64 ⁰	42.89 ¹¹	42.17 ³⁷³	52.453 ²³	59.06 ³³
	106	242	69	26	3	379	62	79
Apr. 10.0	11.478	17.53	29.254	42.90	42.92	38.38	52.515	58.27
20.0	11.662 ¹⁸⁴	15.36 ²¹⁷	29.366 ¹¹²	43.41 ⁵¹	43.10 ¹⁸	34.62 ³⁷⁶	52.619 ¹⁰⁴	57.25 ¹⁰³
29.9	11.920 ²⁵⁸	13.51 ¹⁸⁵	29.520 ¹⁵⁴	44.18 ⁷⁷	43.39 ²⁹	30.97 ³⁶⁵	52.765 ¹⁴⁶	55.99 ¹²⁸
May 9.9	12.248 ³²⁸	12.06 ¹⁴⁵	29.715 ¹⁹⁵	45.22 ¹⁰⁴	43.82 ⁴³	27.51 ³⁴⁶	52.950 ¹⁸⁵	54.52 ¹⁴⁷
19.9	12.636 ³⁸⁸	11.06 ¹⁰⁰	29.945 ²³⁰	46.51 ¹²⁹	44.36 ⁵⁴	24.32 ³¹⁹	53.173 ²³³	52.85 ¹⁶⁷
	437	52	262	151	66	286	254	163
29.8	13.073	10.54	30.207	48.02	45.02	21.46	53.427	51.02
June 8.8	13.545 ⁴⁷²	10.51 ³	30.492 ²⁸⁵	49.72 ¹⁷⁰	45.76 ⁷⁴	19.01 ²⁴⁵	53.706 ²⁷⁹	49.09 ¹⁹⁹
18.8	14.043 ⁴⁹⁸	10.98 ⁴⁷	30.796 ³⁰⁴	51.55 ¹⁸³	46.58 ⁸²	17.01 ²⁰⁰	54.003 ²⁹⁷	47.09 ²⁰⁸
28.8	14.551 ⁵⁰⁸	11.94 ⁹⁶	31.108 ³¹²	53.47 ¹⁹²	47.44 ⁸⁶	15.53 ¹⁴⁸	54.311 ³⁰⁸	45.08 ²⁰¹
July 8.7	15.057 ⁵⁰⁶	13.34 ¹⁴⁰	31.421 ³¹³	55.44 ¹⁹⁷	48.32 ⁸⁸	14.60 ⁹³	54.621 ³¹⁰	43.12 ¹⁹⁶
	490	184	305	196	90	36	303	198
18.7	15.547	15.18	31.726	57.40	49.22	14.24	54.924	41.24
28.7	16.013 ⁴⁶⁶	17.38 ²²⁰	32.017 ²⁹¹	59.30 ¹⁹⁰	50.09 ⁸⁷	14.47 ²³	55.214 ²⁹⁰	39.51 ¹⁷³
Aug. 7.7	16.442 ⁴²⁹	19.90 ²⁵²	32.287 ²⁷⁰	61.09 ¹⁷⁹	50.90 ⁸¹	15.27 ⁸⁰	55.484 ²⁷⁰	37.97 ¹⁵⁴
17.6	16.828 ³⁸⁶	22.68 ²⁷⁸	32.528 ²⁴¹	62.72 ¹⁶³	51.64 ⁷⁴	16.63 ¹³⁶	55.727 ²⁴³	36.65 ¹³²
27.6	17.164 ³³⁶	25.66 ²⁹⁸	32.738 ²¹⁰	64.18 ¹⁴⁶	52.29 ⁶⁵	18.49 ¹⁸⁶	55.940 ²¹³	35.58 ¹⁶⁷
	280	312	178	124	51	231	178	59
Sept. 6.6	17.444	28.78	32.915	65.42	52.80	20.80	56.118	34.76
16.5	17.666 ²²²	31.96 ³¹⁸	33.056 ¹⁴¹	66.45 ¹⁰³	53.18 ³⁸	23.49 ²⁶⁹	56.262 ¹⁴⁴	34.24 ⁸⁴
26.5	17.830 ¹⁶⁴	35.15 ³¹⁹	33.161 ¹⁰⁵	67.23 ⁷⁸	53.41 ²³	26.43 ²⁹⁴	56.370 ¹⁰⁸	33.98 ³⁶
Oct. 6.5	17.935 ¹⁰⁵	38.29 ³¹⁴	33.231 ⁷⁰	67.79 ⁵⁶	53.48 ⁷	29.54 ³¹¹	56.442 ⁷²	33.95 ³
16.5	17.980 ⁴⁵	41.30 ³⁰¹	33.269 ³⁸	68.13 ³⁴	53.39 ⁹	32.69 ³¹⁵	56.482 ⁴⁰	34.16 ²¹
	10	283	7	12	23	306	8	39
26.4	17.970	44.13	33.276	68.25	53.16	35.75	56.490	34.55
Nov. 5.4	17.907 ⁶³	46.71 ²⁵⁸	33.256 ²⁰	68.20 ⁵	52.77 ³⁹	38.61 ²⁶⁶	56.471 ¹⁹	35.09 ⁸⁴
15.4	17.794 ¹¹³	48.98 ²²⁷	33.212 ⁴⁴	67.97 ²³	52.26 ⁵¹	41.15 ²⁵⁴	56.429 ⁴²	35.76 ⁶⁷
25.4	17.633 ¹⁶¹	50.90 ¹⁹²	33.147 ⁶⁵	67.61 ³⁶	51.64 ⁶²	43.28 ²¹³	56.364 ⁶⁵	36.51 ⁷³
Dec. 5.3	17.430 ²⁰³	52.38 ¹⁴⁸	33.065 ⁸²	67.13 ⁴⁸	50.93 ⁷¹	44.90 ¹⁶²	56.282 ⁸²	37.31 ⁹⁹
	237	102	95	59	76	106	96	81
15.3	17.193	53.40	32.970	66.54	50.17	45.96	56.186	38.12
25.3	16.926 ²⁶⁷	53.92 ⁵²	32.861 ¹⁰⁹	65.88 ⁶⁶	49.37 ⁸⁰	46.40 ⁴⁴	56.078 ¹⁰⁸	38.91 ⁷⁹
35.2	16.639 ²⁸⁷	53.91 ¹	32.744 ¹¹⁷	65.16 ⁷²	48.56 ⁸¹	46.24 ¹⁶	55.961 ¹¹⁷	39.68 ⁷⁷
Mean Place	11.422	13.95	28.692	40.23	47.458	50.28	52.004	61.29
Sec δ , Tan δ	1.856	+1.563	1.008	+0.125	3.957	-3.828	1.000	-0.028
$D\phi_a$, $D\omega_a$	+0.07	-0.10	+0.06	-0.01	+0.04	+0.26	+0.06	0.00
$D\phi_\delta$, $D\omega_\delta$	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2

APPARENT PLACES OF STARS, 1919.

323

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Cassiopeiæ. Mag. 2.2		μ Andromedæ. Mag. 3.9		α Sculptoris. Mag. 4.4		ϵ Piscium. Mag. 4.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 0 51 s	° ' " +60 16 "	h m 0 52 s	° ' " +38 3 "	h m 0 54 s	° ' " -29 47 "	h m 0 58 s	° ' " + 7 27 "
Jan. 0.3	50.22	65.10	16.515	54.18	43.131	48.33	45.470	22.52
10.2	49.90	64.95	16.346	53.67	42.975	48.80	45.353	21.80
20.2	49.56	64.26	16.173	52.80	42.819	48.90	45.230	21.06
30.2	49.24	63.06	16.002	51.61	42.668	48.64	45.110	20.32
Feb. 9.2	48.94	61.40	15.844	50.16	42.528	48.02	44.997	19.63
19.1	48.67	59.34	15.704	48.49	42.406	47.05	44.896	18.99
Mar. 1.1	48.46	56.99	15.594	46.68	42.306	45.74	44.816	18.45
11.1	48.32	54.42	15.521	44.81	42.236	44.12	44.760	18.05
21.0	48.25	51.76	15.492	42.97	42.201	42.23	44.737	17.84
31.0	48.25	49.11	15.512	41.24	42.205	40.07	44.752	17.82
Apr. 10.0	48.34	46.60	15.586	39.70	42.252	37.71	44.807	18.04
20.0	48.52	44.29	15.714	38.42	42.344	35.17	44.905	18.51
29.9	48.78	42.30	15.896	37.45	42.483	32.52	45.046	19.25
May 9.9	49.11	40.69	16.128	36.85	42.666	29.81	45.228	20.24
19.9	49.52	39.52	16.405	36.64	42.891	27.08	45.449	21.48
29.9	49.98	38.82	16.720	36.83	43.152	24.41	45.702	22.93
June 8.8	50.48	38.63	17.064	37.43	43.444	21.87	45.981	24.58
18.8	51.00	38.93	17.428	38.40	43.759	19.50	46.280	26.37
28.8	51.54	39.73	17.802	39.75	44.088	17.38	46.590	28.26
July 8.7	52.08	41.01	18.176	41.42	44.423	15.55	46.902	30.19
18.7	52.61	42.72	18.542	43.35	44.755	14.08	47.209	32.12
28.7	53.11	44.83	18.890	45.53	45.075	12.99	47.505	34.00
Aug. 7.7	53.57	47.28	19.214	47.87	45.375	12.32	47.781	35.78
17.6	53.98	50.01	19.506	50.34	45.647	12.09	48.031	37.40
27.6	54.35	52.98	19.762	52.87	45.887	12.27	48.252	38.85
Sept. 6.6	54.67	56.11	19.979	55.42	46.088	12.88	48.441	40.09
16.6	54.92	59.34	20.156	57.93	46.249	13.85	48.596	41.12
26.5	55.10	62.60	20.291	60.36	46.366	15.17	48.715	41.90
Oct. 6.5	55.23	65.84	20.385	62.67	46.441	16.76	48.799	42.47
16.5	55.29	68.98	20.438	64.79	46.475	18.54	48.852	42.82
26.4	55.29	71.95	20.455	66.73	46.471	20.45	48.873	42.95
Nov. 5.4	55.23	74.71	20.435	68.42	46.431	22.40	48.867	42.91
15.4	55.10	77.15	20.383	69.84	46.361	24.31	48.835	42.69
25.4	54.93	79.25	20.301	70.95	46.265	26.09	48.782	42.34
Dec. 5.3	54.71	80.92	20.192	71.73	46.146	27.69	48.707	41.87
15.3	54.45	82.13	20.059	72.17	46.011	29.02	48.617	41.30
25.3	54.15	82.82	19.908	72.24	45.863	30.06	48.512	40.66
35.3	53.83	82.99	19.741	71.93	45.707	30.76	48.396	39.94
Mean Place	48.432	42.30	15.104	36.91	42.150	42.77	44.253	15.58
Sec δ , Tan δ	2.017	+1.752	1.270	+0.783	1.152	-0.573	1.008	+0.131
$D_{\gamma\alpha}$, $D_{\mu\alpha}$	+0.07	-0.11	+0.07	-0.05	+0.06	+0.04	+0.06	-0.01
$D_{\gamma\delta}$, $D_{\mu\delta}$	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2	+0.4	+0.3

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Phœnicis. Mag. 3.4		μ Cassiopeiæ. Mag. 5.3		γ Ceti. Mag. 3.6		β Andromedæ. Mag. 2.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 1 2	° ' " -47 8	h m 1 2	° ' " +54 31	h m 1 4	° ' " -10 36	h m 1 5	° ' " +35 11
	s	"	s	"	s	"	s	"
Jan. 0.3	29.074 ²³⁴	79.71 ²⁷	53.935 ²⁵⁰	46.49 ¹⁹	32.041 ¹²²	39.98 ⁷⁰	12.955 ¹⁵⁷	45.16 ⁴⁵
10.2	28.840 ²³³	79.98 ²³	53.685 ²⁶⁰	46.30 ⁶⁸	31.919 ¹²⁶	40.63 ⁵⁴	12.796 ¹⁶⁶	44.71 ⁷⁸
20.2	28.607 ²²⁵	79.75 ⁷²	53.425 ²⁵⁸	45.62 ¹¹⁵	31.794 ¹²⁶	41.17 ³³	12.632 ¹⁶⁴	43.93 ¹⁰⁷
30.2	28.382 ²⁰⁸	79.03 ¹²⁰	53.169 ²⁴¹	44.47 ¹⁵⁶	31.669 ¹¹⁸	41.50 ¹²	12.468 ¹⁵⁸	42.86 ¹²⁹
Feb. 9.2	28.174 ¹⁸⁶	77.83 ¹⁶³	52.928 ²¹⁴	42.91 ¹⁹²	31.551 ¹⁰⁶	41.62 ¹⁰	12.310 ¹⁴¹	41.54 ¹²¹
19.1	27.988 ¹⁵⁶	76.20 ²⁰⁴	52.714 ¹⁷⁴	40.99 ²²²	31.445 ⁸⁶	41.52 ³³	12.169 ¹¹⁶	40.03 ¹⁰⁶
Mar. 1.1	27.832 ¹¹³	74.16 ²³⁷	52.540 ¹²⁴	38.77 ²⁴⁰	31.359 ⁶⁴	41.19 ⁵⁷	12.053 ⁴¹	38.37 ¹⁷⁹
11.1	27.714 ⁷⁵	71.79 ²⁶⁹	52.416 ⁶³	36.37 ²⁴⁸	31.295 ²²	40.62 ⁸³	11.971 ²³	36.67 ¹⁶⁹
21.0	27.639 ²⁷	69.10 ²⁹³	52.353 ⁷	33.89 ²⁴⁸	31.263 ⁵	39.80 ¹⁰⁶	11.930 ⁷	34.98 ¹⁵⁷
31.0	27.612 ²⁶	66.17 ³¹⁰	52.360 ⁷⁸	31.41 ²³⁶	31.268 ⁴³	38.74 ¹²⁰	11.937 ⁵⁷	33.41 ¹⁶⁴
Apr. 10.0	27.638 ⁵³	63.07 ³²³	52.438 ¹⁵²	29.05 ²¹⁴	31.311 ⁸⁶	37.44 ¹⁵²	11.994 ¹¹⁰	32.00 ¹¹⁹
20.0	27.721 ¹³⁷	59.84 ³²⁸	52.590 ²²⁴	26.91 ¹⁸⁶	31.397 ¹²⁹	35.92 ¹⁷³	12.104 ¹⁶³	30.84 ⁸⁸
29.9	27.858 ¹⁹³	56.56 ³²⁵	52.814 ²⁹²	25.05 ¹⁴⁹	31.526 ¹⁷⁰	34.19 ¹⁸⁰	12.267 ²¹³	29.96 ⁵³
May 9.9	28.051 ²⁴⁴	53.31 ³¹⁷	53.106 ³⁵¹	23.56 ¹⁰⁸	31.696 ²⁰⁹	32.29 ²¹⁴	12.480 ²⁵⁸	29.43 ²²
19.9	28.295 ²⁹⁰	50.14 ²⁹⁸	53.457 ⁴⁰²	22.48 ⁶³	31.905 ²⁴³	30.25 ²¹⁴	12.738 ²⁹⁷	29.27 ²
29.9	28.585 ³³⁰	47.16 ²⁷⁷	53.859 ⁴⁴²	21.85 ¹⁶	32.148 ²⁷¹	28.11 ²¹⁷	13.035 ³²⁷	29.49 ⁹
June 8.8	28.915 ³⁶¹	44.39 ²⁴⁴	54.301 ⁴⁷⁰	21.69 ³¹	32.419 ²⁶³	25.94 ²¹⁶	13.362 ³³⁰	30.08 ⁸⁶
18.8	29.276 ³⁸²	41.95 ²⁰⁹	54.771 ⁴⁸³	22.00 ⁷³	32.712 ³⁰⁶	23.78 ²⁰⁹	13.712 ³⁶²	31.03 ¹²⁹
28.8	29.658 ³⁹⁴	39.86 ¹⁶⁶	55.254 ⁴⁸⁸	22.78 ¹²¹	33.018 ³¹¹	21.69 ¹⁹⁷	14.074 ³⁶⁵	32.32 ¹⁵⁹
July 8.7	30.052 ³⁹⁴	38.20 ¹²⁰	55.742 ⁴⁷⁹	23.99 ¹⁸²	33.329 ³⁰⁷	19.72 ¹⁷⁰	14.439 ³⁶⁰	33.91 ¹⁸⁴
18.7	30.446 ³⁵⁴	37.00 ⁶⁸	56.221 ⁴⁶⁰	25.61 ¹⁹⁸	33.636 ²⁹⁸	17.93 ¹⁵⁶	14.799 ³⁴⁴	35.75 ²⁶⁶
28.7	30.830 ³⁶³	36.32 ¹⁸	56.681 ⁴³⁰	27.59 ²²⁹	33.934 ²⁸¹	16.37 ¹³⁰	15.143 ³²³	37.81 ²²²
Aug. 7.7	31.193 ³³³	36.14 ³⁴	57.111 ³⁹⁴	29.88 ²⁵⁶	34.215 ²⁵⁵	15.07 ¹⁰¹	15.466 ²⁹⁵	40.03 ²²²
17.6	31.526 ²⁹³	36.48 ⁸⁵	57.505 ³⁵¹	32.44 ²⁷⁵	34.470 ²²⁷	14.06 ⁶⁸	15.761 ²⁶²	42.35 ²²⁷
27.6	31.819 ²⁴⁸	37.33 ¹³²	57.856 ³⁰²	35.19 ²⁹⁰	34.697 ¹⁹⁴	13.38 ³⁶	16.023 ²²⁵	44.72 ²²⁸
Sept. 6.6	32.067 ¹⁹⁷	38.65 ¹⁷⁴	58.158 ²⁵¹	38.09 ²⁹³	34.891 ¹⁵⁸	13.02 ⁴	16.248 ¹⁸⁸	47.10 ²⁹⁴
16.6	32.264 ¹⁴²	40.39 ²¹⁰	58.409 ¹⁹⁶	41.07 ²⁹⁹	35.049 ¹²²	12.98 ²⁶	16.436 ¹⁴⁷	49.44 ²²⁵
26.5	32.406 ⁸⁷	42.49 ²³⁶	58.605 ¹⁴³	44.06 ²⁹⁶	35.171 ⁸⁸	13.24 ⁵³	16.583 ¹⁰⁸	51.69 ²¹²
Oct. 6.5	32.493 ³³	44.85 ²⁵⁵	58.748 ⁸⁹	47.02 ²⁶⁷	35.259 ⁵²	13.77 ⁷⁶	16.691 ³³	53.81 ¹⁹⁷
16.5	32.526 ²¹	47.40 ²⁶³	58.837 ³⁶	49.89 ²⁷¹	35.311 ²⁰	14.53 ⁹⁵	16.761 ³³	55.78 ¹⁷³
26.4	32.505 ⁶⁹	50.03 ²⁵⁸	58.873 ¹⁵	52.60 ²¹⁸	35.331 ⁸	15.48 ¹⁰⁷	16.794 ⁰	57.56 ¹⁵³
Nov. 5.4	32.436 ¹¹²	52.61 ²⁴⁵	58.858 ⁶³	55.08 ²²⁰	35.323 ³⁶	16.55 ¹¹⁵	16.794 ³⁴	59.11 ¹²¹
15.4	32.324 ¹⁵¹	55.06 ²²²	58.795 ¹¹⁰	57.28 ¹⁸⁹	35.287 ⁵⁹	17.70 ¹¹⁷	16.760 ⁶⁵	60.42 ¹⁰²
25.4	32.173 ¹⁸⁰	57.28 ¹⁹¹	58.685 ¹⁵¹	59.17 ¹⁴⁹	35.228 ⁸⁰	18.87 ¹¹⁴	16.695 ⁹⁰	61.44 ⁷²
Dec. 5.3	31.993 ²⁰⁶	59.19 ¹⁵¹	58.534 ¹⁸⁹	60.66 ¹⁰⁶	35.148 ⁹⁶	20.01 ¹⁰⁸	16.605 ¹¹⁶	62.16 ⁴¹
15.3	31.787 ²²³	60.70 ¹⁰⁸	58.345 ²¹⁹	61.72 ⁶¹	35.052 ¹⁰⁹	21.09 ⁹⁶	16.489 ¹³⁷	62.57 ²⁷
25.3	31.564 ²³²	61.78 ⁵⁹	58.126 ²⁴⁶	62.33 ¹²	34.943 ¹²¹	22.05 ⁸¹	16.352 ¹⁵³	62.63 ²⁷
35.3	31.332	62.37	57.880	62.45	34.822	22.86	16.199	62.36
Mean Place	28.165	69.49	52.150	25.22	30.897	40.39	11.466	29.10
Sec δ , Tan δ	1.470	-1.078	1.723	+1.403	1.017	-0.187	1.224	+0.705
$D\psi\alpha$, $D\omega\alpha$	+0.05	+0.07	+0.07	-0.09	+0.06	+0.01	+0.07	-0.05
$D\psi\delta$, $D\omega\delta$	+0.4	+0.3	+0.4	+0.3	+0.4	+0.3	+0.4	+0.3

APPARENT PLACES OF STARS, 1919.

325

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	τ Piscium. Mag. 4.7		ζ Piscium. Mag. 5.6		κ Tucanae. Mag. 5.0		f Piscium. Mag. 5.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 1 7	° ' +29 39	h m 1 9	° ' + 7 8	h m 1 12	° ' -69 17	h m 1 13	° ' + 3 11
	s	"	s	"	s	"	s	"
Jan. 0.3	13.132	50.15	31.142	57.11	62.13	97.01	38.451	22.73
10.2	12.990 ¹⁴²	49.64 ⁵¹	31.025 ¹¹⁷	56.39 ⁷²	61.57 ⁵⁶	96.96 ⁵	38.336 ¹¹⁵	22.00 ⁷³
20.2	12.840 ¹⁵⁰	48.86 ⁷⁸	30.903 ¹²²	55.67 ⁷²	61.02 ⁵⁵	96.32 ⁶⁴	38.212 ¹²⁴	21.31 ⁶⁹
30.2	12.689 ¹⁵¹	47.85 ¹⁰¹	30.779 ¹²⁴	54.96 ⁷¹	60.48 ⁵⁴	95.10 ¹²²	38.088 ¹²⁴	20.67 ⁶⁴
Feb. 9.2	12.545 ¹⁴⁴	46.64 ¹²¹	30.662 ¹¹⁷	54.28 ⁶⁸	59.98 ⁵⁰	93.33 ¹⁷⁷	37.970 ¹¹⁸	20.11 ⁴⁶
19.1	12.415 ¹³⁰	45.28 ¹³⁶	30.555 ¹⁰⁷	53.67 ⁶¹	59.54 ⁴⁴	91.07 ²²⁶	37.860 ¹¹⁰	19.63 ⁴⁸
Mar. 1.1	12.308 ¹⁰⁷	43.84 ¹⁴⁴	30.466 ⁸⁹	53.16 ⁵¹	59.15 ³⁹	88.38 ²⁶⁹	37.769 ⁹¹	19.31 ³²
11.1	12.232 ⁷⁶	42.38 ¹⁴⁶	30.402 ⁶⁴	52.78 ³⁸	58.84 ³¹	85.32 ³⁰⁶	37.701 ⁶⁸	19.15 ¹⁶
21.1	12.198 ³⁹	40.97 ¹⁴¹	30.370 ³²	52.58 ²⁰	58.61 ²³	82.00 ³³²	37.664 ³⁷	19.18 ³
31.0	12.198 ⁵	39.67 ¹³⁰	30.374 ⁴	52.57 ¹	58.48 ¹³	78.45 ³⁵⁵	37.665 ¹	19.39 ²¹
Apr. 10.0	12.251 ⁵³	38.57 ¹¹⁰	30.418 ⁴⁴	52.80 ²³	58.43 ⁵	74.78 ³⁶⁷	37.702 ³⁷	19.86 ⁴⁷
20.0	12.354 ¹⁰³	37.71 ⁸⁶	30.505 ⁸⁷	53.27 ⁴⁷	58.49 ⁶	71.05 ³⁷³	37.782 ⁸⁰	20.56 ⁷⁰
29.9	12.506 ¹⁵²	37.14 ⁵⁷	30.636 ¹³¹	54.00 ⁷³	58.64 ¹⁵	67.35 ³⁷⁰	37.908 ¹²⁶	21.51 ⁹⁵
May 9.9	12.707 ²⁰¹	36.89 ²⁵	30.809 ¹⁷³	54.97 ⁹⁷	58.91 ²⁷	63.78 ³⁵⁷	38.075 ¹⁶⁷	22.69 ¹¹⁸
19.9	12.950 ²⁴³	36.99 ¹⁰	31.021 ²¹²	56.20 ¹²³	59.26 ³⁵	60.38 ³⁴⁰	38.279 ²⁰⁴	24.09 ¹⁴⁰
29.9	13.230 ²⁸⁰	37.43 ⁴⁴	31.268 ²⁴⁷	57.63 ¹⁴³	59.69 ⁴³	57.25 ³¹³	38.521 ²⁴²	25.69 ¹⁶⁰
June 8.8	13.541 ³¹¹	38.23 ⁸⁰	31.542 ²⁷⁴	59.25 ¹⁶²	60.20 ⁵¹	54.45 ²⁸⁰	38.790 ²⁶⁹	27.44 ¹⁷⁵
18.8	13.873 ³³²	39.35 ¹¹²	31.836 ²⁹⁴	61.01 ¹⁷⁶	60.77 ⁵⁷	52.08 ²³⁷	39.080 ²⁹⁰	29.30 ¹⁸⁶
28.8	14.217 ³⁴⁴	40.75 ¹⁴⁰	32.145 ³⁰⁹	62.87 ¹⁸⁶	61.39 ⁶²	50.17 ¹⁹¹	39.382 ³⁰²	31.20 ¹⁹⁰
July 8.8	14.565 ³⁴⁸	42.42 ¹⁶⁷	32.457 ³¹²	64.77 ¹⁹⁰	62.04 ⁶⁵	48.78 ¹³⁹	39.691 ³⁰⁹	33.12 ¹⁹²
18.7	14.908 ³⁴³	44.30 ¹⁸⁸	32.766 ³⁰⁹	66.68 ¹⁹¹	62.70 ⁶⁶	47.94 ⁸⁴	39.998 ³⁰⁷	35.02 ¹⁹⁰
28.7	15.239 ³³¹	46.33 ²⁰³	33.064 ²⁹⁸	68.53 ¹⁸⁵	63.36 ⁶⁶	47.68 ²⁶	40.296 ²⁹⁸	36.81 ¹⁷⁹
Aug. 7.7	15.547 ³⁰⁸	48.48 ²¹⁵	33.345 ²⁸¹	70.28 ¹⁷⁵	63.99 ⁶³	48.02 ³⁴	40.576 ²⁸⁰	38.46 ¹⁶⁵
17.6	15.830 ²⁸³	50.68 ²²⁰	33.602 ²⁵⁷	71.87 ¹⁵⁹	64.58 ⁵⁹	48.94 ⁹²	40.835 ²⁵⁹	39.93 ¹⁴⁷
27.6	16.082 ²⁵²	52.89 ²²¹	33.832 ²³⁰	73.29 ¹⁴²	65.10 ⁵²	50.39 ¹⁴⁵	41.066 ¹⁹⁹	41.22 ¹²⁹
Sept. 6.6	16.298 ²¹⁶	55.07 ²¹⁸	34.030 ¹⁹⁸	74.50 ¹²¹	65.55 ⁴⁵	52.34 ¹⁹⁵	41.265 ¹⁹⁹	42.28 ¹⁰¹
16.6	16.478 ¹⁸⁰	57.15 ²⁰⁸	34.194 ¹⁶⁴	75.50 ¹⁰⁰	65.90 ³⁵	54.72 ²³⁸	41.432 ¹⁶⁷	43.02 ⁷⁹
26.5	16.622 ¹⁴⁴	59.13 ¹⁹⁸	34.325 ¹³¹	76.25 ⁷⁵	66.14 ²⁴	57.47 ²⁷⁵	41.565 ¹³³	43.54 ⁵²
Oct. 6.5	16.727 ¹⁰⁵	60.96 ¹⁸³	34.421 ⁹⁶	76.78 ⁵³	66.28 ¹⁴	60.46 ²⁹⁹	41.663 ⁹⁸	43.85 ³¹
16.5	16.796 ⁶⁹	62.62 ¹⁶⁶	34.484 ⁶³	77.08 ³⁰	66.32 ⁴	63.57 ³¹¹	41.730 ⁶⁷	43.90 ⁵
26.5	16.831 ³⁵	64.09 ¹⁴⁷	34.516 ³²	77.19 ¹¹	66.24 ⁸	66.71 ³¹⁴	41.766 ³⁶	43.74 ¹⁶
Nov. 5.4	16.834 ³	65.32 ¹²³	34.521 ⁵	77.12 ⁷	66.04 ²⁰	69.73 ³⁰²	41.772 ⁶	43.44 ³⁰
15.4	16.806 ²⁸	66.33 ¹⁰¹	34.499 ²²	76.87 ²⁵	65.76 ²⁸	72.53 ²⁸⁰	41.754 ¹⁸	42.98 ⁴⁶
25.4	16.752 ⁵⁴	67.08 ⁷⁵	34.454 ⁴⁵	76.50 ³⁷	65.39 ³⁷	74.98 ²⁴⁵	41.709 ⁴⁵	42.41 ⁵⁷
Dec. 5.3	16.670 ⁸²	67.57 ⁴⁹	34.387 ⁶⁷	76.01 ⁴⁹	64.96 ⁴³	77.00 ²⁰²	41.643 ⁶⁶	41.75 ⁶⁶
15.3	16.567 ¹⁰³	67.77 ²⁰	34.302 ⁸⁵	75.43 ⁵⁸	64.47 ⁴⁹	78.52 ¹⁵²	41.560 ⁸³	41.02 ⁷³
25.3	16.445 ¹²²	67.70 ⁷	34.202 ¹⁰⁰	74.78 ⁶⁵	63.94 ⁵³	79.47 ⁹⁵	41.460 ¹⁰⁰	40.30 ⁷²
35.3	16.306 ¹³⁹	67.34 ³⁶	34.088 ¹¹⁴	74.07 ⁷¹	63.38 ⁵⁶	79.82 ³⁵	41.347 ¹¹³	39.57 ⁷³
Mean Place	11.687	35.88	29.862	50.53	61.387	83.02	37.173	17.64
Sec δ , Tan δ	1.151	+0.570	1.008	+0.125	2.830	-2.647	1.002	+0.056
$D\phi\alpha$, $D\omega\alpha$	+0.07	-0.04	+0.06	-0.01	+0.04	+0.18	+0.06	0.00
$D\phi\delta$, $D\omega\delta$	+0.4	+0.3	+0.4	+0.3	+0.4	+0.3	+0.4	+0.3

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ν Piscium. Mag. 4.7		θ Ceti. Mag. 3.8		δ Cassiopeie. Mag. 2.8		γ Phœnicie. Mag. 3.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 1 15	° ' " +26 50	h m 1 19	° ' " - 8 35	h m 1 20	° ' " +59 48	h m 1 24	° ' " -43 43
	s	"	s	"	s	"	s	"
Jan. 0.3	2.077	32.47	59.684	62.60	32.440	75.62	52.011	69.08
10.3	1.941 ¹³⁶	31.97 ⁵⁰	59.563 ¹²¹	63.36 ⁷⁶	32.131 ³⁰⁹	75.79 ¹⁷	51.795 ²¹⁶	69.61 ⁸
20.2	1.796 ¹⁴⁵	31.23 ⁷⁴	59.435 ¹²⁸	63.97 ⁶¹	31.806 ³²⁵	75.44 ³⁵	51.574 ²²¹	69.70 ¹
30.2	1.649 ¹⁴⁷	30.29 ⁹⁴	59.305 ¹³⁰	64.39 ⁴²	31.478 ³²⁸	74.57 ⁸⁷	51.355 ²¹⁹	69.31 ³
Feb. 9.2	1.506 ¹⁴³	29.17 ¹¹²	59.179 ¹²⁶	64.62 ²³	31.162 ³¹⁶	73.22 ¹³⁵	51.146 ²⁰⁸	68.46 ⁵
	130	124	115	2	299	176	193	12
19.1	1.376	27.93	59.064	64.64	30.873	71.46	50.953	67.14
Mar. 1.1	1.266 ¹¹⁰	26.62 ¹³¹	58.964 ¹⁰⁰	64.43 ²¹	30.627 ²⁴⁶	69.34 ²¹²	50.785 ¹⁶⁶	65.41 ¹³
11.1	1.186 ⁸⁰	25.31 ¹³¹	58.888 ⁷⁶	64.00 ⁴³	30.438 ¹⁸⁹	66.97 ²³⁷	50.647 ¹³⁸	63.31 ²⁹
21.1	1.141 ⁴⁵	24.05 ¹²⁶	58.841 ⁴⁷	63.32 ⁶⁸	30.317 ¹²¹	64.44 ²⁵³	50.549 ⁹⁶	60.89 ²⁶
31.0	1.138 ³	22.92 ¹¹³	58.830 ¹¹	62.41 ⁹¹	30.274 ⁴³	61.87 ²⁶⁷	50.495 ⁵⁴	58.18 ²¹
	44	95	29	116	40	263	4	22
Apr. 10.0	1.182	21.97 ⁷¹	58.859	61.25	30.314	59.34	50.491	55.26
20.0	1.275 ⁹³	21.26 ⁴⁴	58.929 ⁷⁰	59.86 ¹³⁹	30.439 ¹²⁵	56.97 ²³⁷	50.541 ⁸⁰	52.17 ²⁹
30.0	1.417 ¹⁴²	20.82 ¹³	59.043 ¹¹⁴	58.26 ¹⁶⁰	30.648 ²⁰⁹	54.85 ²¹²	50.644 ¹⁰³	48.99 ²⁸
May 9.9	1.605 ¹⁸⁸	20.69 ²¹	59.200 ¹⁵⁷	56.47 ¹⁷⁹	30.937 ²⁹⁰	53.07 ¹⁷⁸	50.801 ¹⁵⁷	45.78 ²³
19.9	1.837 ²³²	20.90 ⁵²	59.396 ¹⁹⁶	54.53 ¹⁹⁴	31.297 ³⁶⁰	51.65 ¹⁴²	51.010 ²⁰⁸	42.61 ²⁷
	269		231	205	423	97	256	34
29.9	2.106	21.42	59.627	52.48	31.720	50.68	51.266	39.57
June 8.8	2.406 ³⁰⁰	22.28 ⁸⁶	59.889 ²⁶²	50.35 ²¹³	32.190 ⁴⁷⁰	50.17 ⁵¹	51.564 ²⁹⁸	36.70 ²⁷
18.8	2.727 ³²¹	23.43 ¹¹⁵	60.174 ²⁸⁵	48.22 ²¹³	32.699 ⁵⁰⁹	50.15 ²	51.894 ³³⁰	34.10 ²⁹
28.8	3.063 ³³⁶	24.85 ¹⁴²	60.474 ³⁰⁰	46.14 ²⁰⁸	33.229 ⁵³⁰	50.60 ⁴⁵	52.250 ³⁵⁶	31.82 ²⁵
July 8.8	3.404 ³⁴¹	26.50 ¹⁶⁵	60.782 ³⁰⁸	44.16 ¹⁹⁸	33.770 ⁵⁴¹	51.52 ⁹²	52.621 ³⁷¹	29.98 ¹⁹
	337	183	307	183	534	137	376	16
18.7	3.741	28.33	61.089	42.33	34.304	52.89	52.997	28.47
28.7	4.067 ³²⁶	30.30 ¹⁹⁷	61.388 ²⁹⁹	40.71 ¹⁶²	34.825 ⁵²¹	54.66 ¹⁷⁷	53.368 ³⁷¹	27.49 ⁹
Aug. 7.7	4.374 ³⁰⁷	32.36 ²⁰⁶	61.672 ²⁸⁴	39.33 ¹³⁸	35.317 ⁴⁹²	56.79 ²¹³	53.722 ³⁵⁴	27.03 ⁴
17.7	4.657 ²⁸³	34.45 ²⁰⁹	61.933 ²⁶¹	38.24 ¹⁰⁹	35.771 ⁴⁵⁴	59.22 ²⁴³	54.053 ³³¹	27.06 ¹
27.6	4.909 ²⁵²	36.53 ²⁰⁸	62.169 ²³⁶	37.45 ⁷⁰	36.182 ⁴¹¹	61.92 ²⁷⁰	54.351 ²⁹⁶	27.64 ¹⁶
	220	204	205	48	350	290	250	
Sept. 6.6	5.129	38.57	62.374	36.97	36.541	64.81	54.610	28.69
16.6	5.315 ¹⁸⁶	40.51 ¹⁹⁴	62.545 ¹⁷¹	36.82 ¹⁵	36.844 ³⁰³	67.85 ³⁰⁴	54.824 ²¹⁴	30.20 ¹³
26.5	5.463 ¹⁴⁸	42.33 ¹⁸²	62.682 ¹³⁷	36.97 ¹⁵	37.090 ²⁴⁶	70.97 ³¹²	54.989 ¹⁶⁵	32.06 ¹⁹
Oct. 6.5	5.575 ¹¹²	43.99 ¹⁶⁶	62.785 ¹⁰³	37.39 ⁴²	37.273 ¹⁸³	74.10 ³¹³	55.104 ¹¹⁵	34.30 ²²
16.5	5.653 ⁷⁸	45.48 ¹⁴⁹	62.853 ⁶⁸	38.06 ⁶⁷	37.395 ¹²²	77.18 ³⁰⁶	55.169 ⁶⁵	36.74 ²⁴
	44	130	36	85	62	297	14	28
26.5	5.697 ¹²	46.78	62.889	38.91	37.457	80.15	55.183	39.32
Nov. 5.4	5.709 ¹⁸	47.85 ¹⁰⁷	62.896 ⁷	39.92 ¹⁰¹	37.456 ¹	82.97 ²⁸²	55.151 ³²	41.92 ²⁹
15.4	5.691 ¹⁸	48.72 ⁸⁷	62.875 ²¹	41.02 ¹¹⁰	37.396 ⁶⁰	85.52 ²⁵⁵	55.076 ⁷⁵	44.44 ²³
25.4	5.646 ⁴⁵	49.35 ⁶³	62.829 ⁴⁶	42.16 ¹¹⁴	37.279 ¹¹⁷	87.77 ²²⁵	54.963 ¹¹³	46.79 ²⁵
Dec. 5.4	5.575 ⁷¹	49.74 ³⁹	62.761 ⁶⁸	43.29 ¹¹³	37.108 ¹⁷¹	89.66 ¹⁸⁹	54.817 ¹⁴⁶	48.87 ²⁸
	95	13	87	108	221	146	175	13
15.3	5.480	49.87	62.674	44.37	36.887	91.12	54.642	50.60
25.3	5.365 ¹¹⁵	49.75 ¹²	62.570 ¹⁰⁴	45.36 ⁹⁹	36.623 ²⁶⁴	92.11 ⁹⁹	54.447 ¹⁹⁵	51.93 ¹⁸
35.3	5.234 ¹³¹	49.39 ³⁶	62.452 ¹¹⁸	46.23 ⁸⁷	36.326 ²⁹⁷	92.59 ⁴⁸	54.235 ²¹²	52.62 ⁸
Mean Place	0.602	19.32	58.440	63.43	30.250	53.84	50.929	59.31
Sec δ , Tan δ	1.121	+0.506	1.011	-0.151	1.990	+1.720	1.382	-0.957
$D\psi\alpha$, $D\omega\alpha$	+0.06	-0.03	+0.06	+0.01	+0.08	-0.11	+0.05	+0.06
$D\psi\delta$, $D\omega\delta$	+0.4	+0.3	+0.4	+0.3	+0.4	+0.3	+0.4	+0.4

327

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	38 Cassiopeiæ. Mag. 6.0		7 Piscium. Mag. 3.7		40 Cassiopeiæ. Mag. 5.5		v Andromedæ. Mag. 4.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 1 25	° ' " +69 50	h m 1 27	° ' " +14 55	h m 1 31	° ' " +72 37	h m 1 32	° ' " +41 0
	s "	"	s "	"	s "	"	s "	"
Jan. 0.3	13.55	77.43	10.197	52.11	64.15	63.96	3.974	19.85
10.3	13.06	77.89	10.077	51.50	63.58	64.58	3.802	19.70
20.2	12.54	77.77	9.948	50.78	62.96	64.60	3.616	19.20
30.2	12.02	77.07	9.815	50.00	62.34	64.04	3.422	18.34
Feb. 9.2	11.52	75.83	9.683	49.18	61.74	62.90	3.232	17.15
19.1	11.06	74.09	9.561	48.33	61.19	61.25	3.054	15.71
Mar. 1.1	10.66	71.93	9.455	47.52	60.71	59.14	2.899	14.05
11.1	10.34	69.43	9.373	46.79	60.33	56.66	2.777	12.25
21.1	10.14	66.71	9.322	46.16	60.05	53.94	2.697	10.40
31.0	10.04	63.88	9.309	45.70	59.91	51.07	2.667	8.58
Apr. 10.0	10.06	61.05	9.337	45.44	59.90	48.17	2.691	6.87
20.0	10.21	58.32	9.411	45.41	60.04	45.36	2.773	5.33
30.0	10.47	55.81	9.530	45.64	60.32	42.74	2.914	4.05
May 9.9	10.85	53.61	9.694	46.13	60.73	40.39	3.111	3.06
19.9	11.33	51.78	9.900	46.91	61.26	38.41	3.360	2.42
29.9	11.90	50.39	10.141	47.93	61.89	36.86	3.654	2.16
June 8.8	12.54	49.48	10.414	49.20	62.60	35.78	3.984	2.29
18.8	13.23	49.07	10.709	50.66	63.38	35.20	4.345	2.79
28.8	13.97	49.18	11.021	52.31	64.21	35.14	4.724	3.67
July 8.8	14.72	49.79	11.340	54.06	65.05	35.59	5.111	4.88
18.7	15.46	50.90	11.658	55.89	65.90	36.56	5.498	6.41
28.7	16.17	52.47	11.966	57.75	66.72	38.00	5.875	8.21
Aug. 7.7	16.86	54.47	12.260	59.59	67.51	39.86	6.234	10.22
17.7	17.50	56.84	12.534	61.36	68.25	42.14	6.569	12.42
27.6	18.08	59.54	12.779	63.01	68.92	44.77	6.873	14.73
Sept. 6.6	18.59	62.51	12.995	64.53	69.52	47.68	7.140	17.12
16.6	19.02	65.68	13.181	65.88	70.03	50.84	7.372	19.53
26.5	19.37	69.00	13.331	67.03	70.45	54.16	7.562	21.91
Oct. 6.5	19.63	72.39	13.449	68.00	70.76	57.59	7.712	24.24
16.5	19.79	75.79	13.535	68.75	70.98	61.04	7.822	26.45
26.5	19.87	79.12	13.588	69.32	71.08	64.46	7.892	28.51
Nov. 5.4	19.86	82.30	13.612	69.69	71.08	67.76	7.924	30.40
15.4	19.76	85.26	13.608	69.88	70.97	70.85	7.917	32.05
25.4	19.56	87.93	13.577	69.89	70.76	73.67	7.875	33.45
Dec. 5.4	19.28	90.23	13.523	69.76	70.44	76.12	7.797	34.56
15.3	18.93	92.09	13.446	69.46	70.02	78.15	7.687	35.34
25.3	18.51	93.45	13.350	69.03	69.53	79.67	7.548	35.78
35.3	18.03	94.26	13.236	68.48	68.98	80.65	7.385	35.86
Mean Place	10.654	54.15	8.748	43.29	60.786	40.60	2.169	3.03
Sec δ, Tan δ	2.903	+2.726	1.035	+0.267	3.350	+3.198	1.325	+0.870
D _α , D _δ	+0.09	-0.18	+0.06	-0.02	+0.09	-0.20	+0.07	-0.06
D _δ , D _δ	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.		π Piscium. Mag. 5.6		ν Persei. Mag. 3.8		α Eridani. (Achernar.) Mag. 0.6		ω Cassiopeiæ. Mag. 5.5	
		Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
		h m 1 32	° ' +11 43	h m 1 33	° ' +48 13	h m 1 34	° ' -57 38	h m 1 36	° ' +67 37
		s "	"	s "	"	s "	"	s "	"
Jan.	0.3	49.560	46.82	2.664	24.56	43.004	65.63	22.14	84.88
	10.3	49.444 ¹¹⁶	46.18 ⁶⁴	2.458 ²⁰⁶	24.59 ³	42.670 ³³⁴	66.11 ⁴⁸	21.70 ⁴⁴	85.43 ⁵⁵
	20.2	49.317 ¹²⁷	45.47 ⁷¹	2.235 ²²³	24.19 ⁴⁰	42.329 ³⁴¹	66.04 ⁷	21.24 ⁴⁶	85.40 ³
	30.2	49.185 ¹³²	44.74 ⁷³	2.006 ²²⁹	23.37 ⁸²	41.992 ³³⁷	65.40 ⁶⁴	20.78 ⁴⁶	84.82 ⁵⁸
Feb.	9.2	49.054 ¹³¹	44.00 ⁷⁴	1.780 ²²⁶	22.17 ¹²⁰	41.668 ³²⁴	64.23 ¹¹⁷	20.32 ⁴⁶	83.70 ¹¹²
		122	71	210	155	300	167	42	162
	19.2	48.932	43.29	1.570	20.62	41.368	62.56	19.90	82.08
Mar.	1.1	48.823 ¹⁰⁹	42.62 ⁶⁷	1.385 ¹⁸⁵	18.81 ¹⁸¹	41.101 ²⁶⁷	60.42 ²¹⁴	19.53 ³⁷	80.04 ²⁰⁴
		86	58	145	200	224	253	30	238
	11.1	48.737 ⁵⁵	42.04 ⁴⁵	1.240 ⁹⁶	16.81 ²¹²	40.877 ¹⁷³	57.89 ²⁸⁷	19.23 ²¹	77.66 ²⁶²
	21.1	48.682 ¹⁸	41.59 ²⁷	1.144 ³⁹	14.69 ²¹¹	40.704 ¹¹⁴	55.02 ³¹⁶	19.02 ¹¹	75.04 ²⁷⁵
	31.0	48.664 ²²	41.32 ⁸	1.105 ²¹	12.58 ²⁰⁶	40.590 ⁵⁰	51.86 ³³⁶	18.91 ¹	72.29 ²⁷⁶
Apr.	10.0	48.686	41.24	1.126	10.52	40.540	48.50	18.90	69.53
	20.0	48.752 ⁶⁶	41.41 ¹⁷	1.215 ⁸⁹	8.62 ¹⁹⁰	40.557 ¹⁷	44.99 ³⁵¹	19.02 ¹²	66.85 ²⁶⁸
	30.0	48.863 ¹¹¹	41.81 ⁴⁰	1.368 ¹⁵³	6.98 ¹⁶⁴	40.647 ⁹⁰	41.44 ³⁵⁵	19.24 ²²	64.38 ²⁴⁷
May	9.9	49.018 ¹⁵⁵	42.48 ⁶⁷	1.584 ²¹⁶	5.63 ¹³⁵	40.805 ¹⁵⁸	37.91 ³⁵³	19.56 ³²	62.19 ²¹⁹
	19.9	49.215 ¹⁹⁷	43.39 ⁹¹	1.857 ²⁷³	4.64 ⁹⁹	41.033 ²²⁸	34.47 ³⁴⁴	19.98 ⁴²	60.34 ¹⁸⁵
		234	116	325	59	289	326	52	142
	29.9	49.449	44.55	2.182	4.05	41.322	31.21	20.50	58.92
June	8.9	49.715 ²⁶⁶	45.91 ¹³⁶	2.548 ³⁶⁶	3.87 ¹⁸	41.668 ³⁴⁶	28.21 ³⁰⁰	21.07 ⁵⁷	57.96 ⁹⁶
		289	154	398	24	393	267	63	47
	18.8	50.004 ³⁰⁶	47.45 ¹⁷⁰	2.946 ⁴¹⁹	4.11 ⁶⁶	42.061 ⁴³⁰	25.54 ²²⁸	21.70 ⁶⁵	57.49 ³
	28.8	50.310 ³¹⁴	49.15 ¹⁷⁸	3.365 ⁴²⁸	4.77 ¹⁰⁵	42.491 ⁴⁵⁵	23.26 ¹⁸³	22.35 ⁶⁹	57.52 ⁵²
July	8.8	50.624 ³¹⁴	50.93 ¹⁸³	3.793 ⁴²⁸	5.82 ¹⁴⁰	42.946 ⁴⁶⁷	21.43 ¹³¹	23.04 ⁶⁹	58.04 ¹⁰¹
	18.7	50.938 ³⁰⁶	52.76 ¹⁸²	4.221 ⁴¹⁸	7.22 ¹⁷⁴	43.413 ⁴⁶⁷	20.12 ⁷⁸	23.73 ⁶⁷	59.05 ¹⁴⁶
	28.7	51.244 ²⁹³	54.58 ¹⁷⁷	4.639 ³⁹⁷	8.96 ²⁰²	43.880 ⁴⁵²	19.34 ²⁰	24.40 ⁶⁴	60.51 ¹⁸⁶
Aug.	7.7	51.537 ²⁷³	56.35 ¹⁶⁷	5.036 ³⁷²	10.98 ²²⁵	44.332 ⁴²⁶	19.14 ³⁶	25.04 ⁶⁰	62.37 ²²⁵
	17.7	51.810 ²⁴⁷	58.02 ¹⁵⁴	5.408 ³³⁷	13.23 ²⁴⁴	44.758 ³⁸⁹	19.50 ⁹⁴	25.64 ⁵⁶	64.62 ²⁵⁸
	27.6	52.057 ²¹⁸	59.56 ¹³⁸	5.745 ²⁹⁹	15.67 ²⁵⁷	45.147 ³³⁹	20.44 ¹⁴⁶	26.20 ⁴⁸	67.20 ²⁸⁴
Sept.	6.6	52.275	60.94	6.044	18.24	45.486	21.90	26.68	70.04
	16.6	52.462 ¹⁸⁷	62.11 ¹¹⁷	6.302 ²⁵⁸	20.88 ²⁶⁴	45.767 ²⁸¹	23.83 ¹⁹³	27.10 ⁴²	73.10 ³⁰⁶
	26.6	52.615 ¹⁵³	63.09 ⁹⁸	6.515 ²¹³	23.54 ²⁶⁶	45.985 ²¹⁸	26.18 ²³⁵	27.45 ³⁵	76.30 ³²⁰
Oct.	6.5	52.736 ¹²¹	63.85 ⁷⁶	6.683 ¹⁶⁸	26.19 ²⁶⁵	46.134 ¹⁴⁹	28.85 ²⁶⁷	27.72 ²⁷	79.58 ³³⁸
	16.5	52.826 ⁹⁰	64.41 ⁵⁶	6.805 ¹²²	28.75 ²⁵⁶	46.213 ⁷⁹	31.74 ²⁸⁹	27.92 ²⁰	82.90 ³³²
		58	36	77	245	8	300	10	325
	26.5	52.884	64.77	6.882	31.20	46.221	34.74	28.02	86.15
Nov.	5.4	52.912 ²⁸	64.93 ¹⁶	6.914 ³²	33.47 ²²⁷	46.161 ⁶⁰	37.74 ³⁰⁰	28.04 ²	89.27 ³¹²
	15.4	52.913 ¹	64.93 ⁰	6.902 ¹²	35.51 ²⁰⁴	46.039 ¹²²	40.61 ²⁸⁷	27.98 ⁶	92.20 ²⁹³
	25.4	52.887 ²⁶	64.78 ¹⁵	6.847 ⁵⁵	37.29 ¹⁷⁸	45.860 ¹⁷⁹	43.23 ²⁶²	27.84 ¹⁴	94.85 ²⁶⁵
Dec.	5.4	52.837 ⁵⁰	64.49 ²⁹	6.752 ⁹⁵	38.75 ¹⁴⁶	45.630 ²³⁰	45.53 ²³⁰	27.63 ²¹	97.17 ²³²
		73	41	133	110	271	188	29	188
	15.3	52.764	64.08	6.619	39.85	45.359	47.41	27.34	99.05
	25.3	52.672 ⁹²	63.57 ⁵¹	6.451 ¹⁶⁸	40.55 ⁷⁰	45.056 ³⁰³	48.79 ¹³⁸	26.98 ³⁶	100.46 ¹⁴¹
	35.3	52.561 ¹¹¹	62.97 ⁶⁰	6.256 ¹⁹⁵	40.84 ²⁹	44.730 ³²⁶	49.64 ⁸⁵	26.56 ⁴²	101.34 ⁸⁸
Mean Place		48.104	39.27	0.694	5.87	41.924	53.03	19.221	62.41
Sec δ , Tan δ		1.021	+0.208	1.501	+1.119	1.869	-1.578	2.628	+2.431
$D\delta a$, $D\omega a$		+0.06	-0.01	+0.07	-0.07	+0.04	+0.10	+0.09	-0.15
$D\delta \delta$, $D\omega \delta$		+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4

329

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	♈ Piscum. Mag. 4.7		♉ Persel. Mag. 4.2		♊ Ceti. Mag. 3.6		♋ Piscum. Mag. 4.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 1 37	° ' + 5 4	h m 1 38	° ' +50 16	h m 1 40	° ' -16 21	h m 1 41	° ' + 8 45
	s "	"	s "	"	s "	"	s "	"
Jan. 0.3	14.288	46.62	36.539	71.46	19.563	51.10	8.331	8.09
10.3	14.175 ¹¹³	45.91 ⁷¹	36.322 ²¹⁷	71.60 ¹⁴	19.431 ¹³²	51.90 ⁸⁰	8.217 ¹¹⁴	7.43 ⁶⁶
20.2	14.051 ¹²⁴	45.23 ⁶⁸	36.087 ²³⁵	71.29 ³¹	19.289 ¹⁴²	52.47 ⁵⁷	8.092 ¹²⁵	6.73 ⁷⁰
30.2	13.920 ¹³¹	44.58 ⁶⁵	35.843 ²⁴⁴	70.54 ⁷⁵	19.143 ¹⁴⁶	52.76 ²⁰	7.960 ¹³²	6.05 ⁶⁸
Feb. 9.2	13.790 ¹³⁰	43.98 ⁶⁰	35.602 ²⁴¹	69.39 ¹¹⁵	18.997 ¹⁴⁶	52.78 ²	7.827 ¹³³	5.38 ⁶⁷
19.2	13.667 ¹²³	43.47 ⁵¹	35.375 ²²⁷	67.88 ¹⁵¹	18.860 ¹³⁷	52.51 ²⁷	7.700 ¹²⁷	4.76 ⁶²
Mar. 1.1	13.558 ¹⁰⁹	43.07 ⁴⁰	35.176 ¹⁹⁰	66.08 ¹⁸⁰	18.739 ¹²¹	51.97 ⁵⁴	7.588 ¹¹²	4.22 ⁵⁴
11.1	13.470 ⁸⁸	42.82 ²⁵	35.016 ¹⁶⁰	64.06 ²⁰²	18.638 ¹⁰¹	51.13 ⁸⁴	7.497 ⁹¹	3.79 ⁴³
21.1	13.412 ⁵⁸	42.72 ¹⁰	34.906 ¹¹⁰	61.90 ²¹⁶	18.567 ⁷¹	50.03 ¹¹⁰	7.435 ⁶⁷	3.51 ²¹
31.0	13.388 ²⁴	42.83 ¹¹	34.855 ⁵¹	59.70 ²²⁰	18.531 ³⁶	48.66 ¹³⁷	7.408 ²²	3.40 ¹⁸
	16 ³²	32 ¹³	13 ²¹²	212 ⁴	4 ¹⁶²	162 ¹⁴	14 ⁹	9 ³³
Apr. 10.0	13.404	43.15	34.868	57.58	18.535	47.04	7.422	3.49
20.0	13.463 ⁵⁹	43.70 ⁵⁵	34.949 ⁸¹	55.58 ²⁰⁰	18.580 ⁴⁵	45.20 ¹⁸⁴	7.479 ⁵⁷	3.82 ³³
30.0	13.566 ¹⁰³	44.50 ⁸⁰	35.100 ¹⁵¹	53.82 ¹⁷⁶	18.671 ⁹¹	43.16 ²⁰⁴	7.581 ¹⁰²	4.39 ⁵⁷
May 9.9	13.713 ¹⁴⁷	45.51 ¹⁰¹	35.315 ²¹⁵	52.35 ¹⁴⁷	18.807 ¹³⁶	40.97 ²¹⁹	7.727 ¹⁴⁶	5.21 ⁸²
19.9	13.900 ¹⁸⁷	46.78 ¹²⁷	35.591 ²⁷⁶	51.23 ¹¹²	18.984 ¹⁷⁷	38.66 ²³¹	7.915 ¹⁸⁸	6.25 ¹⁰⁴
	226 ¹⁴⁴	144 ³³¹	331 ⁷³	73 ²¹⁶	216 ²³⁸	238 ²²⁵	225 ¹²⁷	127 ¹⁴⁶
June 29.9	14.126	48.22	35.922	50.50	19.200	36.28	8.140	7.52
8.9	14.383 ²⁵⁷	49.85 ¹⁶³	36.295 ³⁷³	50.18 ³²	19.449 ²⁴⁹	33.90 ²³⁸	8.398 ²⁵⁸	8.98 ¹⁴⁶
18.8	14.664 ²⁸¹	51.60 ¹⁷⁵	36.703 ⁴⁰⁸	50.30 ¹²	19.723 ²⁷⁴	31.56 ²³⁴	8.681 ²⁸³	10.61 ¹⁶³
28.8	14.962 ²⁹⁸	53.42 ¹⁸²	37.134 ⁴³¹	50.83 ⁵³	20.017 ²⁹⁴	29.32 ²²⁴	8.981 ³⁰⁰	12.94 ¹⁷³
July 8.8	15.271 ³⁰⁹	55.28 ¹⁸⁶	37.576 ⁴⁴²	51.76 ⁹³	20.323 ³⁰⁶	27.26 ²⁰⁶	9.291 ³¹⁰	14.13 ¹⁷⁹
	310 ¹⁸⁵	185 ⁴⁴⁴	444 ¹⁸¹	181 ³⁰⁹	309 ¹⁸⁴	184 ³¹²	312 ¹⁸²	182 ¹⁷⁹
18.7	15.581 ³⁰²	57.13 ¹⁷⁸	38.020 ⁴³⁴	53.07 ¹⁶⁶	20.632 ³⁰²	25.42 ¹⁵⁶	9.603 ³⁰⁵	15.95 ¹⁷⁹
28.7	15.883 ²⁸⁰	58.91 ¹⁶⁵	38.454 ⁴¹⁶	54.73 ¹⁹⁵	20.934 ³⁰²	23.86 ¹²⁶	9.908 ³⁰⁵	17.74 ¹⁷⁰
Aug. 7.7	16.173 ²⁷¹	60.56 ¹⁵⁰	38.870 ⁴¹⁶	56.68 ¹⁹⁵	21.225 ²⁹¹	22.61 ¹²⁶	10.201 ²⁹³	19.44 ¹⁷⁰
17.7	16.444 ²⁷¹	62.06 ¹⁵⁰	39.258 ³⁸⁸	58.90 ²²²	21.498 ²⁷³	21.70 ⁹¹	10.476 ²⁷⁵	21.02 ¹⁵⁸
27.6	16.689 ²⁴⁵	63.37 ¹³¹	39.614 ³⁵⁶	61.31 ²⁴¹	21.744 ²⁴⁶	21.17 ⁵³	10.726 ²⁵⁰	22.44 ¹⁴²
	218 ¹⁰⁸	108 ³¹⁶	316 ²⁵⁸	258 ²¹⁸	218 ¹⁶	16 ²²²	222 ¹²²	122 ¹⁰³
Sept. 6.6	16.907	64.45	39.930	63.89	21.962	21.01	10.948	23.66
16.6	17.095 ¹⁸⁸	65.30 ⁸⁵	40.204 ²⁷⁴	66.56 ²⁶⁷	22.148 ¹⁸⁶	21.23 ²²	11.142 ¹⁹⁴	24.69 ¹⁰³
26.6	17.249 ¹⁵⁴	65.90 ⁶⁰	40.433 ²³⁰	69.27 ²⁷¹	22.298 ¹⁶⁰	21.77 ⁵⁴	11.302 ¹⁶⁰	25.48 ⁷⁹
Oct. 6.5	17.372 ¹²³	66.27 ³⁷	40.616 ¹⁸³	71.97 ²⁷⁰	22.414 ¹¹⁶	22.63 ⁸⁶	11.430 ¹²⁸	26.06 ⁵⁸
16.5	17.463 ⁹¹	66.41 ¹⁴	40.751 ¹³⁵	74.63 ²⁶⁶	22.494 ⁸⁰	23.76 ¹¹³	11.528 ⁹⁸	26.43 ³⁷
	60 ⁶	6 ⁸⁷	87 ²⁵³	253 ⁴⁷	47 ¹³²	132 ⁶⁵	65 ¹⁵	15 ²
26.5	17.523 ³⁰	66.35 ²⁴	40.838 ⁴⁰	77.16 ²³⁸	22.541 ¹⁴	25.08 ¹⁴⁶	11.593 ³⁷	26.58 ²
Nov. 5.4	17.553 ³	66.11 ³⁹	40.878 ⁷	79.54 ²¹⁶	22.555 ¹⁶	26.54 ¹⁵²	11.630 ⁸	26.56 ¹⁸
15.4	17.556 ²⁴	65.72 ⁵¹	40.871 ⁵¹	81.70 ¹⁹⁰	22.539 ⁴³	28.06 ¹⁵³	11.638 ¹⁹	26.38 ³²
25.4	17.532 ⁴⁷	65.21 ⁶⁰	40.820 ⁹⁴	83.60 ¹⁵⁸	22.496 ⁶⁹	29.59 ¹⁴⁷	11.619 ⁴³	26.06 ⁴²
Dec. 5.4	17.485 ⁷⁰	64.61 ⁶⁶	40.726 ¹³⁷	85.18 ¹²³	22.427 ⁹⁰	31.06 ¹²⁴	11.576 ⁶⁸	25.64 ⁵²
15.3	17.415	63.95	40.589	86.41	22.337	32.40	11.508	25.12
25.3	17.325 ⁹⁰	63.24 ⁷¹	40.416 ¹⁷³	87.24 ⁸³	22.225 ¹¹²	33.57 ¹¹⁷	11.420 ⁸⁸	24.52 ⁶⁰
35.3	17.218 ¹⁰⁷	62.53 ⁷¹	40.212 ²⁰⁴	87.64 ⁴⁰	22.099 ¹²⁶	34.55 ⁹⁸	11.314 ¹⁰⁶	23.88 ⁶⁴
Mean Place	12.857	41.50	34.455	52.51	18.268	48.80	6.847	1.80
Sec δ, Tan δ	1.004	+0.089	1.565	+1.204	1.042	-0.294	1.012	+0.154
D _α , D _α	+0.06	-0.01	+0.07	-0.07	+0.06	+0.02	+0.06	-0.01
D _δ , D _δ	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Sculptoris. Mag. 5.4		ζ Ceti. Mag. 3.9		α Trianguli. Mag. 3.6		ε Cassiopeiae. Mag. 3.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 1 41 s	° ' -25 26 "	h m 1 47 s	° ' -10 43 "	h m 1 48 s	° ' +29 11 "	h m 1 48 s	° ' +63 16 "
Jan. 0.3	52.176	89.74	29.090	65.18	29.321	18.06	35.85	40.01
10.3	52.030 ¹⁴⁶	90.61 ⁸⁷	28.970 ¹²⁰	66.05 ⁸⁷	29.189 ¹³²	17.77 ²⁰	35.51 ²⁴	40.59 ⁵⁸
20.2	51.874 ¹⁶⁶	91.14 ⁵³	28.838 ¹³²	66.71 ⁶⁶	29.040 ¹⁴⁹	17.25 ⁵²	35.14 ³⁷	40.63 ⁴
30.2	51.714 ¹⁶⁰	91.32 ¹⁸	28.699 ¹³⁹	67.18 ⁴⁷	28.882 ¹⁵⁸	16.49 ⁷⁶	34.75 ³⁰	40.14 ⁴⁹
Feb. 9.2	51.554 ¹⁶⁰	91.15 ¹⁷	28.559 ¹⁴⁰	67.42 ²⁴	28.721 ¹⁶¹	15.55 ⁹⁴	34.37 ²⁸	39.13 ¹⁰¹
	151	52	134	1	154	112	36	148
19.2	51.403	90.63	28.425	67.43	28.567	14.43	34.01	37.65
Mar. 1.1	51.268 ¹³⁵	89.76 ⁸⁷	28.305 ¹²⁰	67.19 ²⁴	28.428 ¹³⁹	13.20 ¹²³	33.69 ³²	35.77 ¹⁸⁸
11.1	51.157 ¹¹¹	88.56 ¹²⁰	28.204 ¹⁰¹	66.71 ⁴⁸	28.315 ¹¹³	11.91 ¹²⁹	33.43 ²⁶	33.55 ²²²
21.1	51.075 ⁸²	87.03 ¹⁵³	28.131 ⁷³	65.96 ⁷⁵	28.236 ⁷⁹	10.63 ¹²⁸	33.24 ¹⁹	31.09 ²⁴⁶
31.1	51.028 ⁴⁷	85.24 ¹⁷⁹	28.092 ³⁹	64.98 ⁹⁸	28.197 ³⁹	9.41 ¹²²	33.13 ¹¹	28.50 ²⁵⁹
	5	205	1	125	7	110	2	261
Apr. 10.0	51.023	83.19	28.091	63.73	28.204	8.31	33.11	25.89
20.0	51.063 ⁴⁰	80.93 ²²⁶	28.133 ⁴²	62.27 ¹⁴⁶	28.262 ⁵⁸	7.40 ⁹¹	33.18 ⁷	23.36 ²⁶³
30.0	51.147 ⁸⁴	78.48 ²⁴⁵	28.219 ⁸⁶	60.58 ¹⁶⁰	28.371 ¹⁰⁰	6.73 ⁶⁷	33.35 ¹⁷	21.00 ²³⁶
May 9.9	51.280 ¹³³	75.90 ²⁵⁸	28.349 ¹³⁰	58.71 ¹⁸⁷	28.530 ¹⁵⁹	6.32 ⁴¹	33.62 ²⁷	18.90 ²¹⁰
19.9	51.457 ¹⁷⁷	73.24 ²⁶⁶	28.521 ¹⁷³	56.69 ²⁰²	28.737 ²⁰⁷	6.23 ⁹	33.97 ³⁵	17.14 ¹⁷⁶
	218	266	211	214	249	21	42	137
29.9	51.675	70.58	28.732	54.55	28.986	6.44	34.39	15.77
June 8.9	51.929 ²⁵⁴	67.96 ²⁶²	28.976 ²⁴⁴	52.36 ²¹⁹	29.270 ²⁸⁴	6.96 ⁵²	34.87 ⁴⁸	14.83 ⁹⁴
18.8	52.210 ²⁸¹	65.46 ²⁵⁰	29.246 ²⁷⁰	50.17 ²¹⁹	29.583 ³¹³	7.78 ⁸²	35.41 ⁵⁴	14.36 ⁴⁷
28.8	52.515 ³⁰⁵	63.13 ²³³	29.537 ²⁹¹	48.03 ²¹⁴	29.915 ³³²	8.89 ¹¹¹	35.98 ⁵⁷	14.36 ⁰
July 8.8	52.832 ³¹⁷	61.04 ²⁰⁹	29.841 ³⁰⁴	46.00 ²⁰³	30.259 ³⁴⁴	10.23 ¹³⁴	36.57 ⁵⁹	14.83 ⁴⁷
	321	179	307	187	346	157	59	93
18.8	53.153	59.25	30.148	44.13	30.605	11.80	37.16	15.76
28.7	53.472 ³¹⁹	57.80 ¹⁴⁵	30.450 ³⁰²	42.49 ¹⁶⁴	30.945 ³⁴⁰	13.52 ¹⁷²	37.75 ⁵⁹	17.12 ¹³⁶
Aug. 7.7	53.779 ³⁰⁷	56.74 ¹⁰⁶	30.743 ²⁹³	41.10 ¹³⁹	31.273 ³²⁸	15.36 ¹⁸⁴	38.32 ⁵⁷	18.88 ¹⁷⁶
17.7	54.068 ²⁸⁹	56.10 ⁶⁴	31.019 ²⁷⁶	40.02 ¹⁰⁸	31.580 ³⁰⁷	17.28 ¹⁹²	38.86 ⁵⁴	21.00 ²¹²
27.6	54.331 ²⁶³	55.88 ²²	31.271 ²⁵²	39.27 ⁷⁵	31.863 ²⁸³	19.22 ¹⁹⁴	39.35 ⁴⁹	23.42 ²⁴²
	235	22	226	42	253	194	45	268
Sept. 6.6	54.566	56.10	31.497	38.85	32.116	21.16	39.80	26.10
16.6	54.765 ¹⁹⁹	56.74 ⁶⁴	31.692 ¹⁹⁵	38.78 ⁷	32.338 ²²²	23.04 ¹⁸⁸	40.19 ³⁹	28.97 ²⁸⁷
26.6	54.928 ¹⁶³	57.76 ¹⁰²	31.854 ¹⁶²	39.03 ²⁵	32.527 ¹⁸⁹	24.84 ¹⁸⁰	40.51 ³²	32.00 ³⁰³
Oct. 6.5	55.053 ¹²⁵	59.10 ¹³⁴	31.982 ¹²⁸	39.57 ⁵⁴	32.680 ¹⁵³	26.51 ¹⁶⁷	40.77 ²⁶	35.10 ³¹⁰
16.5	55.140 ⁸⁷	60.72 ¹⁶²	32.079 ⁹⁷	40.39 ⁸²	32.798 ¹¹⁸	28.06 ¹⁵⁵	40.97 ²⁰	38.23 ³¹³
	51	180	63	102	85	139	13	307
26.5	55.191	62.52	32.142	41.41	32.883	29.45	41.10	41.30
Nov. 5.5	55.206 ¹⁵	64.46 ¹⁹⁴	32.174 ³²	42.60 ¹¹⁹	32.935 ⁵²	30.64 ¹¹⁹	41.16 ⁶	44.26 ²⁹⁶
15.4	55.188 ¹⁸	66.42 ¹⁹⁶	32.178 ⁴	43.88 ¹²⁸	32.953 ¹⁸	31.65 ¹⁰¹	41.15 ¹	47.05 ²⁷⁹
25.4	55.139 ⁴⁹	68.35 ¹⁹³	32.152 ²⁶	45.21 ¹³³	32.940 ¹³	32.47 ⁸²	41.07 ⁸	49.58 ²⁵³
Dec. 5.4	55.062 ⁷⁷	70.15 ¹⁸⁰	32.102 ⁵⁰	46.51 ¹³⁰	32.896 ⁴⁴	33.06 ⁵⁹	40.91 ¹⁶	51.79 ²²¹
	100	161	75	125	73	36	21	183
15.3	54.962	71.76	32.027	47.76	32.823	33.42 ¹⁰	40.70	53.62
25.3	54.838 ¹²⁴	73.13 ¹³⁷	31.933 ⁹⁴	48.88 ¹¹²	32.724 ⁹⁹	33.52 ¹⁴	40.43 ²⁷	55.00 ¹³⁸
35.3	54.699 ¹³⁹	74.21 ¹⁰⁸	31.819 ¹¹⁴	49.87 ⁹⁹	32.599 ¹²⁵	33.38	40.11 ³²	55.90 ⁹⁰
Mean Place	50.899	84.73	27.704	64.71	27.574	5.34	33.062	18.86
Sec δ, Tan δ	1.108	-0.476	1.018	-0.180	1.145	+0.559	2.224	+1.986
D _μ α, D _ω α	+0.06	+0.03	+0.06	+0.01	+0.07	-0.03	+0.08	-0.12
D _μ δ, D _ω δ	+0.4	+0.4	+0.4	+0.5	+0.4	+0.5	+0.4	+0.5

APPARENT PLACES OF STARS, 1919.

331

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ξ Piscium. Mag. 4.8		β Arietis. Mag. 2.7		ψ Phœnicis. Mag. 4.4		ν Ceti. Mag. 4.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 1 49 s	° ' " + 2 47 "	h m 1 50 s	° ' " +20 24 "	h m 1 50 s	° ' " -46 41 "	h m 1 56 s	° ' " -21 27 "
Jan. 0.3	23.115 ¹¹²	21.42 ⁷⁴	11.325 ¹¹⁹	55.25 ⁴⁵	25.049 ²³³	68.14 ⁸³	12.645 ¹³⁵	75.11 ⁹⁷
10.3	23.003 ¹²⁴	20.68 ⁶⁹	11.206 ¹³⁴	54.80 ⁶⁰	24.816 ²⁴⁶	68.97 ³³	12.510 ¹⁴⁸	76.08 ⁶⁶
20.2	22.879 ¹³²	19.99 ⁶³	11.072 ¹⁴³	54.20 ⁷⁴	24.570 ²⁴⁹	69.30 ¹⁸	12.362 ¹⁵⁵	76.74 ³⁵
30.2	22.747 ¹³⁵	19.36 ⁵⁴	10.929 ¹⁴⁶	53.46 ⁸⁴	24.321 ²⁴⁵	69.12 ⁶⁹	12.207 ¹⁵⁸	77.09 ²
Feb. 9.2	22.612 ¹³⁰	18.82 ⁴⁴	10.783 ¹⁴¹	52.62 ⁹¹	24.076 ²³³	68.43 ¹¹⁷	12.049 ¹⁵²	77.11 ³¹
19.2	22.482 ¹¹⁶	18.38 ³⁰	10.642 ¹²⁶	51.71 ⁹⁵	23.843 ²¹⁰	67.26 ¹⁶²	11.897 ¹³⁹	76.80 ⁶⁴
Mar. 1.1	22.366 ⁹⁸	18.08 ¹⁵	10.516 ¹⁰⁵	50.76 ⁹³	23.633 ¹⁸³	65.64 ²⁰³	11.758 ¹¹⁸	76.16 ⁹⁴
11.1	22.268 ⁶⁹	17.93 ²	10.411 ⁷³	49.83 ⁸⁷	23.450 ¹⁴³	63.61 ²³⁸	11.640 ⁹²	75.22 ¹²⁶
21.1	22.199 ³⁵	17.95 ²³	10.338 ³⁷	48.96 ⁷⁵	23.307 ⁹⁸	61.23 ²⁷¹	11.548 ⁵⁷	73.96 ¹⁵⁵
31.1	22.164 ³	18.18 ⁴⁵	10.301 ⁷	48.21 ⁶⁰	23.209 ⁴⁷	58.52 ²⁹⁶	11.491 ¹⁷	72.41 ¹⁸⁰
Apr. 10.0	22.167 ⁴⁶	18.63 ⁶⁷	10.308 ⁵²	47.61 ⁴⁰	23.162 ⁸	55.56 ³¹⁴	11.474 ²⁶	70.61 ²⁰⁴
20.0	22.213 ⁹⁰	19.30 ⁹¹	10.360 ¹⁰¹	47.21 ¹⁵	23.170 ⁶⁵	52.42 ³²⁷	11.500 ⁷²	68.57 ²²³
30.0	22.303 ¹³⁵	20.21 ¹¹³	10.461 ¹⁴⁷	47.06 ¹¹	23.235 ¹²²	49.15 ³³²	11.572 ¹¹⁸	66.34 ²³⁹
May 9.9	22.438 ¹⁷⁷	21.34 ¹³⁴	10.608 ¹⁹³	47.17 ³⁷	23.357 ¹⁸⁰	45.83 ³³¹	11.690 ¹⁶³	63.95 ²⁵⁰
19.9	22.615 ²¹⁵	22.68 ¹⁵³	10.801 ²³²	47.54 ⁶⁶	23.537 ²³²	42.52 ³²⁰	11.853 ²⁰⁴	61.45 ²⁵⁵
29.9	22.830 ²⁴⁸	24.21 ¹⁶⁹	11.033 ²⁶⁷	48.20 ⁹¹	23.769 ²⁷⁹	39.32 ³⁰³	12.057 ²³⁹	58.90 ²⁵⁴
June 8.9	23.078 ²⁷³	25.90 ¹⁷⁸	11.300 ²⁹³	49.11 ¹¹⁵	24.048 ³¹⁹	36.29 ²⁷⁹	12.296 ²⁷⁰	56.36 ²⁴⁶
18.8	23.351 ²⁹²	27.68 ¹⁸⁶	11.593 ³¹³	50.26 ¹³⁶	24.367 ³⁵¹	33.50 ²⁴⁶	12.566 ²⁹²	53.90 ²³⁴
28.8	23.643 ³⁰⁵	29.54 ¹⁸⁶	11.906 ³²³	51.62 ¹⁵⁴	24.718 ³⁷¹	31.04 ²⁰⁹	12.858 ³⁰⁸	51.56 ²¹²
July 8.8	23.948 ³⁰⁷	31.40 ¹⁸⁴	12.229 ³²⁷	53.16 ¹⁶⁷	25.089 ³⁸³	28.95 ¹⁶³	13.166 ³¹⁵	49.44 ¹⁸⁹
18.8	24.255 ³⁰³	33.24 ¹⁷⁴	12.556 ³²²	54.83 ¹⁷⁵	25.472 ³⁸⁵	27.32 ¹¹⁵	13.481 ³¹²	47.55 ¹⁵⁶
28.7	24.558 ²⁹²	34.98 ¹⁶⁰	12.878 ³⁰⁹	56.58 ¹⁷⁹	25.857 ³⁷⁶	26.17 ⁶³	13.793 ³⁰³	45.99 ¹²¹
Aug. 7.7	24.850 ²⁷⁵	36.58 ¹⁴³	13.187 ²⁹²	58.37 ¹⁷⁷	26.233 ³⁵⁷	25.54 ⁹	14.096 ²⁸⁹	44.78 ⁸²
17.7	25.125 ²⁵²	38.01 ¹²⁰	13.479 ²⁶⁷	60.14 ¹⁷³	26.590 ³²⁹	25.45 ⁴⁷	14.385 ²⁶⁶	43.96 ⁴¹
27.6	25.377 ²²⁷	39.21 ⁹⁸	13.746 ²⁴¹	61.87 ¹⁶³	26.919 ²⁹²	25.92 ⁹⁸	14.651 ²⁴⁰	43.55 ⁰
Sept. 6.6	25.604 ¹⁹⁶	40.19 ⁷²	13.987 ²¹⁰	63.50 ¹⁵²	27.211 ²⁵⁰	26.90 ¹⁴⁸	14.891 ²⁰⁷	43.55 ⁴¹
16.6	25.800 ¹⁶⁵	40.91 ⁴⁷	14.197 ¹⁷⁹	65.02 ¹³⁸	27.461 ²⁰²	28.38 ¹⁹⁰	15.098 ¹⁷⁴	43.96 ⁷⁹
26.6	25.965 ¹³⁵	41.38 ²¹	14.376 ¹⁴⁶	66.40 ¹²⁰	27.663 ¹⁵²	30.28 ²²⁸	15.272 ¹³⁹	44.75 ¹¹³
Oct. 6.5	26.100 ¹⁰²	41.59 ¹	14.522 ¹¹³	67.60 ¹⁰⁴	27.815 ⁹⁹	32.56 ²⁵⁵	15.411 ¹⁰³	45.88 ¹⁴¹
16.5	26.202 ⁷¹	41.58 ²²	14.635 ⁸¹	68.64 ⁸⁶	27.914 ⁴⁵	35.11 ²⁷²	15.514 ⁶⁸	47.29 ¹⁶³
26.5	26.273 ⁴²	41.36 ⁴⁰	14.716 ⁵¹	69.50 ⁶⁷	27.959 ⁵	37.83 ²⁷⁹	15.582 ³³	48.92 ¹⁷⁸
Nov. 5.5	26.315 ¹³	40.96 ⁵³	14.767 ²⁰	70.17 ⁵⁰	27.954 ⁵⁴	40.62 ²⁷⁴	15.615 ¹	50.70 ¹⁸⁴
15.4	26.328 ¹⁴	40.43 ⁶⁵	14.787 ⁹	70.67 ³²	27.900 ⁹⁸	43.36 ²⁵⁹	15.616 ³⁰	52.54 ¹⁸⁴
25.4	26.314 ³⁹	39.78 ⁷³	14.778 ³⁷	70.99 ¹⁴	27.802 ¹³⁷	45.95 ²³⁶	15.586 ⁸⁴	54.38 ¹⁷⁵
Dec. 5.4	26.275 ⁶³	39.05 ⁷⁶	14.741 ⁶⁴	71.13 ²	27.665 ¹⁷³	48.31 ²⁰¹	15.528 ⁸⁴	56.13 ¹⁶⁰
15.3	26.212 ⁸⁵	38.29 ⁷⁸	14.677 ⁸⁹	71.11 ²¹	27.492 ²⁰³	50.32 ¹⁶⁰	15.444 ¹⁰⁸	57.73 ¹⁴⁰
25.3	26.127 ¹⁰⁴	37.51 ⁷⁶	14.588 ¹⁰⁹	70.90 ³⁶	27.289 ²²⁴	51.92 ¹¹⁵	15.336 ¹²⁷	59.13 ¹¹³
35.3	26.023	36.75	14.479	70.54	27.065	53.07	15.209	60.26
Mean Place	21.630	17.41	9.675	45.37	23.808	57.54	11.269	71.09
Sec δ , Tan δ	1.001	+0.049	1.067	+0.372	1.458	-1.061	1.075	-0.393
$D\psi\alpha$, $D\omega\alpha$	+0.06	0.00	+0.07	-0.02	+0.05	+0.06	+0.06	+0.02
$D\psi\delta$, $D\omega\delta$	+0.4	+0.5	+0.4	+0.5	+0.4	+0.5	+0.3	+0.5

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Hydri. Mag. 3.0		50 Cassiopeiæ. Mag. 4.1		γ Andromedæ pr. Mag. 2.3		α Arietis. Mag. 2.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 1 56	° ' " -61 57	h m 1 56	° ' " +72 1	h m 1 58	° ' " +41 56	h m 2 2	° ' " +23 4
	s	"	s	"	s	"	s	"
Jan. 0.3	13.87	62.58 72	32.99	70.61 90	57.268	46.09 11	37.944	58.44 24
10.3	13.47 40	63.30 13	32.46 53	71.51 34	57.103 165	46.20 26	37.826 118	58.10 82
20.3	13.06 41	63.43 46	31.89 80	71.85 25	56.917 200	45.94 61	37.690 148	57.58 68
30.2	12.65 40	62.97 101	31.29 80	71.60 83	56.717 203	45.33 94	37.542 153	56.90 81
Feb. 9.2	12.25 38	61.96 155	30.69 56	70.77 137	56.514 197	44.39 124	37.389 150	56.09 92
19.2	11.87 35	60.41 203	30.13 51	69.40 185	56.317 180	43.15 148	37.239 138	55.17 96
Mar. 1.1	11.52 31	58.38 246	29.62 42	67.55 225	56.137 150	41.67 166	37.101 115	54.19 100
11.1	11.21 25	55.92 283	29.20 33	65.30 256	55.987 111	40.01 176	36.986 87	53.19 97
21.1	10.96 18	53.09 315	28.87 21	62.74 275	55.876 63	38.25 179	36.899 50	52.22 88
31.1	10.78 12	49.94 337	28.66 7	59.99 284	55.813 9	36.46 174	36.849 6	51.34 74
Apr. 10.0	10.66 4	46.57 355	28.59 7	57.15 282	55.804 51	34.72 160	36.843 40	50.60 57
20.0	10.62 5	43.02 362	28.66 19	54.33 269	55.855 110	33.12 141	36.883 90	50.03 24
30.0	10.67 12	39.40 362	28.85 33	51.64 246	55.965 168	31.71 113	36.973 139	49.69 10
May 10.0	10.79 20	35.78 354	29.18 46	49.18 214	56.133 224	30.58 82	37.112 185	49.59 18
19.9	10.99 28	32.24 338	29.64 56	47.04 177	56.357 274	29.75 51	37.297 227	49.77 45
29.9	11.27 34	28.86 315	30.20 65	45.27 133	56.631 316	29.24 13	37.524 263	50.22 72
June 8.9	11.61 40	25.71 283	30.85 73	43.94 87	56.947 351	29.11 24	37.787 291	50.94 97
18.8	12.01 45	22.88 244	31.58 79	43.07 37	57.298 374	29.35 59	38.078 315	51.91 121
28.8	12.46 48	20.44 198	32.37 81	42.70 13	57.672 388	29.94 93	38.393 326	53.12 139
July 8.8	12.94 51	18.46 148	33.18 83	42.83 63	58.060 394	30.87 125	38.719 331	54.51 153
18.8	13.45 52	16.98 92	34.01 82	43.46 110	58.454 389	32.12 153	39.050 329	56.06 167
28.7	13.97 51	16.06 34	34.83 80	44.56 156	58.843 378	33.65 177	39.379 319	57.73 172
Aug. 7.7	14.48 49	15.72 24	35.63 76	46.12 197	59.221 356	35.42 195	39.698 301	59.45 175
17.7	14.97 45	15.96 84	36.39 71	48.09 233	59.577 332	37.37 212	39.999 280	61.20 173
27.7	15.42 41	16.80 140	37.10 64	50.42 266	59.909 299	39.49 221	40.279 254	62.93 166
Sept. 6.6	15.83 34	18.20 190	37.74 56	53.08 292	60.208 265	41.70 228	40.533 224	64.59 157
16.6	16.17 28	20.10 235	38.30 49	56.00 313	60.473 228	43.98 228	40.757 195	66.16 145
26.6	16.45 21	22.45 272	38.79 38	59.13 327	60.701 191	46.26 225	40.952 161	67.61 132
Oct. 6.5	16.66 11	25.17 298	39.17 30	62.40 334	60.892 149	48.51 219	41.113 129	68.93 115
16.5	16.77 5	28.15 312	39.47 20	65.74 336	61.041 110	50.70 207	41.242 98	70.08 99
26.5	16.82 4	31.27 315	39.67 7	69.10 329	61.151 69	52.77 194	41.340 65	71.07 83
Nov. 5.5	16.78 11	34.42 306	39.74 2	72.39 313	61.220 30	54.71 175	41.406 34	71.90 64
15.4	16.67 19	37.47 285	39.72 13	75.52 291	61.250 10	56.46 153	41.439 3	72.54 48
25.4	16.48 25	40.32 252	39.59 23	78.43 261	61.240 48	57.99 99	41.442 27	73.02 29
Dec. 5.4	16.23 30	42.84 211	39.36 33	81.04 222	61.192 87	59.26 99	41.415 55	73.31 12
15.4	15.93 35	44.95 162	39.03 43	83.26 176	61.105 121	60.25 66	41.360 84	73.43 7
25.3	15.58 38	46.57 107	38.60 50	85.02 124	60.984 153	60.91 31	41.276 107	73.36 25
35.3	15.20	47.64	38.10	86.26	60.831	61.22	41.169	73.11
Mean Place	12.608	49.28	29.160	48.57	55.208	30.18	36.182	48.20
Sec δ , Tan δ	2.127	-1.878	3.242	+3.084	1.344	+0.899	1.067	+0.426
$D\alpha$, $D\alpha$	+0.04	+0.11	+0.10	-0.18	+0.07	-0.05	+0.07	-0.02
$D\delta$, $D\delta$	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5

APPARENT PLACES OF STARS, 1919.

333

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Trianguli. Mag. 3.1		δ Cassiopeiae. Mag. 6.2		ϵ Persei. Mag. 5.4		ξ^1 Ceti. Mag. 4.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 4	° ' " +84 36	h m 2 8	° ' " +66 8	h m 2 8	° ' " +50 41	h m 2 8	° ' " + 8 28
	s	"	s	"	s	"	s	"
Jan. 0.3	45.043	30.81	9.62	64.78	14.907	42.46	43.905	7.32
10.3	44.905 ¹³⁸	30.77 ⁴	9.25 ³⁷	65.66 ⁸⁸	14.705 ²⁰²	42.90 ⁴⁴	43.799 ¹⁰⁶	6.67 ⁶⁵
20.3	44.745 ¹⁶⁰	30.44 ³³	8.84 ⁴¹	66.01 ³⁵	14.477 ²²⁸	42.90 ⁰	43.675 ¹²⁴	6.01 ⁶⁶
30.2	44.572 ¹⁷³	29.82 ⁶²	8.41 ⁴³	65.81 ²⁰	14.230 ²⁴⁷	42.47 ⁴³	43.540 ¹³⁵	5.36 ⁶⁵
Feb. 9.2	44.393 ¹⁷⁹	28.95 ⁸⁷	7.97 ⁴⁴	65.07 ⁷⁴	13.973 ²⁶²	41.62 ⁸⁵	43.399 ¹⁴¹	4.74 ⁶²
19.2	44.218 ¹⁷⁵	27.85 ¹¹⁰	7.54 ⁴⁸	63.82 ¹²⁵	13.731 ²⁴⁷	40.39 ¹²³	43.259 ¹⁴⁰	4.17 ⁵⁷
Mar. 1.1	44.058 ¹⁸⁰	26.57 ¹²⁸	7.15 ³⁹	62.11 ¹⁷¹	13.506 ²²⁵	38.83 ¹⁵⁶	43.129 ¹³⁰	3.67 ⁵⁰
11.1	43.922 ¹³⁶	25.18 ¹³⁰	6.82 ³³	60.02 ²⁰⁹	13.312 ¹⁹⁴	37.02 ¹⁸¹	43.018 ¹¹¹	3.27 ⁴⁰
21.1	43.820 ¹⁰²	23.72 ¹⁴⁶	6.56 ²⁶	57.65 ²³⁷	13.164 ¹⁴⁸	35.01 ²⁰¹	42.933 ⁸⁵	3.02 ²⁵
31.1	43.760 ⁶⁰	22.28 ¹⁴⁴	6.39 ¹⁷	55.08 ²⁵⁷	13.072 ⁹²	32.90 ²¹¹	42.879 ⁵⁴	2.92 ¹⁰
	12	137	7	266	30	210	14	8
Apr. 10.0	43.748	20.91	6.32	52.42	13.042	30.80	42.865	3.00
20.0	43.789 ⁴¹	19.70 ¹²¹	6.35 ⁸	49.78 ²⁶⁴	13.081 ³⁹	28.77 ²⁰³	42.895 ⁸⁰	3.31 ⁸¹
30.0	43.886 ⁹⁷	18.69 ¹⁰¹	6.49 ¹⁴	47.27 ²⁵¹	13.190 ¹⁰⁹	26.89 ¹⁸⁸	42.969 ⁷⁴	3.83 ⁵²
May 10.0	44.036 ¹⁸⁰	17.93 ⁷⁶	6.73 ²⁴	44.97 ²³⁰	13.366 ¹⁷⁶	25.26 ¹⁶³	43.089 ¹²⁰	4.59 ⁷⁶
19.9	44.237 ²⁰¹	17.45 ⁴⁸	7.07 ³⁴	42.96 ²⁰¹	13.610 ²⁴⁴	23.92 ¹³⁴	43.253 ¹⁶⁴	5.57 ⁹⁸
	248	16	44	166	301	98	204	119
29.9	44.485	17.29	7.51	41.30	13.911	22.94	43.457	6.76
June 8.9	44.772 ²⁸⁷	17.46 ¹⁷	8.02 ⁵¹	40.06 ¹²⁴	14.263 ³⁵²	22.33 ⁶¹	43.695 ²³⁸	8.13 ¹³⁷
18.8	45.092 ³²⁰	17.94 ⁴⁸	8.58 ⁵⁶	39.26 ⁸⁰	14.655 ³⁹²	22.11 ²²	43.963 ²⁶⁸	9.66 ¹⁵³
28.8	45.434 ³⁴²	18.74 ⁸⁰	9.19 ⁶¹	38.92 ³⁴	15.077 ⁴²²	22.30 ¹⁹	44.252 ²⁸⁹	11.31 ¹⁶⁵
July 8.8	45.792 ³⁵⁸	19.82 ¹⁰⁸	9.83 ⁶⁴	39.06 ¹⁴	15.520 ⁴⁴³	22.87 ⁵⁷	44.556 ³⁰⁴	13.02 ¹⁷¹
	363	133	65	60	449	96	309	173
18.8	46.155	21.15	10.48	39.66	15.969	23.83	44.865	14.75
28.7	46.515 ³⁶⁰	22.71 ¹⁵⁶	11.14 ⁶⁶	40.71 ¹⁰⁵	16.416 ⁴⁴⁷	25.14 ¹³¹	45.173 ³⁰⁸	16.44 ¹⁶⁹
Aug. 7.7	46.864 ³⁴⁹	24.43 ¹⁷²	11.78 ⁶⁴	42.18 ¹⁴⁷	16.852 ⁴³⁶	26.77 ¹⁶³	45.472 ²⁹⁹	18.05 ¹⁶¹
17.7	47.196 ³³²	26.29 ¹⁸⁶	12.39 ⁶¹	44.03 ¹⁸⁵	17.268 ⁴¹⁶	28.65 ¹⁸⁸	45.758 ²⁸⁶	19.55 ¹⁵⁰
27.7	47.504 ³⁰⁸	28.23 ¹⁹⁴	12.96 ⁵⁷	46.23 ²²⁰	17.655 ³⁸⁷	30.78 ²¹³	46.023 ²⁶⁵	20.90 ¹³⁵
	281	199	53	249	355	230	241	115
Sept. 6.6	47.785	30.22	13.49	48.72	18.010	33.08	46.264	22.05
16.6	48.035 ²⁵⁰	32.21 ¹⁹⁹	13.96 ⁴⁷	51.45 ²⁷³	18.326 ³¹⁶	35.51 ²⁴³	46.478 ²¹⁴	23.00 ⁹⁵
26.6	48.250 ²¹⁵	34.17 ¹⁹⁶	14.35 ³⁹	54.38 ²⁹³	18.601 ²⁷⁵	38.03 ²⁵²	46.663 ¹⁸⁵	23.72 ⁷²
Oct. 6.5	48.432 ¹⁸²	36.06 ¹⁸⁹	14.69 ³⁴	57.44 ³⁰⁶	18.832 ²³¹	40.59 ²⁵⁶	46.817 ¹⁵⁴	24.23 ⁵¹
16.5	48.577 ¹⁴⁵	37.85 ¹⁷⁹	14.96 ²⁷	60.56 ³¹²	19.017 ¹⁸⁵	43.14 ²⁵⁵	46.941 ¹²⁴	24.51 ²⁸
	110	166	19	313	138	248	94	9
26.5	48.687	39.51	15.15	63.69	19.155	45.62	47.035	24.60
Nov. 5.5	48.760 ⁷³	41.02 ¹⁵¹	15.26 ¹¹	66.75 ³⁰⁶	19.245 ⁹⁰	48.00 ²³⁸	47.099 ⁶⁴	24.51 ⁹
15.4	48.798 ³⁸	42.36 ¹³⁴	15.29 ³	69.69 ²⁹⁴	19.287 ⁴²	50.22 ²²²	47.133 ³⁴	24.27 ²⁴
25.4	48.801 ³	43.49 ¹¹³	15.23 ⁶	72.42 ²⁷³	19.280 ⁷	52.21 ¹⁹⁹	47.140 ⁷	23.90 ³⁷
Dec. 5.4	48.769 ⁸²	44.41 ⁹²	15.10 ¹³	74.85 ²⁴³	19.226 ⁵⁴	53.94 ¹⁷³	47.118 ²²	23.43 ⁴⁷
	66	66	21	209	102	144	48	54
15.4	48.703	45.07	14.89	76.94	19.124	55.38	47.070	22.89
25.3	48.605 ⁹⁸	45.48 ⁴¹	14.61 ²⁸	78.61 ¹⁶⁷	18.979 ¹⁴⁵	56.45 ¹⁰⁷	46.996 ⁷⁴	22.29 ⁶⁰
35.3	48.478 ¹²⁷	45.60 ¹²	14.27 ³⁴	79.80 ¹¹⁹	18.795 ¹⁸⁴	57.12 ⁶⁷	46.900 ⁹⁶	21.65 ⁶⁴
Mean Place	43.090	17.20	6.296	44.26	12.506	24.91	42.264	2.00
Sec δ , Tan δ	1.215	+0.690	2.473	+2.262	1.579	+1.222	1.011	+0.149
$D\phi\alpha$, $D\omega\alpha$	+0.07	-0.04	+0.09	-0.13	+0.08	-0.07	+0.06	-0.01
$D\phi\delta$, $D\omega\delta$	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	μ Fornacis. Mag. 5.2		γ Trianguli. Mag. 4.1		67 Ceti. Mag. 5.7		ϕ Eridani. Mag. 3.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 9	° ' " -31 5	h m 2 12	° ' " +33 28	h m 2 12	° ' " - 6 47	h m 2 13	° ' " -51 52
	s	"	s	"	s	"	s	"
Jan. 0.3	21.591	80.17	31.597	36.61	58.062	41.49	38.235	84.15
10.3	21.432 ¹⁵⁹	81.25 ¹⁰⁸	31.466 ¹⁸¹	36.59 ²	57.951 ¹¹¹	42.41 ⁹²	37.966 ²⁶⁹	85.20 ¹⁰⁵
20.3	21.259 ¹⁷³	81.95 ⁷⁰	31.312 ¹⁵⁴	36.29 ³⁰	57.824 ¹²⁷	43.16 ⁷⁵	37.679 ²⁸⁷	85.75 ³⁵
30.2	21.077 ¹⁸²	82.25 ³⁰	31.141 ¹⁷¹	35.73 ⁵⁶	57.685 ¹³⁹	43.75 ⁸⁹	37.382 ²⁹⁷	85.73 ²
Feb. 9.2	20.890 ¹⁸⁷	82.13 ¹²	30.964 ¹⁷⁷	34.91 ⁸²	57.541 ¹⁴⁴	44.16 ⁴¹	37.085 ²⁹⁷	85.18 ⁵³
19.2	20.708 ¹⁸²	81.61 ⁵²	30.789 ¹⁷⁵	33.89 ¹⁰²	57.397 ¹⁴⁴	44.35 ¹⁹	36.798 ²⁸⁷	84.11 ²⁶⁷
Mar. 1.2	20.540 ¹⁶⁸	80.71 ⁹⁰	30.627 ¹⁶²	32.69 ¹²⁰	57.262 ¹³⁵	44.33 ²	36.531 ²⁸⁷	82.56 ¹⁵⁵
11.1	20.391 ¹⁴⁹	79.42 ¹²⁰	30.486 ¹⁴¹	31.37 ¹³²	57.145 ¹¹⁷	44.08 ²⁵	36.291 ²⁴⁰	80.55 ²⁰⁸
21.1	20.272 ¹¹⁹	77.79 ¹⁶³	30.378 ¹⁰⁸	30.00 ¹³⁷	57.052 ⁹³	43.60 ⁴⁸	36.091 ²⁰⁰	78.16 ²³⁹
31.1	20.187 ⁸⁵	75.84 ¹⁹⁵	30.311 ⁶⁷	28.63 ¹³⁷	56.991 ⁶¹	42.88 ⁷²	35.938 ¹⁸³	75.42 ²²⁴
Apr. 10.0	20.144 ⁴³	73.60 ²²⁴	30.291 ²⁰	27.33 ¹³⁰	56.968 ²⁸	41.93 ⁹⁵	35.838 ¹⁰⁰	72.40 ³⁰²
20.0	20.146 ²	71.12 ²⁴⁸	30.322 ³¹	26.18 ¹¹⁵	56.986 ¹⁸	40.73 ¹²⁰	35.799 ³⁹	69.17 ¹²⁸
30.0	20.197 ⁵¹	68.46 ²⁶⁶	30.408 ⁸⁶	25.20 ⁹⁸	57.049 ⁶⁸	39.31 ¹⁴³	35.822 ²⁸	65.80 ³²⁷
May 10.0	20.297 ¹⁰⁰	65.66 ²⁸⁰	30.548 ¹⁴⁰	24.48 ⁷²	57.156 ¹⁰⁷	37.69 ¹⁶²	35.909 ⁸⁷	62.35 ³⁴⁵
19.9	20.446 ¹⁴⁹	62.79 ²⁸⁷	30.739 ¹⁹¹	24.03 ⁴⁵	57.307 ¹⁵¹	35.90 ¹⁷⁹	36.060 ¹⁵¹	58.91 ³⁴⁴
29.9	20.640 ¹⁹⁴	59.90 ²⁸⁹	30.977 ²³⁸	23.88 ¹⁵	57.497 ¹⁹⁰	33.98 ¹⁹²	36.271 ²¹¹	55.55 ³³⁸
June 8.9	20.873 ²³³	57.08 ²⁸²	31.255 ²⁷⁸	24.05 ¹⁷	57.724 ²²⁷	31.96 ²⁰²	36.537 ²⁶⁶	52.35 ³³⁹
18.9	21.143 ²⁷⁰	54.38 ²⁷⁰	31.566 ³¹¹	24.51 ⁴⁶	57.981 ²⁵⁷	29.89 ²⁰⁷	36.852 ³¹⁵	49.41 ³⁰⁴
28.8	21.439 ²⁴⁶	51.88 ²⁵⁰	31.902 ³³⁶	25.29 ⁷⁸	58.260 ²⁷⁹	27.83 ²⁰⁶	37.207 ³³⁵	46.78 ²⁸³
July 8.8	21.754 ³¹⁵	49.65 ²²³	32.255 ³⁵³	26.33 ¹⁰⁴	58.554 ²⁹⁴	25.84 ¹⁹⁹	37.593 ³⁹⁶	44.54 ²⁹⁴
18.8	22.080 ³²⁶	47.73 ¹⁹²	32.613 ³⁵⁸	27.61 ¹²⁸	58.857 ³⁰³	23.97 ¹⁸⁷	37.998 ⁴⁰⁵	42.75 ¹⁷⁹
28.7	22.409 ³²⁹	46.21 ¹⁵²	32.970 ³⁵⁷	29.11 ¹⁵⁰	59.159 ³⁰²	22.28 ¹⁶⁹	38.412 ⁴¹⁴	41.46 ¹²⁹
Aug. 7.7	22.733 ³²⁴	45.10 ¹¹¹	33.317 ³⁴⁷	30.78 ¹⁶⁷	59.455 ²⁹⁶	20.80 ¹⁴⁸	38.824 ⁴¹²	40.71 ⁷³
17.7	23.041 ³⁰⁸	44.46 ⁶⁴	33.649 ³³²	32.56 ¹⁷⁸	59.738 ²⁸³	19.60 ¹²⁰	39.220 ³⁹⁶	40.54 ¹⁷
27.7	23.330 ²⁸⁹	44.30 ¹⁶	33.958 ³⁰⁹	34.43 ¹⁸⁷	60.002 ²⁶⁴	18.68 ⁹²	39.593 ³⁷³	40.93 ⁹
Sept. 6.6	23.591 ²⁶¹	44.61 ³¹	34.242 ²⁸⁴	36.33 ¹⁹⁰	60.243 ²⁴¹	18.09 ⁵⁹	39.932 ³³⁹	40.93 ⁹⁷
16.6	23.821 ²³⁰	45.38 ⁷⁷	34.496 ²⁵⁴	38.23 ¹⁹⁰	60.456 ²¹³	17.82 ²⁷	40.229 ²⁹⁷	41.90 ¹⁴⁹
26.6	24.015 ¹⁹⁴	46.58 ¹²⁰	34.717 ²²¹	40.10 ¹⁸⁷	60.641 ¹⁸⁵	17.86 ⁴	40.477 ²⁴⁸	43.39 ¹⁵⁷
Oct. 6.6	24.171 ¹⁵⁶	48.16 ¹⁵⁸	34.905 ¹⁸⁸	41.90 ¹⁸⁰	60.794 ¹⁵³	18.21 ³⁵	40.670 ¹⁹³	45.36 ²⁴⁵
16.5	24.288 ¹¹⁷	50.05 ¹⁸⁹	35.057 ¹⁵²	43.60 ¹⁷⁰	60.915 ¹²¹	18.83 ⁶²	40.805 ¹³⁵	47.72 ²⁸⁵
26.5	24.366 ⁷⁸	52.17 ²¹²	35.174 ¹¹⁷	45.17 ¹⁵⁷	61.007 ⁹²	19.67 ⁸⁴	40.883 ⁷⁸	50.40 ²⁸⁹
Nov. 5.5	24.405 ³⁹	54.43 ²²⁶	35.256 ⁸²	46.60 ¹⁴³	61.067 ⁶⁰	20.68 ¹⁰¹	40.903 ²⁰	53.30 ²⁸⁹
15.4	24.408 ³	56.75 ²³²	35.304 ⁴⁸	47.87 ¹²⁷	61.096 ²⁹	21.83 ¹¹⁵	40.865 ³⁸	56.29 ²⁸⁹
25.4	24.373 ³⁵	59.02 ²²⁷	35.315 ¹¹	48.94 ¹⁰⁷	61.098 ²	21.83 ¹²¹	40.865 ⁹²	59.28 ²⁸⁹
Dec. 5.4	24.306 ⁶⁷	61.15 ²¹³	35.292 ²³	49.81 ⁸⁷	61.071 ²⁷	23.04 ¹²³	40.773 ¹⁴¹	62.14 ²⁸⁵
15.4	24.306 ⁹⁷	61.15 ¹⁹⁴	35.292 ⁵⁷	49.81 ⁶³	61.071 ⁵³	24.27 ¹¹⁹	40.632 ¹⁸⁵	64.75 ²²⁷
25.3	24.209 ¹²⁴	63.09 ¹⁶⁶	35.235 ⁸⁹	50.44 ⁴⁰	61.018 ⁷⁹	25.46 ¹¹²	40.447 ²³⁴	67.02 ¹⁶⁸
35.3	24.085 ¹⁴⁸	64.75 ¹³³	35.146 ¹²⁰	50.84 ¹³	60.939 ¹⁰²	26.58 ¹⁰²	40.223 ²⁵⁴	68.90 ¹⁴⁹
35.3	23.937 ¹⁴⁸	66.08 ¹³³	35.026 ¹²⁰	50.97 ¹³	60.837 ¹⁰²	27.60 ¹⁰²	39.969 ²⁵⁴	70.30 ¹⁴⁹
Mean Place	20.182	73.21	29.609	23.70	56.515	41.72	36.838	72.46
Sec δ , Tan δ	1.168	-0.603	1.199	+0.661	1.007	-0.119	1.620	-1.275
$D\mu_a$, $D\mu_\delta$	+0.05	+0.03	+0.07	-0.04	+0.06	+0.01	+0.04	+0.07
$D\phi_\delta$, $D\omega_\delta$	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5	+0.3	+0.6

APPARENT PLACES OF STARS, 1919.

335

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	o Ceti. (Mira.) Var. 1.7-9.6		κ Fornacis. Mag. 5.4		δ Hydri. Mag. 4.3		ι Cassiopeiæ. Mag. 4.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 15 s	° ' " - 3 20 "	h m 2 18 s	° ' " -24 10 "	h m 2 20 s	° ' " -69 1 "	h m 2 22 s	° ' " +67 2 "
Jan. 0.3	16.791	39.68	51.621	67.64	19.70	53.64	25.97	40.88
10.3	16.684 ¹⁰⁷	40.56 ⁸⁸	51.486 ¹³⁵	68.78 ¹¹⁴	19.15 ⁵⁵	54.59 ⁹⁵	25.61 ³⁶	41.95 ¹⁰⁷
20.3	16.558 ¹²⁶	41.31 ⁷⁵	51.333 ¹⁸³	69.58 ⁸⁰	18.57 ⁵⁸	54.94 ³⁵	25.18 ⁴³	42.49 ⁵⁴
30.2	16.421 ¹³⁷	41.94 ⁶³	51.167 ¹⁶⁶	70.05 ⁴⁷	17.98 ⁵⁹	54.69 ²⁵	24.73 ⁴⁵	42.48 ¹
Feb. 9.2	16.278 ¹⁴³	42.40 ⁴⁶	50.997 ¹⁷⁰	70.16 ¹¹	17.40 ⁵⁸	53.85 ⁸⁴	24.26 ⁴⁷	41.93 ⁵⁵
19.2	16.136 ¹⁴²	42.68 ²⁸	50.828 ¹⁶⁹	69.90 ²⁶	16.83 ⁵⁷	52.45 ¹⁴⁰	23.81 ⁴⁵	40.85 ¹⁰⁸
Mar. 1.2	16.002 ¹³⁴	42.79 ¹¹	50.670 ¹⁵⁸	69.29 ⁶¹	16.31 ⁵²	50.54 ¹⁹¹	23.40 ⁴¹	39.30 ¹⁵⁵
11.1	15.885 ¹¹⁷	42.70 ⁹	50.528 ¹⁴²	68.34 ⁹⁵	15.84 ⁴⁷	48.17 ²³⁷	23.03 ³⁷	37.35 ¹⁹⁵
21.1	15.792 ⁹⁸	42.39 ³¹	50.412 ¹¹⁶	67.06 ¹²⁸	15.44 ⁴⁰	45.40 ²⁷⁷	22.73 ³⁰	35.08 ²²⁷
31.1	15.730 ⁶²	41.87 ⁵²	50.329 ⁸³	65.48 ¹⁵⁸	15.10 ³⁴	42.30 ³¹⁰	22.52 ²¹	32.56 ²⁵²
Apr. 10.0	15.706 ²⁴	41.11 ⁷⁶	50.284 ⁴⁵	63.62 ¹⁸⁶	14.86 ²⁴	38.94 ³³⁶	22.41 ¹¹	29.93 ²⁶³
20.0	15.724 ¹⁸	40.12 ⁹⁹	50.283 ¹	61.50 ²¹²	14.71 ¹⁵	35.38 ³⁵⁶	22.41 ⁰	27.28 ²⁶⁵
30.0	15.786 ⁶²	38.91 ¹²¹	50.329 ⁴⁶	59.19 ²³¹	14.68 ³	31.73 ³⁶⁵	22.53 ¹²	24.72 ²⁵⁶
May 10.0	15.892 ¹⁰⁶	37.50 ¹⁴¹	50.422 ⁹³	56.70 ²⁴⁹	14.74 ⁶	28.05 ³⁶⁸	22.74 ²¹	22.32 ²⁴⁰
19.9	16.042 ¹⁵⁰	35.89 ¹⁶¹	50.561 ¹³⁹	54.10 ²⁶⁰	14.90 ¹⁶	24.43 ³⁶²	23.06 ³²	20.18 ²¹⁴
29.9	16.232 ¹⁹⁰	34.14 ¹⁷⁵	50.744 ¹⁸³	51.44 ²⁶⁶	15.16 ²⁶	20.95 ³⁴⁸	23.47 ⁴¹	18.38 ¹⁸⁰
June 8.9	16.459 ²²⁷	32.27 ¹⁸⁷	50.966 ²²²	48.80 ²⁶⁴	15.52 ³⁶	17.68 ³²⁷	23.97 ⁵⁰	16.95 ¹⁴³
18.9	16.715 ²⁵⁶	30.33 ¹⁹⁴	51.223 ²⁵⁷	46.23 ²⁵⁷	15.96 ⁴⁴	14.73 ²⁹⁵	24.55 ⁵⁸	15.96 ⁹⁹
28.8	16.993 ²⁷⁸	28.37 ¹⁹⁶	51.505 ²⁸²	43.79 ²⁴⁴	16.48 ⁵²	12.16 ²⁵⁷	25.16 ⁶¹	15.42 ⁵⁴
July 8.8	17.287 ²⁹⁴	26.44 ¹⁹³	51.808 ³⁰³	41.57 ²²²	17.05 ⁵⁷	10.03 ²¹³	25.81 ⁶⁵	15.34 ⁸
18.8	17.589 ³⁰²	24.60 ¹⁸⁴	52.120 ³¹²	39.60 ¹⁹⁷	17.66 ⁶¹	8.40 ¹⁶³	26.49 ⁶⁸	15.72 ³⁸
28.7	17.892 ³⁰³	22.92 ¹⁶⁸	52.437 ³¹⁷	37.97 ¹⁶³	18.29 ⁶³	7.33 ¹⁰⁷	27.17 ⁶⁸	16.55 ⁸³
Aug. 7.7	18.188 ²⁹⁶	21.41 ¹⁵¹	52.748 ³¹¹	36.70 ¹²⁷	18.94 ⁶⁵	6.86 ⁴⁷	27.84 ⁶⁷	17.82 ¹²⁷
17.7	18.471 ²⁸³	20.13 ¹²⁸	53.047 ²⁹⁹	35.84 ⁸⁶	19.57 ⁶³	6.97 ¹¹	28.48 ⁶⁴	19.48 ¹⁶⁶
27.7	18.735 ²⁶⁴	19.11 ¹⁰²	53.328 ²⁸¹	35.42 ⁴²	20.16 ⁵⁹	7.70 ⁷³	29.09 ⁶¹	21.50 ²⁰²
Sept. 6.6	18.977 ²⁴²	18.39 ⁷²	53.584 ²⁵⁶	35.44 ²	20.71 ⁵⁵	9.02 ¹³²	29.66 ⁵⁷	23.83 ²³³
16.6	19.191 ²¹⁴	17.97 ⁴²	53.812 ²²⁸	35.89 ⁴⁵	21.18 ⁴⁷	10.88 ¹⁸⁶	30.17 ⁵¹	26.43 ²⁶⁰
26.6	19.377 ¹⁸⁶	17.85 ¹²	54.008 ¹⁹⁶	36.75 ⁸⁶	21.58 ⁴⁰	13.23 ²³⁵	30.62 ⁴⁵	29.23 ²⁸⁰
Oct. 6.6	19.532 ¹⁵⁵	18.02 ¹⁷	54.169 ¹⁶¹	38.00 ¹²⁵	21.88 ³⁰	15.98 ²⁷⁵	31.00 ³⁸	32.20 ²⁹⁷
16.5	19.657 ¹²⁵	18.44 ⁴²	54.295 ¹²⁶	39.56 ¹⁵⁶	22.08 ²⁰	19.03 ³⁰⁵	31.32 ³²	35.28 ³⁰⁸
26.5	19.752 ⁹⁵	19.09 ⁶⁵	54.387 ⁹²	41.35 ¹⁷⁹	22.18 ¹⁰	22.26 ³²³	31.55 ²³	38.38 ³¹⁰
Nov. 5.5	19.816 ⁶⁴	19.92 ⁸³	54.442 ⁵⁵	43.32 ¹⁹⁷	22.17 ¹	25.55 ³²⁹	31.69 ¹⁴	38.38 ³⁰⁷
15.4	19.850 ³⁴	20.87 ⁹⁵	54.462 ²⁰	45.37 ²⁰⁵	22.04 ¹³	28.79 ³²⁴	31.75 ⁶	41.45 ²⁹⁷
25.4	19.856 ⁶	21.91 ¹⁰⁴	54.449 ¹³	47.42 ²⁰⁵	21.81 ²³	31.83 ³⁰⁴	31.74 ¹	44.42 ²⁸⁰
Dec. 5.4	19.833 ⁴³	22.99 ¹⁰⁸	54.405 ⁴⁴	49.40 ¹⁹⁸	21.50 ³¹	34.58 ²⁷⁵	31.64 ¹⁰	47.22 ²⁵⁴
15.4	19.784 ²⁹	24.06 ¹⁰⁷	54.331 ⁷⁴	51.22 ¹⁸²	21.10 ⁴⁰	36.93 ²³⁵	31.45 ¹⁹	49.76 ²²²
25.3	19.709 ⁷⁵	25.09 ¹⁰³	54.231 ¹⁰⁰	52.82 ¹⁶⁰	20.62 ⁴⁸	38.78 ¹⁸⁵	31.18 ²⁷	51.98 ¹⁸²
35.3	19.612 ⁹⁷	26.03 ⁹⁴	54.105 ¹²⁶	54.16 ¹³⁴	20.10 ⁵²	40.11 ¹³³	30.85 ³³	53.80 ¹³⁷
Mean Place	15.209	40.97	50.135	62.49	18.136	39.63	22.323	21.13
Sec δ, Tan δ	1.002	-0.058	1.096	-0.449	2.794	-2.608	2.564	+2.361
D _φ α, D _ω α	+0.06	0.00	+0.05	+0.02	+0.02	+0.14	+0.10	-0.13
D _φ δ, D _ω δ	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ξ Ceti. Mag. 4.3		σ Ceti. Mag. 4.8		36 H. Cassiopeia. Mag. 5.3		γ Ceti. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 23 s	° ' " + 8 5 "	h m 2 28 s	° ' " -15 35 "	h m 2 30 s	° ' " +72 27 "	h m 2 31 s	° ' " + 5 14 "
Jan. 0.3	52.713	56.32	16.374	60.47	22.55	74.46	38.995	29.47
10.3	52.612 ¹⁰¹	55.67 ⁶⁵	16.256 ¹¹⁸	61.58 ¹¹¹	22.05 ⁵⁰	75.76 ¹³⁰	38.897 ⁹⁸	28.75 ⁷²
20.3	52.490 ¹²²	55.02 ⁶⁵	16.121 ¹³⁵	62.44 ⁸⁶	21.49 ⁵⁶	76.54 ⁷⁸	38.777 ¹³⁰	28.07 ⁶⁸
30.2	52.355 ¹³⁵	54.38 ⁶⁴	15.971 ¹⁸⁰	63.03 ⁸⁰	20.89 ⁶⁰	76.74 ²⁰	38.642 ¹³⁵	27.43 ⁶⁴
Feb. 9.2	52.210 ¹⁴⁵	53.78 ⁶⁰	15.813 ¹⁵⁸	63.34 ³¹	20.27 ⁶²	76.36 ³⁸	38.497 ¹⁴⁵	26.86 ⁵⁷
19.2	52.065 ¹⁴⁵	53.23 ⁵⁵	15.655 ¹⁵⁸	63.37 ⁸	19.65 ⁶²	75.40 ⁹⁶	38.350 ¹⁴⁷	26.38 ⁴⁸
Mar. 1.2	51.927 ¹³⁸	52.76 ⁴⁷	15.503 ¹⁶²	63.10 ²⁷	19.08 ⁵⁷	73.94 ¹⁴⁶	38.208 ¹⁴²	26.00 ³⁸
11.1	51.805 ¹²²	52.39 ³⁷	15.366 ¹³⁷	62.53 ⁵⁷	18.57 ⁵¹	72.03 ¹⁹¹	38.082 ¹²⁶	25.75 ²⁵
21.1	51.707 ⁹⁸	52.16 ²³	15.254 ¹¹²	61.68 ⁸⁵	18.15 ⁴²	69.73 ²³⁰	37.978 ¹⁰⁴	25.64 ¹¹
31.1	51.641 ⁶⁶	52.07 ⁹	15.172 ⁸²	60.55 ¹¹³	17.84 ³¹	67.16 ²⁶⁷	37.905 ⁷³	25.70 ⁶
Apr. 10.1	51.613 ²⁸	52.17 ¹⁰	15.126 ⁴⁶	59.16 ¹³⁹	17.67 ¹⁷	64.42 ²⁷⁴	37.869 ³⁶	25.96 ²⁶
20.0	51.628 ¹⁵	52.48 ³¹	15.122 ⁴	57.51 ¹⁶⁵	17.63 ⁴	61.62 ²⁸⁰	37.875 ⁶	26.42 ⁴⁶
30.0	51.687 ⁵⁹	52.99 ⁵¹	15.164 ⁴²	55.65 ¹⁸⁶	17.73 ¹⁰	58.86 ²⁷⁶	37.925 ⁸⁰	27.10 ⁶⁶
May 10.0	51.793 ¹⁰⁶	53.74 ⁷⁵	15.252 ⁸⁸	53.58 ²⁰⁷	17.97 ²⁴	56.25 ²⁶¹	38.021 ⁹⁶	27.98 ⁸⁸
19.9	51.943 ¹⁵⁰	54.70 ⁹⁶	15.383 ¹³¹	51.38 ²²⁰	18.34 ³⁷	53.86 ²⁸⁹	38.161 ¹⁴⁰	29.08 ¹¹⁰
29.9	52.135 ¹⁹²	55.86 ¹¹⁶	15.557 ¹⁷⁴	49.08 ²³⁰	18.84 ⁵⁰	51.80 ²⁰⁶	38.343 ¹⁸²	30.37 ¹²⁹
June 8.9	52.362 ²²⁷	57.20 ¹³⁴	15.770 ²¹³	46.73 ²³⁵	19.43 ⁵⁰	50.10 ¹⁷⁰	38.562 ²¹⁹	31.82 ¹⁴⁵
18.9	52.621 ²⁵⁹	58.69 ¹⁴⁹	16.016 ²⁴⁶	44.39 ²³⁴	20.13 ⁷⁰	48.83 ¹²⁷	38.813 ²⁵¹	33.40 ¹⁵⁸
28.8	52.903 ²⁸²	60.30 ¹⁶¹	16.287 ²⁷¹	42.11 ²²⁸	20.89 ⁷⁶	48.01 ⁸³	39.088 ²⁷⁵	35.08 ¹⁶⁸
July 8.8	53.200 ²⁹⁷	61.96 ¹⁶⁶	16.577 ²⁹⁰	39.97 ²¹⁴	21.71 ⁸²	47.67 ³⁴	39.381 ²⁹³	36.79 ¹⁷¹
18.8	53.508 ³⁰⁸	63.65 ¹⁶⁹	16.878 ³⁰¹	38.02 ¹⁹⁵	22.55 ⁸⁴	47.80 ¹³	39.683 ³⁰²	38.50 ¹⁷¹
28.8	53.816 ³⁰⁸	65.29 ¹⁶⁴	17.184 ³⁰⁶	36.32 ¹⁷⁰	23.41 ⁸⁶	48.41 ⁶¹	39.988 ³⁰⁵	40.14 ¹⁶⁴
Aug. 7.7	54.117 ³⁰¹	66.87 ¹⁵⁸	17.485 ³⁰¹	34.91 ¹⁴¹	24.26 ⁸⁵	49.48 ¹⁰⁷	40.289 ³⁰¹	41.68 ¹⁵⁴
17.7	54.407 ²⁹⁰	68.33 ¹⁴⁶	17.775 ²⁹⁰	33.84 ¹⁰⁷	25.09 ⁸³	50.98 ¹⁸⁰	40.579 ²⁹⁰	43.08 ¹⁴⁰
27.7	54.679 ²⁷²	69.62 ¹²⁹	18.050 ²⁷⁵	33.15 ⁶⁹	25.88 ⁷⁹	52.87 ¹⁸⁹	40.853 ²⁷⁴	44.29 ¹²¹
Sept. 6.6	54.929 ²⁵⁰	70.72 ¹¹⁰	18.302 ²⁵²	32.84 ³¹	26.61 ⁷³	55.12 ²²⁵	41.105 ²⁵²	45.29 ¹⁰⁰
16.6	55.155 ²²⁶	71.62 ⁹⁰	18.529 ²²⁷	32.92 ⁸	27.28 ⁶⁷	57.69 ²⁶⁷	41.334 ²²⁹	46.04 ⁷⁵
26.6	55.352 ¹⁹⁷	72.28 ⁶⁶	18.726 ¹⁹⁷	33.38 ⁴⁶	27.87 ⁵⁹	60.50 ²⁸¹	41.535 ²⁰¹	46.57 ⁵³
Oct. 6.6	55.521 ¹⁶⁹	72.74 ⁴⁶	18.893 ¹⁶⁷	34.18 ⁸⁰	28.37 ⁵⁰	63.53 ³⁰³	41.709 ¹⁷⁴	46.84 ²⁷
16.5	55.661 ¹⁴⁰	72.96 ²²	19.028 ¹³⁵	35.30 ¹¹²	28.79 ⁴²	66.69 ³¹⁶	41.854 ¹⁴⁵	46.90 ⁶
26.5	55.769 ¹⁰⁸	73.00 ⁴	19.130 ¹⁰²	36.66 ¹³⁶	29.11 ³²	69.93 ³²⁴	41.969 ¹¹⁵	46.73 ¹⁷
Nov. 5.5	55.848 ⁷⁹	72.86 ¹⁴	19.200 ⁷⁰	38.20 ¹⁵⁴	29.30 ¹⁹	73.18 ³²⁵	42.055 ⁸⁶	46.40 ³³
15.5	55.899 ⁵¹	72.56 ³⁰	19.238 ³⁸	39.87 ¹⁶⁷	29.40 ¹⁰	76.36 ³¹⁸	42.110 ⁵⁵	45.92 ⁴⁸
25.4	55.919 ²⁰	72.16 ⁴⁰	19.245 ⁷	41.57 ¹⁷⁰	29.38 ²	79.38 ³⁰²	42.135 ²⁵	45.33 ⁶⁹
Dec. 5.4	55.910 ⁹	71.65 ⁵¹	19.220 ²⁵	43.26 ¹⁶⁹	29.25 ¹³	82.18 ²⁸⁰	42.133 ²	44.65 ⁶⁸
15.4	55.873 ³⁷	71.08 ⁵⁷	19.167 ⁵³	44.84 ¹⁵⁸	28.99 ²⁶	84.66 ²⁴⁸	42.100 ³³	43.92 ⁷³
25.3	55.807 ⁶⁶	70.46 ⁶²	19.087 ⁸⁰	46.29 ¹⁴⁵	28.63 ³⁶	86.76 ²¹⁰	42.039 ⁶¹	43.19 ⁷³
35.3	55.718 ⁸⁹	69.81 ⁶⁵	18.982 ¹⁰⁵	47.54 ¹²⁵	28.18 ⁴⁵	88.38 ¹⁶²	41.954 ⁸⁵	42.45 ⁷⁴
Mean Place	50.991	51.63	14.799	57.66	17.917	54.51	37.258	25.96
Sec δ , Tan δ	1.010	+0.142	1.038	-0.279	3.320	+3.166	1.004	+0.092
$D\delta_a, D\alpha_a$	+0.06	-0.01	+0.06	+0.01	+0.11	-0.17	+0.06	-0.01
$D\delta_s, D\alpha_s$	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6

APPARENT PLACES OF STARS, 1919.

337

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	μ Hydri. Mag. 5.3		ν Arietis. Mag. 5.4		δ Ceti. Mag. 4.0		ε Hydri. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 33	° ' -79 27	h m 2 34	° ' +21 36	h m 2 35	° ' - 0 0	h m 2 38	° ' -68 36
	s	"	s	"	s	"	s	"
Jan. 0.3	23.30	61.28	14.750	51.04	21.467	70.74	22.07	63.63
10.3	22.13 ¹¹⁷	62.23 ⁹⁵	14.647 ¹⁰³	50.76 ²⁸	21.368 ⁹⁹	71.59 ⁸⁵	21.54 ⁵³	64.84 ¹²¹
20.3	20.90 ¹²³	62.58 ³⁵	14.519 ¹²⁸	50.36 ⁴⁰	21.248 ¹²⁰	72.35 ⁷⁶	20.98 ⁵⁶	65.47 ⁶³
30.2	19.64 ¹²⁶	62.33 ²⁵	14.373 ¹⁴⁶	49.82 ⁵⁴	21.112 ¹³⁶	72.99 ⁶⁴	20.40 ⁵⁸	65.50 ³
Feb. 9.2	18.40 ¹²⁴	61.48 ⁸⁵	14.217 ¹⁵⁶	49.17 ⁶⁵	20.965 ¹⁴⁷	73.52 ⁵³	19.81 ⁵⁹	64.93 ⁵⁷
19.2	17.19 ¹²¹	60.06 ¹⁴²	14.057 ¹⁶⁰	48.42 ⁷⁵	20.816 ¹⁴⁹	73.91 ³⁹	19.23 ⁵⁸	63.80 ¹¹³
Mar. 1.2	16.05 ¹¹⁴	58.14 ¹⁹²	13.903 ¹⁵⁴	47.61 ⁸¹	20.672 ¹⁴⁴	74.13 ²²	18.69 ⁵⁴	62.14 ¹⁶⁶
11.1	15.01 ¹⁰⁴	55.75 ²³⁹	13.766 ¹³⁷	46.78 ⁸³	20.542 ¹³⁰	74.19 ⁶	18.19 ⁵⁰	60.00 ²¹⁴
21.1	14.10 ⁹¹	52.98 ²⁷⁷	13.654 ¹¹²	45.96 ⁸²	20.435 ¹⁰⁷	74.07 ¹²	17.75 ⁴⁴	57.42 ²⁵⁸
31.1	13.34 ⁷⁶	49.86 ³¹²	13.576 ⁷⁸	45.20 ⁷⁶	20.358 ⁷⁷	73.73 ³⁴	17.38 ³⁷	54.49 ²⁹³
Apr. 10.1	12.73 ⁶¹	46.51 ³³⁵	13.539 ³⁷	44.56 ⁶⁴	20.317 ⁴¹	73.19 ⁵⁴	17.10 ²⁸	51.27 ³²²
20.0	12.30 ⁴³	42.96 ³⁵⁵	13.545 ⁶	44.06 ⁵⁰	20.316 ¹	72.43 ⁷⁶	16.91 ¹⁹	47.81 ³⁴⁶
30.0	12.08 ²²	39.31 ³⁶⁵	13.601 ⁵⁶	43.76 ³⁰	20.360 ⁴⁴	71.45 ⁹⁸	16.82 ⁹	44.22 ³⁵⁹
May 10.0	12.04 ⁴	35.65 ³⁶⁶	13.707 ¹⁰⁶	43.66 ¹⁰	20.450 ⁹⁰	70.26 ¹¹⁹	16.83 ¹	40.57 ³⁶⁵
19.9	12.20 ¹⁶	32.05 ³⁶⁰	13.860 ¹⁵³	43.81 ¹⁵	20.584 ¹³⁴	68.87 ¹³⁹	16.94 ¹¹	36.93 ³⁶⁴
29.9	12.55 ³⁵	28.60 ³⁴⁵	14.057 ¹⁹⁷	44.19 ³⁸	20.760 ¹⁷⁶	67.32 ¹⁵⁵	17.16 ²²	33.40 ³⁵³
June 8.9	13.08 ⁵³	25.36 ³²⁴	14.293 ²³⁶	44.82 ⁶³	20.973 ²¹³	65.63 ¹⁶⁹	17.47 ³¹	30.05 ³³⁵
18.9	13.79 ⁷¹	22.44 ²⁹²	14.564 ²⁷¹	45.67 ⁸⁵	21.218 ²⁴⁵	63.84 ¹⁷⁹	17.87 ⁴⁰	26.97 ³⁰⁸
28.8	14.64 ⁸⁵	19.90 ²⁵⁴	14.860 ²⁹⁶	46.73 ¹⁰⁶	21.487 ²⁶⁹	62.01 ¹⁸³	18.34 ⁴⁷	24.24 ²⁷³
July 8.8	15.62 ⁹⁸	17.81 ²⁰⁹	15.174 ³¹⁴	47.97 ¹²⁴	21.775 ²⁸⁸	60.17 ¹⁸⁴	18.88 ⁵⁴	21.93 ²³¹
18.8	16.69 ¹⁰⁷	16.22 ¹⁵⁹	15.497 ³²³	49.35 ¹³⁸	22.074 ²⁹⁹	58.39 ¹⁷⁸	19.46 ⁵⁸	20.10 ¹⁸³
28.8	17.83 ¹¹⁴	15.18 ¹⁰⁴	15.824 ³²⁷	50.82 ¹⁴⁷	22.376 ³⁰²	56.72 ¹⁶⁷	20.08 ⁶²	18.81 ¹²⁹
Aug. 7.7	19.01 ¹¹⁸	14.75 ⁴³	16.145 ³²¹	52.35 ¹⁵³	22.674 ²⁹⁸	55.19 ¹⁵³	20.71 ⁶³	18.10 ⁷¹
17.7	20.17 ¹¹⁶	14.91 ¹⁶	16.455 ³¹⁰	53.89 ¹⁵⁴	22.963 ²⁸⁹	53.87 ¹⁸²	21.33 ⁶²	18.00 ¹⁰
27.7	21.29 ¹¹²	15.68 ⁷⁷	16.748 ²⁹³	55.42 ¹⁵³	23.236 ²⁷³	52.79 ¹⁰⁸	21.94 ⁶¹	18.53 ⁵³
Sept. 6.6	22.34 ¹⁰⁵	17.03 ¹³⁵	17.021 ²⁷³	56.87 ¹⁴⁵	23.488 ²⁵²	51.96 ⁸³	22.50 ⁵⁶	19.64 ¹¹¹
16.6	23.26 ⁹²	18.95 ¹⁹²	17.268 ²⁴⁷	58.24 ¹³⁷	23.718 ²³⁰	51.41 ⁵⁵	23.00 ⁵⁰	21.33 ¹⁶⁹
26.6	24.03 ⁷⁷	21.34 ²³⁹	17.488 ²²⁰	59.49 ¹²⁶	23.920 ²⁰²	51.14 ²⁷	23.43 ⁴³	23.53 ²²⁰
Oct. 6.6	24.64 ⁶¹	24.12 ²⁷⁸	17.679 ¹⁹¹	60.60 ¹¹¹	24.094 ¹⁷⁴	51.14 ⁰	23.77 ³⁴	26.16 ²⁶³
16.5	25.03 ³⁹	27.22 ³¹⁰	17.840 ¹⁶¹	61.57 ⁹⁷	24.241 ¹⁴⁷	51.40 ²⁶	24.00 ²³	29.15 ²⁹⁹
26.5	25.21 ¹⁸	30.49 ³²⁷	17.970 ¹³⁰	62.38 ⁸¹	24.357 ¹¹⁶	51.88 ⁴⁸	24.15 ¹⁵	32.35 ³²⁰
Nov. 5.5	25.18 ³	33.83 ³³⁴	18.070 ¹⁰⁰	63.05 ⁶⁷	24.444 ⁸⁷	52.54 ⁶⁶	24.18 ³	35.68 ³³³
15.5	24.92 ²⁶	37.11 ³²⁸	18.137 ⁶⁷	63.58 ⁵³	24.500 ⁵⁶	53.34 ⁸⁰	24.11 ⁷	38.99 ³³¹
25.4	24.45 ⁴⁷	40.19 ³⁰⁸	18.172 ³⁵	63.96 ³⁸	24.526 ²⁶	54.24 ⁹⁰	23.93 ¹⁸	42.16 ³¹⁷
Dec. 5.4	23.77 ⁶⁸	42.98 ²⁷⁹	18.176 ⁴	64.19 ²³	24.523 ³	55.19 ⁹⁵	23.66 ²⁷	45.07 ²⁹¹
15.4	22.93 ⁸⁴	45.36 ²³⁸	18.146 ³⁰	64.28 ⁹	24.490 ³³	56.16 ⁹⁷	23.30 ³⁶	47.61 ²⁵⁴
25.3	21.94 ⁹⁹	47.24 ¹⁸⁸	18.085 ⁶¹	64.24 ⁴	24.429 ⁶¹	57.11 ⁹⁵	22.87 ⁴³	49.70 ²⁰⁹
35.3	20.82 ¹¹²	48.56 ¹³²	17.995 ⁹⁰	64.04 ²⁰	24.344 ⁸⁵	58.01 ⁹⁰	22.38 ⁴⁹	51.28 ¹⁵⁸
Mean Place	21.032	46.74	12.813	42.61	19.754	72.51	20.292	49.84
Sec δ, Tan δ	5.468	-5.376	1.076	+0.396	1.000	0.000	2.742	-2.553
D _μ α, D _μ δ	-0.03	+0.28	+0.07	-0.02	+0.06	0.00	+0.02	+0.13
D _ν δ, D _ν δ	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.8

5934°-1919-22

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Persel. Mag. 4.2		γ Ceti seq. Mag. 3.7		π Ceti. Mag. 4.4		μ Ceti. Mag. 4.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 38 s	° ' " +48 53 "	h m 2 39 s	° ' " + 2 53 "	h m 2 40 s	° ' " -14 11 "	h m 2 40 s	° ' " + 9 46 "
Jan. 0.3	42.148	27.79	7.844	45.01	17.620	66.47	35.462	27.29
10.3	41.978 ¹⁷⁰	28.43 ⁶⁴	7.748 ⁹⁶	44.23 ⁷⁸	17.509 ¹¹¹	67.61 ¹¹⁴	35.368 ⁹⁴	26.69 ⁶⁰
20.3	41.773 ²⁰⁵	28.69 ²⁶	7.629 ¹¹⁹	43.51 ⁷²	17.377 ¹³²	68.53 ⁹²	35.250 ¹¹⁸	26.07 ⁶²
30.3	41.542 ²³¹	28.54 ¹⁵	7.494 ¹³⁵	42.86 ⁶⁵	17.229 ¹⁴⁸	69.18 ⁶⁵	35.115 ¹³⁵	25.46 ⁶¹
Feb. 9.2	41.297 ²⁴⁵	27.99 ⁵⁵	7.348 ¹⁴⁶	42.31 ⁵⁵	17.070 ¹⁵⁹	69.58 ⁴⁰	34.968 ¹⁴⁷	24.87 ⁵⁹
19.2	41.049 ²⁴⁸	27.08 ⁹¹	7.199 ¹⁴⁹	41.86 ⁴⁵	16.909 ¹⁶¹	69.69 ¹¹	34.817 ¹⁵¹	24.31 ⁵⁶
Mar. 1.2	40.812 ²³⁷	25.82 ¹²⁶	7.053 ¹⁴⁶	41.54 ³²	16.753 ¹⁵⁶	69.51 ¹⁸	34.671 ¹⁴⁶	23.81 ⁵⁰
11.1	40.599 ²¹³	24.28 ¹⁸⁴	6.921 ¹³²	41.38 ¹⁶	16.610 ¹⁴³	69.05 ⁴⁶	34.538 ¹³³	23.39 ⁴³
21.1	40.426 ¹⁷³	22.53 ¹⁷⁵	6.812 ¹⁰⁹	41.36 ²	16.489 ¹²¹	68.30 ⁷⁵	34.428 ¹¹⁰	23.09 ³⁰
31.1	40.300 ¹²⁶	20.64 ¹⁸⁹	6.732 ⁸⁰	41.54 ¹⁸	16.397 ⁹²	67.28 ¹⁰²	34.349 ⁷⁹	22.93 ¹⁶
Apr. 10.1	40.231 ⁶⁹	18.69 ¹⁹⁵	6.687 ⁴⁵	41.91 ³⁷	16.342 ⁵⁵	65.99 ¹²⁰	34.306 ⁴³	22.92 ¹
20.0	40.228 ³	16.77 ¹⁹²	6.684 ³	42.49 ⁵⁸	16.328 ¹⁴	64.45 ¹⁵⁴	34.304 ²	23.11 ¹⁹
30.0	40.292 ⁶⁴	14.95 ¹⁸²	6.726 ⁴²	43.29 ⁸⁰	16.358 ³⁰	62.69 ¹⁷⁶	34.349 ⁴⁵	23.49 ³⁸
May 10.0	40.424 ¹³²	13.31 ¹⁶⁴	6.812 ⁸⁶	44.29 ¹⁰⁰	16.434 ⁷⁶	60.73 ¹⁹⁶	34.440 ⁹¹	24.10 ⁶¹
20.0	40.621 ¹⁹⁷	11.90 ¹⁴¹	6.944 ¹³²	45.51 ¹²²	16.555 ¹²¹	58.60 ²¹³	34.577 ¹³⁷	24.91 ⁸¹
29.9	40.878 ²⁵⁷	10.80 ¹¹⁰	7.119 ¹⁷⁵	46.90 ¹³⁹	16.720 ¹⁶⁵	56.37 ²²³	34.757 ¹⁸⁰	25.92 ¹⁰¹
June 8.9	41.189 ⁸¹¹	10.02 ⁷⁸	7.331 ²¹²	48.43 ¹⁵³	16.923 ²⁰³	54.07 ²³⁰	34.974 ²¹⁷	27.13 ¹²¹
18.9	41.546 ³⁵⁷	9.58 ⁴⁴	7.575 ²⁴⁴	50.09 ¹⁶⁶	17.159 ²³⁶	51.77 ²³⁰	35.224 ²⁵⁰	28.48 ¹³⁵
28.8	41.937 ³⁹¹	9.52 ⁶	7.845 ²⁷⁰	51.81 ¹⁷²	17.424 ²⁶⁵	49.51 ²²⁶	35.499 ²⁷⁵	29.96 ¹⁴⁸
July 8.8	42.353 ⁴¹⁶	9.82 ³⁰	8.133 ²⁸⁸	53.56 ¹⁷⁵	17.708 ²⁸⁴	47.38 ²¹³	35.793 ²⁹⁴	31.52 ¹⁵⁴
18.8	42.785 ⁴³²	10.47 ⁶⁵	8.432 ²⁹⁹	55.29 ¹⁷³	18.005 ²⁹⁷	45.41 ¹⁹⁷	36.099 ³⁰⁶	33.11 ¹⁵⁹
28.8	43.222 ⁴³⁷	11.44 ⁹⁷	8.735 ³⁰³	56.92 ¹⁶³	18.308 ³⁰³	43.68 ¹⁷³	36.407 ³⁰⁸	34.69 ¹⁵⁶
Aug. 7.7	43.654 ⁴³²	12.73 ¹²⁹	9.034 ²⁹⁹	58.45 ¹⁵³	18.609 ³⁰¹	42.23 ¹⁴⁵	36.712 ³⁰⁵	36.22 ¹⁵³
17.7	44.074 ⁴²⁰	14.28 ¹⁵⁵	9.325 ²⁹¹	59.80 ¹³⁵	18.902 ²⁹³	41.11 ¹¹²	37.008 ²⁹⁶	37.64 ¹⁴³
27.7	44.474 ⁴⁰⁰	16.06 ¹⁷⁸	9.600 ²⁷⁵	60.94 ¹¹⁴	19.180 ²⁷⁸	40.35 ⁷⁶	37.289 ²⁸¹	38.92 ¹²⁶
Sept. 6.7	44.847 ³⁷³	18.02 ¹⁹⁶	9.855 ²⁵⁵	61.85 ⁹¹	19.437 ²⁵⁷	39.97 ³⁸	37.550 ²⁶¹	40.02 ¹¹⁰
16.6	45.189 ³⁴²	20.14 ²¹²	10.087 ²³²	62.50 ⁶⁵	19.671 ²³⁴	39.96 ¹	37.789 ²³⁹	40.94 ⁹²
26.6	45.495 ³⁰⁶	22.36 ²²²	10.293 ²⁰⁶	62.90 ⁴⁰	19.878 ²⁰⁷	40.34 ³⁸	38.001 ²¹²	41.63 ⁶⁹
Oct. 6.6	45.762 ²⁶⁷	24.64 ²²⁸	10.472 ¹⁷⁹	63.03 ¹³	20.056 ¹⁷⁸	41.07 ⁷³	38.187 ¹⁸⁶	42.13 ⁵⁰
16.5	45.989 ²²⁷	26.95 ²³¹	10.623 ¹⁵¹	62.93 ¹⁰	20.203 ¹⁴⁷	42.10 ¹⁰³	38.343 ¹⁵⁶	42.41 ²⁸
26.5	46.172 ¹⁸³	29.24 ²²⁹	10.743 ¹²⁰	62.61 ³²	20.318 ¹¹⁵	43.40 ¹³⁰	38.471 ¹²⁸	42.50 ⁹
Nov. 5.5	46.309 ¹³⁷	31.46 ²²²	10.834 ⁹¹	62.12 ⁴⁹	20.401 ⁸³	44.88 ¹⁴⁸	38.569 ⁹⁶	42.44 ⁶
15.5	46.400 ⁹¹	33.56 ²¹⁰	10.895 ⁶¹	61.47 ⁶⁵	20.453 ⁵²	46.51 ¹⁶³	38.637 ⁶⁸	42.21 ²³
25.4	46.442 ⁴²	35.52 ¹⁹⁶	10.926 ³¹	60.72 ⁷⁵	20.472 ¹⁹	48.19 ¹⁶⁸	38.674 ³⁷	41.87 ³⁴
Dec. 5.4	46.435 ⁷	37.27 ¹⁷⁵	10.927 ¹	59.90 ⁸²	20.460 ¹²	49.85 ¹⁰⁶	38.682 ⁸	41.43 ⁴⁴
15.4	46.378 ⁵⁷	38.77 ¹⁸⁰	10.901 ²⁶	59.05 ⁸⁵	20.418 ⁴²	51.44 ¹⁸⁰	38.658 ²⁴	40.92 ⁵¹
25.4	46.273 ¹⁰⁵	39.97 ¹²⁰	10.844 ⁵⁷	58.21 ⁸⁴	20.347 ⁷¹	52.90 ¹⁴⁶	38.605 ⁵³	40.36 ⁵⁶
35.3	46.123 ¹⁵⁰	40.83 ⁸⁶	10.760 ⁸⁴	57.39 ⁸²	20.249 ⁹⁸	54.19 ¹²⁰	38.523 ⁸²	39.77 ⁵⁸
Mean Place	39.530	12.45	6.089	42.48	15.976	63.85	33.633	22.69
Sec δ , Tan δ	1.521	+1.146	1.001	+0.051	1.032	-0.253	1.015	+0.172
$D\alpha$, $D_{\alpha\alpha}$	+0.08	-0.06	+0.06	0.00	+0.06	+0.01	+0.06	-0.01
$D\delta$, $D_{\delta\delta}$	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6

APPARENT PLACES OF STARS, 1919.

339

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Time.	η Persei. Mag. 3.9		δ Arietis. Mag. 3.7		β Fornacis. Mag. 4.5		σ Arietis. Mag. 5.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 44 s	° ' " +55 33 "	h m 2 45 s	° ' " +26 55 "	h m 2 45 s	° ' " -32 44 "	h m 2 47 s	° ' " +14 44 "
l. 0.3	49.659 ²⁰⁶	53.53 ⁹³	14.770 ¹⁰⁴	48.48 ⁶	43.647 ¹⁵³	51.80 ¹⁴³	2.963 ⁹²	61.97 ⁴⁵
10.3	49.453 ²⁴⁹	54.46 ⁴⁹	14.666 ¹³¹	48.42 ²⁶	43.494 ¹⁷⁵	53.23 ¹⁰²	2.871 ¹¹⁸	61.52 ⁵¹
20.3	49.204 ²⁷⁹	54.95 ⁵	14.535 ¹⁸²	48.16 ⁴²	43.319 ¹⁹¹	54.25 ⁶¹	2.753 ¹³⁷	61.01 ⁵⁶
30.3	48.925 ²⁹⁷	55.00 ⁴¹	14.383 ¹⁶⁸	47.74 ⁶⁰	43.128 ²⁰²	54.86 ¹⁷	2.616 ¹⁵⁰	60.45 ⁵⁹
b. 9.2	48.628 ³⁰¹	54.59 ⁸⁵	14.215 ¹⁷¹	47.14 ⁷⁶	42.926 ²⁰⁵	55.03 ²⁷	2.466 ¹⁵⁶	59.86 ⁶¹
19.2	48.327 ²⁸⁹	53.74 ¹²⁵	14.044 ¹⁶⁵	46.38 ⁸⁷	42.721 ¹⁹⁸	54.76 ⁶⁸	2.310 ¹⁵²	59.25 ⁶⁰
r. 1.2	48.038 ²⁶¹	52.49 ¹⁶⁰	13.879 ¹⁵²	45.51 ⁹⁶	42.523 ¹⁸³	54.08 ¹⁰⁹	2.158 ¹³⁹	58.65 ⁵⁷
11.1	47.777 ²¹⁸	50.89 ¹⁸⁶	13.727 ¹²⁶	44.55 ⁹⁹	42.340 ¹⁵⁸	52.99 ¹⁴⁸	2.019 ¹¹⁷	58.08 ⁵¹
21.1	47.559 ¹⁶²	49.03 ²⁰⁸	13.601 ⁹²	43.56 ⁹⁸	42.182 ¹²⁶	51.51 ¹⁸²	1.902 ⁸⁶	57.57 ⁴¹
31.1	47.397 ⁹⁵	46.95 ²¹⁸	13.509 ⁵¹	42.58 ⁹²	42.056 ⁸⁷	49.69 ²¹⁴	1.816 ⁵⁰	57.16 ²⁷
r. 10.1	47.302 ²³	44.77 ²²⁰	13.458 ³	41.66 ⁸⁰	41.969 ⁴¹	47.55 ²⁴¹	1.766 ⁶	56.89 ¹¹
20.0	47.279 ⁵⁵	42.57 ²¹²	13.455 ⁴⁸	40.86 ⁶³	41.928 ⁶	45.14 ²⁶⁵	1.760 ⁴⁰	56.78 ⁸
30.0	47.334 ¹³⁴	40.45 ¹⁹⁸	13.503 ⁹⁸	40.23 ⁴⁵	41.934 ⁵⁷	42.49 ²⁸⁰	1.800 ⁸⁷	56.86 ²⁹
y 10.0	47.468 ²⁰⁹	38.47 ¹⁷⁶	13.601 ¹⁴⁸	39.78 ²⁰	41.991 ¹⁰⁷	39.69 ²⁹²	1.887 ¹³⁴	57.15 ⁵⁰
20.0	47.677 ²⁷⁸	36.71 ¹⁴⁸	13.749 ¹⁹⁶	39.58 ³	42.098 ¹⁵⁶	36.77 ²⁹⁷	2.021 ¹⁷⁸	57.65 ⁷²
29.9	47.955 ³⁴³	35.23 ¹¹³	13.945 ²³⁶	39.61 ²⁹	42.254 ²⁰¹	33.80 ²⁹⁴	2.199 ²¹⁸	58.37 ⁹¹
ae 8.9	48.298 ³⁹⁵	34.10 ⁷⁸	14.181 ²⁷⁴	39.90 ⁵⁴	42.455 ²⁴¹	30.86 ²⁸⁴	2.417 ²⁵¹	59.28 ¹¹¹
18.9	48.693 ⁴³⁷	33.32 ³⁸	14.455 ³⁰¹	40.44 ⁷⁸	42.696 ²⁷³	28.02 ²⁶⁶	2.668 ²⁷⁷	60.39 ¹²⁶
28.8	49.130 ⁴⁶⁹	32.94 ¹	14.756 ³²¹	41.22 ⁹⁸	42.969 ²⁹⁹	25.36 ²⁴³	2.945 ²⁹⁷	61.65 ¹³⁷
y 8.8	49.599 ⁴⁸⁸	32.93 ⁴⁰	15.077 ³³³	42.20 ¹¹⁸	43.268 ³¹⁷	22.93 ²¹²	3.242 ³¹⁰	63.02 ¹⁴⁶
18.8	50.087 ⁴⁹⁵	33.33 ⁷⁷	15.410 ³³⁸	43.38 ¹³¹	43.585 ³²⁷	20.81 ¹⁷⁴	3.552 ³¹⁴	64.48 ¹⁴⁹
28.8	50.582 ⁴⁹¹	34.10 ¹¹³	15.748 ³³⁴	44.69 ¹⁴²	43.912 ³²⁸	19.07 ¹³¹	3.866 ³¹¹	65.97 ¹⁴⁸
g. 7.7	51.073 ⁴⁸⁰	35.23 ¹⁴⁴	16.082 ³²⁵	46.11 ¹⁴⁹	44.240 ³²¹	17.76 ⁸⁵	4.177 ³⁰²	67.45 ¹⁴⁴
17.7	51.553 ⁴⁵⁹	36.67 ¹⁷³	16.407 ¹⁵³	47.60 ¹⁵¹	44.561 ³⁰⁶	16.91 ³⁵	4.479 ²⁷⁰	68.89 ¹³⁴
27.7	52.012 ⁴³¹	38.40 ¹⁹⁸	16.716 ²⁹⁰	49.13 ¹⁵¹	44.867 ²⁸⁷	16.56 ¹⁵	4.767 ²⁷⁰	70.23 ¹²¹
pt. 6.7	52.443 ³⁹⁶	40.38 ²¹⁹	17.006 ²⁶⁵	50.64 ¹⁴⁷	45.154 ²⁶⁰	16.71 ⁶⁵	5.037 ²⁴⁶	71.44 ¹⁰⁷
16.6	52.839 ³⁵⁷	42.57 ²³⁴	17.271 ²³⁹	52.11 ¹⁴¹	45.414 ²²⁹	17.36 ¹¹²	5.283 ²²¹	72.51 ⁹⁰
26.6	53.196 ³¹³	44.91 ²⁴⁶	17.510 ²¹⁰	53.52 ¹³²	45.643 ¹⁹⁵	18.48 ¹⁵⁵	5.504 ¹⁹⁵	73.41 ⁷²
t. 6.6	53.509 ²⁶⁷	47.37 ²⁵⁴	17.720 ¹⁸¹	54.84 ¹²⁰	45.838 ¹⁵⁷	20.03 ¹⁹¹	5.699 ¹⁶⁷	74.13 ⁵⁵
16.5	53.776 ²¹⁶	49.91 ²⁵⁵	17.901 ¹⁴⁸	56.04 ¹⁰⁹	45.995 ¹¹⁹	21.94 ²²¹	5.866 ¹³⁷	74.68 ³⁷
26.5	53.992 ¹⁶²	52.46 ²⁵³	18.049 ¹¹⁶	57.13 ⁹⁷	46.114 ⁸¹	24.15 ²³⁹	6.003 ¹⁰⁷	75.05 ²⁰
v. 5.5	54.154 ¹⁰⁷	54.99 ²⁴⁴	18.165 ⁸³	58.10 ⁸³	46.195 ⁴⁰	26.54 ²⁵⁰	6.110 ⁷⁷	75.25 ⁸
15.5	54.261 ⁴⁸	57.43 ²³¹	18.248 ⁵⁰	58.93 ⁶⁸	46.235 ²	29.04 ²⁵¹	6.187 ⁴⁷	75.33 ⁶
25.4	54.309 ¹¹	59.74 ²⁰⁹	18.298 ¹³	59.61 ³⁹	46.237 ³⁷	31.55 ²⁴²	6.234 ¹⁴	75.27 ¹⁶
c. 5.4	54.298 ⁶⁹	61.83 ¹⁸⁵	18.311 ²¹	60.15 ²¹	46.200 ⁷³	33.97 ²²⁴	6.248 ¹⁸	75.11 ²⁶
15.4	54.229 ¹²⁷	63.68 ¹⁵⁸	18.290 ⁵⁷	60.54 ²¹	46.127 ¹⁰⁷	36.21 ¹⁹⁷	6.230 ⁴⁸	74.85 ³⁴
25.4	54.102 ¹⁸²	65.21 ¹¹⁷	18.233 ⁸⁸	60.75 ⁴	46.020 ¹³⁶	38.18 ¹⁶⁴	6.182 ⁷⁹	74.51 ⁴²
35.3	53.920	66.38	18.145	60.79	45.884	39.82	6.103	74.09
Place	46.664	37.25	12.683	39.06	42.041	44.18	1.045	56.15
, Tan δ	1.768	+1.458	1.122	+0.508	1.189	-0.643	1.034	+0.263
D_{α}	+0.09	-0.07	+0.07	-0.03	+0.05	+0.03	+0.07	-0.01
D_{δ}	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	τ^2 Eridani. Mag. 4.8		τ Persei. Mag. 4.1		η Eridani. Mag. 4.0		ϵ Arietis (mean). Mag. 4.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 47	° ' " -21 19	h m 2 48	° ' " +52 25	h m 2 52	° ' " - 9 12	h m 2 54	° ' " +21 1
	s	"	s	"	s	"	s	"
Jan. 0.3	23.420	78.50	33.151	70.60	29.922	72.69	36.631	8.96
10.3	23.299	79.80	32.969	71.44	29.824	73.80	36.539	8.72
20.3	23.155	80.81	32.747	71.90	29.700	74.73	36.418	8.37
30.3	22.994	81.50	32.493	71.92	29.559	75.44	36.276	7.91
Feb. 9.2	22.822	81.84	32.222	71.51	29.405	75.94	36.119	7.35
19.2	22.647	81.84	31.946	70.70	29.246	76.19	35.956	6.70
Mar. 1.2	22.476	81.49	31.680	69.50	29.089	76.21	35.794	5.99
11.2	22.319	80.81	31.437	67.99	28.943	75.98	35.645	5.25
21.1	22.182	79.80	31.234	66.22	28.819	75.49	35.519	4.51
31.1	22.076	78.48	31.082	64.27	28.721	74.75	35.422	3.83
Apr. 10.1	22.006	76.86	30.992	62.22	28.659	73.77	35.365	3.24
20.0	21.977	74.98	30.968	60.16	28.637	72.53	35.352	2.76
30.0	21.994	72.87	31.018	58.17	28.659	71.08	35.387	2.47
May 10.0	22.058	70.57	31.140	56.33	28.726	69.41	35.471	2.36
20.0	22.169	68.13	31.334	54.71	28.839	67.58	35.604	2.46
29.9	22.324	65.58	31.592	53.36	28.994	65.60	35.782	2.80
June 8.9	22.521	63.01	31.910	52.34	29.189	63.53	36.002	3.35
18.9	22.752	60.48	32.278	51.67	29.418	61.41	36.257	4.13
28.9	23.015	58.04	32.686	51.37	29.675	59.32	36.539	5.08
July 8.8	23.299	55.76	33.123	51.44	29.953	57.28	36.844	6.22
18.8	23.598	53.71	33.579	51.87	30.245	55.37	37.161	7.48
28.8	23.906	51.95	34.043	52.66	30.543	53.66	37.485	8.83
Aug. 7.7	24.214	50.53	34.505	53.78	30.842	52.17	37.807	10.23
17.7	24.513	49.49	34.955	55.19	31.134	50.97	38.121	11.65
27.7	24.800	48.87	35.388	56.87	31.414	50.07	38.420	13.04
Sept. 6.7	25.067	48.68	35.794	58.77	31.675	49.53	38.703	14.37
16.6	25.311	48.93	36.170	60.87	31.916	49.33	38.963	15.61
26.6	25.527	49.60	36.509	63.10	32.130	49.49	39.199	16.73
Oct. 6.6	25.714	50.66	36.808	65.43	32.318	49.97	39.408	17.72
16.6	25.868	52.05	37.064	67.82	32.476	50.76	39.589	18.58
26.5	25.988	53.73	37.274	70.22	32.605	51.79	39.740	19.29
Nov. 5.5	26.076	55.60	37.435	72.59	32.704	53.04	39.860	19.87
15.5	26.129	57.61	37.544	74.87	32.771	54.42	39.950	20.31
25.4	26.147	59.65	37.600	77.01	32.807	55.89	40.006	20.63
Dec. 5.4	26.132	61.66	37.601	78.97	32.812	57.37	40.030	20.82
15.4	26.085	63.56	37.547	80.69	32.785	58.81	40.018	20.90
25.4	26.006	65.26	37.439	82.11	32.728	60.17	39.972	20.86
35.3	25.898	66.75	37.282	83.18	32.642	61.38	39.896	20.70
Mean Place	21.773	73.77	30.287	55.17	28.190	71.26	34.587	1.67
Sec δ , Tan δ	1.074	-0.391	1.640	+1.300	1.013	-0.162	1.071	+0.384
$D\mu a$, $D\omega a$	+0.05	+0.02	+0.08	-0.06	+0.06	+0.01	+0.07	-0.02
$D\psi\delta$, $D\omega\delta$	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

APPARENT PLACES OF STARS, 1919.

341

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Eridani. Mag. 3.4		47 H. Cephei. Mag. 5.7		α Ceti. Mag. 2.8		γ^3 Eridani. Mag. 4.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 55	° ' -40 37	h m 2 55	° ' +79 5	h m 2 58	° ' + 3 46	h m 2 58	° ' -23 56
	s	"	s	"	s	"	s	"
Jan. 0.3	13.174	52.75	22.95	80.18	4.450	23.92	50.929	33.88
10.3	12.994 ¹⁸⁰	54.31 ¹⁵⁶	22.18 ⁷⁷	81.97 ¹⁷⁹	4.362 ⁸⁸	23.13 ⁷⁰	50.807 ¹²²	35.31 ¹⁴³
20.3	12.786 ²⁰⁸	55.43 ¹¹²	21.27 ⁹¹	83.22 ¹²⁵	4.248 ¹¹⁴	22.41 ⁷²	50.661 ¹⁴⁶	36.41 ¹¹⁰
30.3	12.560 ²³⁶	56.07 ⁶⁴	20.28 ⁹⁹	83.88 ⁶⁶	4.115 ¹³³	21.76 ⁶⁵	50.494 ¹⁶⁷	37.17 ⁷⁶
Feb. 9.2	12.322 ²⁶⁸	56.23 ¹⁶	19.24 ¹⁰⁴	83.92 ⁴	3.968 ¹⁴⁷	21.19 ⁵⁷	50.315 ¹⁷⁹	37.56 ³⁹
19.2	12.082 ²⁴⁰	55.90 ³⁸	18.20 ¹⁰⁴	83.37 ⁵⁵	3.813 ¹⁵⁵	20.73 ⁴⁶	50.131 ¹⁸⁴	37.60 ⁴
Mar. 1.2	11.847 ²³⁵	55.10 ⁸⁰	17.20 ¹⁰⁰	82.24 ¹¹³	3.659 ¹⁵⁴	20.39 ³⁴	49.949 ¹⁸²	37.25 ³⁵
11.2	11.628 ²¹⁹	53.84 ¹²⁶	16.29 ⁹¹	80.58 ¹⁰⁶	3.517 ¹⁴²	20.19 ²⁰	49.780 ¹⁶⁹	36.54 ⁷¹
21.1	11.434 ¹⁹⁴	52.17 ¹⁶⁷	15.52 ⁷⁷	78.46 ²¹²	3.394 ¹²³	20.13 ⁶	49.630 ¹⁵⁰	35.48 ¹⁰⁶
31.1	11.274 ¹⁶⁰	50.12 ²⁰⁵	14.90 ⁶²	75.98 ²⁴⁸	3.299 ⁹⁵	20.24 ¹¹	49.509 ¹²¹	34.12 ¹³⁶
Apr. 10.1	11.156 ¹¹⁸	47.74 ²³⁸	14.48 ⁴²	73.24 ²⁷⁴	3.239 ⁶⁰	20.55 ³¹	49.424 ⁸⁵	32.43 ¹⁶⁹
20.0	11.066 ⁷⁰	45.06 ²⁰⁸	14.26 ²²	70.34 ²⁹⁰	3.219 ²⁰	21.05 ⁸⁰	49.380 ⁴⁴	30.47 ¹⁹⁶
30.0	11.068 ¹⁸	42.16 ²⁰⁰	14.26 ⁰	67.40 ²⁹⁴	3.244 ²⁵	21.77 ⁷²	49.382 ²	28.28 ²¹⁹
May 10.0	11.105 ³⁷	39.09 ³⁰⁷	14.48 ²²	64.52 ²⁸⁸	3.314 ⁷⁰	22.68 ⁹¹	49.431 ⁴⁹	25.88 ²⁴⁰
20.0	11.197 ²²	35.92 ³¹⁷	14.91 ⁴³	61.80 ²⁷²	3.429 ¹¹⁵	23.80 ¹¹²	49.528 ⁹⁷	23.34 ²⁵⁴
29.9	11.342 ¹⁴⁵	32.72 ³²⁰	15.56 ⁶⁵	59.33 ²⁴⁷	3.587 ¹⁵⁸	25.09 ¹²⁹	49.671 ¹⁴³	20.72 ²⁶²
June 8.9	11.537 ¹⁹⁵	29.57 ³¹⁵	16.37 ⁸¹	57.18 ²¹⁵	3.786 ¹⁹⁹	26.53 ¹⁴⁴	49.856 ¹⁸⁵	18.06 ²⁶⁶
18.9	11.777 ²⁴⁰	26.56 ³⁰¹	17.34 ⁹⁷	55.41 ¹⁷⁷	4.017 ²³¹	28.09 ¹⁵⁶	50.079 ²²³	15.44 ²⁶²
28.9	12.055 ²⁷⁸	23.74 ²⁸²	18.45 ¹¹¹	54.08 ¹³³	4.277 ²⁶⁰	29.74 ¹⁶⁵	50.335 ²⁵⁶	12.92 ²⁵²
July 8.8	12.365 ³¹⁰	21.21 ²⁵⁸	19.65 ¹²⁰	53.20 ⁸⁸	4.556 ²⁷⁹	31.42 ¹⁶⁸	50.614 ²⁷⁹	10.57 ²³⁵
18.8	12.696 ³³¹	19.03 ²¹⁸	20.92 ¹²⁷	52.82 ³⁸	4.850 ²⁹⁴	33.07 ¹⁶⁵	50.912 ²⁹⁸	8.47 ²¹⁰
28.8	13.041 ³⁴⁵	17.27 ¹⁷⁶	22.24 ¹³²	52.92 ¹⁰	5.151 ³⁰¹	34.66 ¹⁵⁹	51.220 ³⁰⁶	6.65 ¹⁸²
Aug. 7.7	13.392 ³⁵¹	15.97 ¹³⁰	23.57 ¹³³	53.50 ⁵⁸	5.451 ³⁰⁰	36.15 ¹⁴⁹	51.529 ³⁰⁹	5.20 ¹⁴⁵
17.7	13.739 ³⁴⁷	15.19 ⁷⁸	24.88 ¹³¹	54.55 ¹⁰⁵	5.745 ²⁹⁴	37.47 ¹³²	51.833 ³⁰⁴	4.16 ¹⁰⁴
27.7	14.073 ³³⁴	14.94 ²⁵	26.16 ¹²⁸	56.05 ¹⁵⁰	6.028 ²⁸³	38.60 ¹¹³	52.127 ²⁹⁴	3.54 ⁶²
Sept. 6.7	14.386 ³¹³	15.25 ³¹	27.38 ¹²²	57.95 ¹⁹⁰	6.292 ²⁶⁴	39.50 ⁹⁰	52.403 ²⁷⁶	3.38 ¹⁶
16.6	14.673 ²⁸⁷	16.10 ⁸⁵	28.51 ¹¹³	60.24 ²²⁹	6.537 ²⁴⁵	40.15 ⁶⁵	52.656 ²⁵³	3.68 ³⁰
26.6	14.926 ²⁵³	17.45 ¹³⁵	29.52 ¹⁰¹	62.86 ²⁶²	6.758 ²²¹	40.55 ⁴⁰	52.884 ²²⁸	4.42 ⁷⁴
Oct. 6.6	15.142 ²¹⁶	19.27 ¹⁸²	30.42 ⁹⁰	65.74 ²⁸⁸	6.954 ¹⁹⁶	40.69 ¹⁴	53.081 ¹⁹⁷	5.57 ¹¹⁵
16.6	15.318 ¹⁷⁶	21.48 ²²¹	31.18 ⁷⁶	68.86 ³¹²	7.122 ¹⁶⁸	40.61 ⁸	53.246 ¹⁶⁵	7.08 ¹⁵¹
26.5	15.451 ¹³³	24.00 ²⁵²	31.78 ⁶⁰	72.12 ³²⁶	7.263 ¹⁴¹	40.29 ³²	53.378 ¹³²	8.88 ¹⁸⁰
Nov. 5.5	15.538 ⁸⁷	26.71 ²⁷¹	32.21 ⁴³	75.48 ³³⁶	7.374 ¹¹¹	39.81 ⁴⁸	53.476 ⁹⁸	10.90 ²⁰²
15.5	15.679 ⁴¹	29.53 ²⁸²	32.46 ²⁵	78.84 ³³⁶	7.455 ⁸¹	39.18 ⁶³	53.538 ⁶²	13.07 ²¹⁷
25.4	15.576 ³	32.35 ²⁸²	32.51 ⁵	82.12 ³²⁸	7.506 ⁵¹	38.43 ⁷⁵	53.564 ²⁶	15.27 ²²⁰
Dec. 5.4	15.531 ⁴⁵	35.06 ²⁷¹	32.37 ¹⁴	85.23 ³¹¹	7.525 ¹⁹	37.63 ⁸⁰	53.556 ⁸	17.44 ²¹⁷
15.4	15.442 ⁸⁹	37.55 ²⁴⁹	32.02 ³⁵	88.10 ²⁶⁷	7.513 ¹²	36.79 ⁸⁴	53.514 ⁴²	19.49 ²⁰⁵
25.4	15.314 ¹²⁸	39.74 ²¹⁹	31.51 ⁵¹	90.62 ²⁵²	7.470 ⁴³	35.95 ⁸⁴	53.438 ⁷⁶	21.35 ¹⁸⁶
35.3	15.151 ¹⁶⁸	41.57 ¹⁸³	30.82 ⁶⁹	92.71 ²⁰⁹	7.396 ⁷⁴	35.13 ⁸²	53.332 ¹⁰⁶	22.96 ¹⁶¹
Mean Place	11.518	43.35	15.335	61.49	2.590	21.74	49.235	28.34
Sec δ , Tan δ	1.318	-0.858	5.290	+5.195	1.002	+0.066	1.094	-0.444
$D\psi_a$, $D_{\omega a}$	+0.05	+0.04	+0.16	-0.25	+0.06	0.00	+0.05	+0.82
$D\psi_\delta$, $D_{\omega\delta}$	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Persei. Mag. 3.1		ρ Persei. Var. 3.4-4.2		μ Horologii. Mag. 5.2		θ Hydri. Mag. 5.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 2 58 s	° ' +53 11 "	h m 2 59 s	° ' +38 31 "	h m 3 1 s	° ' -60 2 "	h m 3 1 s	° ' -72 12 "
Jan. 0.3	58.194	40.06	61.226	49.66	43.83	77.39	66.74	81.26
10.3	58.017 ¹⁷⁷	41.02 ⁹⁶	61.109 ¹¹⁷	50.08 ⁴²	43.48 ³⁵	79.02 ¹⁶³	66.12 ⁶²	82.76 ¹⁵⁰
20.3	57.796 ²²¹	41.59 ⁵⁷	60.958 ¹⁵¹	50.22 ¹⁴	43.10 ³⁸	80.11 ¹⁰⁹	65.42 ⁷⁰	83.68 ⁹²
30.3	57.541 ²⁵⁵	41.73 ¹⁴	60.780 ¹⁷⁸	50.07 ¹⁵	42.70 ⁴⁰	80.63 ⁵²	64.70 ⁷²	84.02 ³⁴
Feb. 9.2	57.264 ²⁷⁷	41.44 ²⁹	60.583 ¹⁹⁷	49.65 ⁴²	42.29 ⁴¹	80.56 ⁷	63.97 ⁷³	83.75 ²⁷
19.2	56.979 ²⁸⁵	40.74 ⁷⁰	60.379 ²⁰⁴	48.93 ⁷²	41.87 ⁴²	79.93 ⁶³	63.24 ⁷³	82.91 ⁸⁴
Mar. 1.2	56.701 ²⁷⁸	39.65 ¹⁰⁹	60.177 ²⁰²	47.98 ⁹⁶	41.48 ³⁹	78.76 ¹¹⁷	62.53 ⁷¹	81.51 ¹⁴⁰
11.2	56.446 ²⁵⁵	38.22 ¹⁴³	59.990 ¹⁸⁷	46.82 ¹¹⁶	41.10 ³⁸	77.09 ¹⁶⁷	61.88 ⁶⁵	79.61 ¹⁹⁰
21.1	56.228 ²¹⁸	36.51 ¹⁷¹	59.831 ¹⁵⁹	45.51 ¹³¹	40.76 ³⁴	74.96 ²¹³	61.29 ⁵⁹	77.27 ²³⁴
31.1	56.059 ¹⁶⁹	34.61 ¹⁹⁰	59.709 ¹²²	44.10 ¹⁴¹	40.47 ²⁹	72.42 ²⁵⁴	60.77 ⁵²	74.52 ²⁷⁵
Apr. 10.1	55.951 ³⁹	32.58 ²⁰⁷	59.633 ²⁴	42.67 ¹⁴⁰	40.23 ¹⁶	69.53 ³¹⁷	60.34 ³²	71.45 ³³²
20.0	55.912 ³³	30.51 ²⁰³	59.609 ³³	41.27 ¹³⁰	40.07 ¹⁰	66.36 ³³⁷	60.02 ²⁰	68.13 ³⁵¹
30.0	55.945 ¹⁰⁸	28.48 ¹⁹⁰	59.642 ⁹³	39.97 ¹¹³	39.97 ¹	62.99 ³⁵³	59.82 ⁸	64.62 ³⁶¹
May 10.0	56.053 ¹⁸¹	26.58 ¹⁶⁹	59.735 ¹⁴⁹	38.84 ⁹⁴	39.96 ⁶	59.46 ³⁵⁶	59.74 ³	61.01 ³⁶³
20.0	56.234 ²⁴⁸	24.89 ¹⁴⁵	59.884 ²⁰²	37.90 ⁶⁸	40.02 ¹⁵	55.90 ³⁵³	59.77 ¹⁷	57.38 ³⁵⁶
29.9	56.482 ³⁰⁹	23.44 ¹¹³	60.086 ²⁵¹	37.22 ⁴²	40.17 ²²	52.37 ³⁴³	59.94 ²⁸	53.82 ³⁴²
June 8.9	56.791 ³⁶²	22.31 ⁸¹	60.337 ²⁹²	36.80 ¹²	40.39 ²⁸	48.94 ³²⁴	60.22 ³⁹	50.40 ³¹⁹
18.9	57.153 ⁴⁰⁴	21.50 ⁴⁵	60.629 ³²⁶	36.68 ¹⁷	40.67 ³⁴	45.70 ²⁹⁴	60.61 ⁴⁸	47.21 ²⁸⁷
28.9	57.557 ⁴³⁹	21.05 ⁷	60.955 ³⁵²	36.85 ⁴⁴	41.01 ⁴⁰	42.76 ²⁵⁹	61.09 ⁵⁷	44.34 ²⁴⁸
July 8.8	57.996 ⁴⁵⁸	20.98 ²⁹	61.307 ³⁶⁷	37.29 ⁷²	41.41 ⁴³	40.17 ²¹⁵	61.66 ⁶⁵	41.86 ²⁰²
18.8	58.454 ⁴⁷⁰	21.27 ⁶⁵	61.674 ³⁷⁵	38.01 ⁹⁶	41.84 ⁴⁷	38.02 ¹⁶⁷	62.31 ⁶⁹	39.84 ¹⁵⁰
28.8	58.924 ⁴⁷⁰	21.92 ⁹⁷	62.049 ³⁷⁶	38.97 ¹¹⁸	42.31 ⁴⁸	36.35 ¹¹⁰	63.00 ⁷³	38.34 ⁹²
Aug. 7.7	59.394 ⁴⁶³	22.89 ¹²⁸	62.425 ³⁶⁸	40.15 ¹³⁵	42.79 ⁴⁸	35.25 ⁵²	63.73 ⁷³	37.42 ³³
17.7	59.857 ⁴⁴⁶	24.17 ¹⁵⁶	62.793 ³⁵³	41.50 ¹⁴⁹	43.27 ⁴⁶	34.73 ⁹	64.46 ⁷²	37.09 ²⁹
27.7	60.303 ⁴²²	25.73 ¹⁷⁸	63.146 ³³⁵	42.99 ¹⁶²	43.73 ⁴⁵	34.82 ⁶⁹	65.18 ⁶⁹	37.38 ⁹²
Sept. 6.7	60.725 ³⁹³	27.51 ¹⁹⁹	63.481 ³¹⁰	44.61 ¹⁶⁸	44.18 ⁴¹	35.51 ¹²⁸	65.87 ⁶²	38.30 ¹⁵⁰
16.6	61.118 ³⁵⁷	29.50 ²¹⁶	63.791 ²⁸⁴	46.29 ¹⁷¹	44.59 ³⁶	36.79 ¹⁸⁵	66.49 ⁵⁵	39.80 ²⁰⁴
26.6	61.475 ³¹⁸	31.66 ²²⁶	64.075 ²⁵³	48.00 ¹⁷³	44.95 ³⁰	38.64 ²³⁴	67.04 ⁴⁶	41.84 ²⁵³
Oct. 6.6	61.793 ²⁷⁷	33.92 ²³⁵	64.328 ²²⁰	49.73 ¹⁷¹	45.25 ²⁴	40.98 ²⁷⁴	67.50 ³⁴	44.37 ²⁹¹
16.6	62.070 ²³⁰	36.27 ²³⁷	64.548 ¹⁸⁷	51.44 ¹⁶⁵	45.49 ¹⁷	43.72 ³⁰⁴	67.84 ²³	47.28 ³¹⁹
26.5	62.300 ¹⁸¹	38.64 ²³⁶	64.735 ¹⁴⁹	53.09 ¹⁵⁰	45.66 ⁸	46.76 ³²⁴	68.07 ⁹	50.47 ³³⁵
Nov. 5.5	62.481 ¹²⁸	41.00 ²³¹	64.884 ¹¹⁰	54.68 ¹⁵⁰	45.74 ²	50.00 ³³⁰	68.16 ⁴	53.82 ³³⁹
15.5	62.609 ⁷⁴	43.31 ²¹⁷	64.994 ⁷¹	56.18 ¹³⁷	45.76 ⁵	53.30 ³²⁵	68.12 ¹⁶	57.21 ³³¹
25.4	62.683 ¹⁷	45.48 ²⁰²	65.065 ²⁸	57.55 ¹²¹	45.71 ¹³	56.55 ³⁰⁷	67.96 ²⁸	60.52 ³⁰⁸
Dec. 5.4	62.700 ⁴¹	47.50 ¹⁸⁰	65.093 ¹⁴	58.76 ¹⁰⁴	45.58 ²⁰	59.62 ²⁸⁰	67.68 ³⁹	63.60 ²⁷⁶
15.4	62.659 ⁹⁸	49.30 ¹⁵¹	65.079 ⁵⁷	59.80 ⁸²	45.38 ²⁶	62.42 ²⁴¹	67.29 ⁵¹	66.36 ²³⁵
25.4	62.561 ¹⁵¹	50.81 ¹¹⁸	65.022 ⁹⁶	60.62 ⁵⁸	45.12 ³²	64.83 ¹⁹⁵	66.78 ⁵⁸	68.71 ¹⁸⁵
35.3	62.410	51.99	64.926	61.20	44.80	66.78	66.20	70.56
Mean Place	55.196	25.22	58.790	38.07	41.993	64.84	64.529	67.57
Sec δ , Tan δ	1.669	+1.336	1.278	+0.796	2.003	-1.736	3.274	-3.118
$D\phi a, D_{\omega a}$	+0.09	-0.06	+0.08	-0.04	+0.03	+0.08	0.00	+0.15
$D\phi \delta, D_{\omega \delta}$	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

APPARENT PLACES OF STARS, 1919.

343

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Persei. (Algol.) Var. 2.1-3.2		δ Arietis. Mag. 4.5		12 Eridani. Mag. 4.0		48 H. Cephei. Mag. 5.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 3 2	° ' " +40 38	h m 3 6	° ' " +19 25	h m 3 8	° ' " -29 17	h m 3 9	° ' " +77 26
	s	"	s	"	s	"	s	"
Jan. 0.4	56.031	52.30	61.730	22.91	39.479	87.83	66.48	37.75
10.3	55.911 ¹²⁰	52.82 ⁵²	61.645 ⁸⁵	22.65 ²⁶	39.349 ¹³⁰	89.39 ¹⁵⁶	65.87 ⁶¹	39.64 ¹⁸⁹
20.3	55.754 ¹⁶⁷	53.05 ²³	61.530 ¹¹⁵	22.30 ³⁵	39.191 ¹⁵⁸	90.59 ¹²⁰	65.13 ⁷⁴	41.00 ¹³⁶
30.3	55.569 ¹⁸⁵	52.98 ⁷	61.393 ¹³⁷	21.86 ⁴⁴	39.013 ¹⁷⁸	91.41 ⁸²	64.30 ⁸³	41.81 ⁸¹
Feb. 9.2	55.364 ²⁰⁵	52.59 ³⁹	61.238 ¹⁵⁵	21.33 ⁵³	38.819 ¹⁹⁴	91.81 ⁴⁰	63.42 ⁸⁸	42.04 ²³
	214	69	165	59	201	0	90	38
19.2	55.150	51.90	61.073	20.74	38.618	91.81	62.52	41.66
Mar. 1.2	54.940 ²¹⁰	50.96 ⁹⁴	60.909 ¹⁶⁴	20.11 ⁶³	38.419 ¹⁹⁹	91.39 ⁴²	61.64 ⁸⁸	40.70 ⁹⁶
11.2	54.744 ¹⁹⁶	49.77 ¹¹⁹	60.755 ¹⁵⁴	19.45 ⁶⁶	38.230 ¹⁸⁹	90.57 ⁸²	60.83 ⁸¹	39.21 ¹⁴⁹
21.1	54.576 ¹⁶⁸	48.42 ¹³⁵	60.621 ¹³⁴	18.81 ⁶⁴	38.063 ¹⁶⁷	89.37 ¹²⁰	60.11 ⁷²	37.25 ¹⁹⁶
31.1	54.446 ¹³⁰	46.95 ¹⁴⁷	60.517 ¹⁰⁴	18.22 ⁵⁹	37.923 ¹⁴⁰	87.81 ¹⁵⁶	59.54 ⁵⁷	34.92 ²³³
	82	152	67	51	103	187	42	263
Apr. 10.1	54.364	45.43	60.450	17.71	37.820	85.94	59.12	32.29
20.1	54.335 ²⁹	43.94 ¹⁴⁹	60.426 ²⁴	17.33 ²⁸	37.758 ⁶²	83.76 ²¹⁸	58.88 ²⁴	29.48 ²⁶¹
30.0	54.364 ²⁹	42.53 ¹⁴¹	60.448 ²²	17.12 ²¹	37.744 ¹⁴	81.35 ²⁴¹	58.83 ⁵	26.60 ²⁸⁸
May 10.0	54.455 ⁹¹	41.28 ¹²⁵	60.520 ⁷²	17.08 ⁴	37.778 ³⁴	78.72 ²⁶³	58.97 ¹⁴	23.74 ²⁸⁶
20.0	54.603 ¹⁴⁸	40.22 ¹⁰⁶	60.639 ¹¹⁹	17.25 ¹⁷	37.862 ⁸⁴	75.96 ²⁷⁶	59.30 ³³	21.01 ²⁷³
	203	80	165	37	132	285	51	251
29.9	54.806	39.42	60.804	17.62	37.994	73.11	59.81	18.50
June 8.9	55.060 ²⁵⁴	38.87 ⁵⁵	61.012 ²⁰⁸	18.21 ⁵⁹	38.171 ¹⁷⁷	70.25 ²⁸⁶	60.48 ⁶⁷	16.28 ²²²
18.9	55.357 ²⁹⁷	38.63 ²⁴	61.255 ²⁴³	19.00 ⁷⁹	38.390 ²¹⁹	67.43 ²⁸²	61.30 ⁸²	14.40 ¹⁸⁸
28.9	55.689 ³³²	38.67 ⁴	61.528 ²⁷³	19.95 ⁹⁵	38.643 ²⁵³	64.75 ²⁶⁸	62.24 ⁹⁴	12.94 ¹⁴⁶
July 8.8	56.048 ³⁵⁹	39.02 ³⁵	61.823 ²⁹⁵	21.07 ¹¹²	38.922 ²⁷⁹	62.27 ²⁴⁸	63.27 ¹⁰³	11.92 ¹⁰²
	375	63	312	123	301	222	111	55
18.8	56.423 ³⁸⁵	39.65 ⁸⁹	62.135 ³¹⁸	22.30 ¹³⁰	39.223 ³¹³	60.05 ¹⁸⁹	64.38 ¹¹⁵	11.37 ⁹
28.8	56.808 ³⁸⁵	40.54 ¹¹²	62.453 ³¹⁹	23.60 ¹³⁴	39.536 ³¹⁹	58.16 ¹⁴⁹	65.53 ¹¹⁷	11.28 ³⁹
Aug. 7.8	57.193 ³⁷⁸	41.66 ¹³¹	62.772 ³¹³	24.94 ¹³⁴	39.855 ³¹⁵	56.67 ¹⁰⁵	66.70 ¹¹⁷	11.67 ⁸⁵
17.7	57.571 ³⁶⁵	42.97 ¹⁴⁸	63.085 ³⁰²	26.28 ¹³⁰	40.170 ³⁰⁶	55.62 ⁵⁷	67.87 ¹¹⁴	12.52 ¹²⁰
27.7	57.936 ³⁴⁴	44.45 ¹⁶²	63.387 ²⁸⁶	27.58 ¹²³	40.476 ²⁹⁰	55.05 ⁸	69.01 ¹¹⁰	13.81 ¹⁷¹
Sept. 6.7	58.280	46.07	63.673	28.81	40.766	54.97	70.11	15.52
16.6	58.602 ³²²	47.77 ¹⁷⁰	63.939 ²⁶⁶	29.92 ¹¹¹	41.034 ²⁶⁸	55.37 ⁴⁰	71.14 ¹⁰³	17.60 ²⁰⁸
26.6	58.895 ²⁹³	49.53 ¹⁷⁶	64.183 ²⁴⁴	30.92 ¹⁰⁰	41.276 ²⁴²	56.26 ⁸⁹	72.09 ⁹⁵	20.01 ²⁴¹
Oct. 6.6	59.158 ²⁶³	51.32 ¹⁷⁹	64.400 ²¹⁷	31.79 ⁸⁷	41.488 ²¹²	57.58 ¹³²	72.94 ⁸⁵	22.73 ²⁷²
16.6	59.388 ²³⁰	53.11 ¹⁷⁹	64.592 ¹⁹²	32.50 ⁷¹	41.667 ¹⁷⁹	59.30 ¹⁷²	73.66 ⁷²	25.67 ²⁹⁴
	194	176	162	58	145	203	60	313
26.5	59.582	54.87	64.754	33.08	41.812	61.33	74.26	28.80
Nov. 5.5	59.739 ¹⁵⁷	56.57 ¹⁷⁰	64.888 ¹³⁴	33.52 ⁴⁴	41.919 ¹⁰⁷	63.58 ²²⁵	74.72 ⁴⁶	32.04 ³²⁴
15.5	59.855 ¹¹⁶	58.18 ¹⁶¹	64.989 ¹⁰¹	33.84 ³²	41.988 ⁶⁹	65.99 ²⁴¹	75.00 ²⁸	35.31 ³²⁷
25.5	59.930 ⁷⁵	59.67 ¹⁴⁹	65.058 ⁶⁹	34.03 ¹⁹	42.019 ³¹	68.44 ²⁴⁵	75.13 ¹³	38.54 ³²³
Dec. 5.4	59.961 ³¹	61.02 ¹³⁵	65.093 ³⁵	34.13 ¹⁰	42.013 ⁶	70.85 ²⁴¹	75.08 ⁵	41.62 ³⁰⁸
	13	115	2	1	43	227	21	288
15.4	59.948	62.17	65.095	34.12	41.970	73.12	74.87	44.50
25.4	59.891 ⁸⁷	63.11 ⁹⁴	65.060 ³⁵	34.01 ¹¹	41.890 ⁸⁰	75.17 ²⁰⁵	74.49 ³⁸	47.07 ²⁵⁷
35.3	59.790 ¹⁰¹	63.79 ⁶⁸	64.992 ⁶⁸	33.80 ²¹	41.776 ¹¹⁴	76.94 ¹⁷⁷	73.96 ⁵³	49.23 ²¹⁶
Mean Place	53.513	40.41	59.641	16.67	37.749	80.91	59.384	20.41
Sec δ , Tan δ	1.318	+0.859	1.060	+0.353	1.147	-0.561	4.599	+4.489
$D\alpha$, $D_{\alpha\alpha}$	+0.08	-0.04	+0.07	-0.02	+0.05	+0.03	+0.15	-0.20
$D\delta$, $D_{\delta\delta}$	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Arietis. Mag. 5.0		38 G. Horologii. Mag. 5.7		ζ Eridani. Mag. 4.9		τ Arietis. Mag. 5.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 3 10	° ' " +20 44	h m 3 10	° ' " -57 36	h m 3 11	° ' " - 9 6	h m 3 16	° ' " +20 51
	s	"	s	"	s	"	s	"
Jan. 0.4	16.643	48.59	31.688	100.71	55.678	73.03	35.006	27.29
10.3	16.559	48.37	31.387	102.46	55.588	74.20	34.926	27.09
20.3	16.445	48.07	31.048	103.68	55.472	75.19	34.815	26.81
30.3	16.307	47.66	30.683	104.35	55.331	75.99	34.678	26.43
Feb. 9.2	16.150	47.16	30.301	104.45	55.176	76.54	34.522	25.96
19.2	15.983	46.58	29.915	103.98	55.012	76.87	34.354	25.40
Mar. 1.2	15.817	45.93	29.537	102.98	54.847	76.94	34.185	24.78
11.2	15.660	45.26	29.180	101.46	54.692	76.77	34.026	24.12
21.1	15.523	44.58	28.857	99.49	54.553	76.34	33.885	23.46
31.1	15.415	43.93	28.577	97.09	54.441	75.66	33.772	22.83
Apr. 10.1	15.344	43.36	28.351	94.33	54.361	74.72	33.695	22.27
20.1	15.316	42.91	28.187	91.27	54.321	73.54	33.661	21.81
30.0	15.335	42.62	28.092	87.99	54.324	72.14	33.674	21.50
May 10.0	15.403	42.49	28.069	84.56	54.371	70.53	33.736	21.36
20.0	15.520	42.56	28.121	81.02	54.466	68.73	33.847	21.41
29.9	15.683	42.85	28.245	77.51	54.603	66.80	34.005	21.67
June 8.9	15.889	43.34	28.441	74.08	54.781	64.75	34.203	22.12
18.9	16.132	44.04	28.701	70.81	54.994	62.66	34.446	22.79
28.9	16.405	44.92	29.020	67.81	55.239	60.56	34.712	23.63
July 8.8	16.700	45.96	29.388	65.15	55.506	58.53	35.005	24.62
18.8	17.013	47.13	29.795	62.90	55.790	56.62	35.316	25.75
28.8	17.333	48.38	30.229	61.12	56.085	54.87	35.635	26.97
Aug. 7.8	17.654	49.69	30.680	59.88	56.383	53.37	35.956	28.23
17.7	17.970	51.01	31.134	59.22	56.675	52.12	36.273	29.51
27.7	18.274	52.30	31.578	59.17	56.958	51.21	36.579	30.76
Sept. 6.7	18.564	53.53	32.003	59.72	57.228	50.63	36.872	31.95
16.6	18.834	54.66	32.394	60.88	57.479	50.40	37.146	33.06
26.6	19.081	55.68	32.743	62.59	57.708	50.55	37.397	34.06
Oct. 6.6	19.303	56.59	33.042	64.80	57.910	51.02	37.625	34.94
16.6	19.500	57.37	33.281	67.45	58.086	51.80	37.826	35.68
26.5	19.666	57.99	33.457	70.42	58.233	52.86	38.000	36.30
Nov. 5.5	19.803	58.50	33.564	73.61	58.351	54.11	38.144	36.80
15.5	19.908	58.89	33.604	76.89	58.437	55.54	38.257	37.18
25.5	19.981	59.15	33.573	80.15	58.492	57.04	38.336	37.44
Dec. 5.4	20.019	59.32	33.474	83.26	58.514	58.58	38.382	37.61
15.4	20.023	59.38	33.312	86.12	58.503	60.09	38.392	37.67
25.4	19.991	59.34	33.091	88.62	58.461	61.50	38.365	37.64
35.3	19.925	59.20	32.818	90.68	58.387	62.80	38.303	37.52
Mean Place	14.519	42.16	29.823	88.59	53.853	71.18	32.848	21.16
Sec δ, Tan δ	1.069	+0.379	1.867	-1.577	1.013	-0.161	1.070	+0.351
Dψa, Dωa	+0.07	-0.02	+0.03	+0.07	+0.06	+0.01	+0.07	-0.02
Dψδ, Dωδ	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.8

APPARENT PLACES OF STARS, 1919.

345

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Eridani. Mag. 4.3		ι Hydri. Mag. 5.5		α Persci. Mag. 1.9		ο Tauri. Mag. 3.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 3 16	° ' -43 22	h m 3 17	° ' -77 40	h m 3 18	° ' +49 34	h m 3 20	° ' + 8 44
	s	"	s	"	s	"	s	"
Jan. 0.4	43.338	53.70	59.91	79.15	34.850	39.05	29.131	43.63
10.3	43.163 ¹⁷⁵	55.48 ¹⁷⁸	58.98 ⁹³	80.79 ¹⁶⁴	34.712 ¹³⁸	40.02 ⁹⁷	29.055 ⁷⁶	42.99 ⁶⁴
20.3	42.956 ²⁰⁷	56.82 ¹³⁴	57.97 ¹⁰¹	81.89 ¹¹⁰	34.527 ¹⁸⁵	40.65 ⁶³	28.951 ¹⁰⁴	42.37 ⁶²
30.3	42.725 ²³¹	57.67 ⁸⁵	56.90 ¹⁰⁷	82.36 ⁴⁷	34.305 ²²²	40.90 ²⁵	28.821 ¹³⁰	41.78 ⁵⁹
Feb. 9.3	42.477 ²⁴⁸	58.02 ³⁵	55.80 ¹¹⁰	82.26 ¹⁰	34.058 ²⁴⁷	40.77 ¹³	28.672 ¹⁴⁹	41.23 ⁵⁵
19.2	42.221 ²⁵⁶	57.86 ¹⁶	54.70 ¹¹⁰	81.58 ⁶⁸	33.795 ²⁶³	40.27 ⁵⁰	28.514 ¹⁵⁸	40.73 ⁵⁰
Mar. 1.2	41.968 ²⁵³	57.19 ⁶⁷	53.63 ¹⁰⁷	80.32 ¹²⁶	33.535 ²⁶⁰	39.39 ⁸⁸	28.353 ¹⁶¹	40.30 ⁴³
11.2	41.728 ²⁴⁰	56.06 ¹¹³	52.62 ¹⁰¹	78.58 ¹⁷⁴	33.289 ²⁴⁶	38.19 ¹²⁰	28.199 ¹⁵⁴	39.95 ³⁵
21.1	41.510 ²¹⁸	54.49 ¹⁸⁷	51.69 ⁹⁸	76.38 ²²⁰	33.072 ²¹⁷	36.73 ¹⁴⁶	28.061 ¹³⁸	39.72 ²³
31.1	41.323 ¹⁸⁷	52.50 ¹⁹⁹	50.86 ⁸⁸	73.75 ²⁶³	32.898 ¹⁷⁴	35.05 ¹⁶⁶	27.950 ¹¹¹	39.60 ¹²
Apr. 10.1	41.178 ¹⁴⁵	50.17 ²³³	50.17 ⁶⁹	70.80 ²⁶⁵	32.776 ¹²²	33.24 ¹⁸¹	27.872 ⁷⁸	39.63 ³
20.1	41.080 ⁹⁸	47.51 ²⁶⁶	49.61 ⁵⁶	67.58 ³²²	32.716 ⁶⁰	31.38 ¹⁸⁶	27.834 ³⁸	39.84 ²¹
30.0	41.036 ⁴⁴	44.60 ²⁶¹	49.22 ³⁹	64.17 ³⁴¹	32.723 ⁷	29.54 ¹⁸⁴	27.839 ⁵	40.22 ³⁸
May 10.0	41.047 ¹¹	41.49 ³¹¹	48.98 ²⁴	60.61 ³⁵⁶	32.798 ⁷⁵	27.79 ¹⁷⁵	27.891 ⁵²	40.78 ⁵⁶
20.0	41.115 ⁶⁸	38.26 ³²³	48.92 ⁶	57.01 ³⁶⁰	32.942 ¹⁴⁴	26.21 ¹⁵⁸	27.989 ⁹⁸	41.55 ⁷⁷
30.0	41.240 ¹²⁶	34.98 ³²⁸	49.04 ¹³	53.48 ³⁵³	33.151 ²⁰⁹	24.85 ¹³⁶	28.130 ¹⁴¹	42.50 ⁹⁵
June 8.9	41.418 ¹⁷⁸	31.73 ³²⁵	49.32 ²⁸	50.06 ³⁴²	33.418 ²⁶⁷	23.75 ¹¹⁰	28.314 ¹⁸⁴	43.62 ¹¹²
18.9	41.646 ²²⁸	28.58 ³¹⁵	49.77 ⁴⁵	46.87 ³¹⁹	33.739 ³²¹	22.95 ⁸⁰	28.533 ²¹⁹	44.87 ¹²⁵
28.9	41.918 ²⁷²	25.63 ²⁶⁵	50.36 ⁵⁹	43.95 ²⁹²	34.102 ³⁶³	22.46 ¹⁵	28.784 ²⁵¹	46.23 ¹³⁶
July 8.8	42.225 ³⁰⁷	22.95 ²⁶⁸	51.09 ⁷³	41.41 ²⁵⁴	34.500 ³⁹⁸	22.31 ⁴⁹	29.057 ²⁷³	47.66 ¹⁴³
18.8	42.560 ³³⁵	20.59 ²⁸⁶	51.93 ⁸⁴	39.31 ²¹⁰	34.921 ⁴²¹	22.48 ¹⁷	29.346 ²⁸⁹	49.12 ¹⁴⁶
28.8	42.915 ³⁵⁵	18.65 ¹⁹⁴	52.85 ⁹²	37.71 ¹⁶⁰	35.356 ⁴³⁵	22.97 ⁴⁹	29.646 ³⁰⁰	50.57 ¹⁴⁵
Aug. 7.8	43.280 ³⁶⁵	17.19 ¹⁴⁶	53.84 ⁹⁹	36.70 ¹⁰¹	35.797 ⁴⁴¹	23.76 ⁷⁹	29.949 ³⁰³	51.95 ¹³⁸
17.7	43.645 ³⁶⁵	16.25 ⁹⁴	54.85 ¹⁰¹	36.27 ⁴³	36.234 ⁴³⁷	24.84 ¹⁰⁸	30.249 ³⁰⁰	53.23 ¹²⁸
27.7	44.003 ³⁵⁸	15.86 ³⁹	55.86 ¹⁰¹	36.43 ¹⁶	36.660 ⁴²⁶	26.15 ¹³¹	30.540 ²⁹¹	54.35 ¹¹²
Sept. 6.7	44.345 ³⁴²	16.04 ¹⁸	56.84 ⁹⁸	37.23 ⁸⁰	37.066 ⁴⁰⁶	27.68 ¹⁵³	30.818 ²⁷⁸	55.31 ⁹⁶
16.7	44.663 ³¹⁸	16.78 ⁷⁴	57.75 ⁹¹	38.65 ¹⁴²	37.450 ³⁸⁴	29.40 ¹⁷²	31.077 ²⁵⁹	56.06 ⁷⁵
26.6	44.951 ²⁸⁸	18.07 ¹²⁹	58.56 ⁸¹	40.58 ¹⁹³	37.805 ³⁵⁵	31.25 ¹⁸⁵	31.317 ²⁴⁰	56.60 ⁵⁴
Oct. 6.6	45.205 ²⁵⁴	19.86 ¹⁷⁹	59.24 ⁶⁸	43.03 ²⁴⁵	38.127 ³²²	33.23 ¹⁹⁸	31.533 ²¹⁶	56.92 ³²
16.6	45.416 ²¹¹	22.05 ²¹⁹	59.77 ⁵³	45.88 ²⁸⁵	38.412 ²⁸⁵	35.27 ²⁰⁴	31.725 ¹⁹²	57.03 ¹¹
26.5	45.585 ¹⁶⁹	24.61 ²⁵⁶	60.13 ³⁶	49.04 ³¹⁶	38.657 ²⁴⁵	37.36 ²⁰⁹	31.890 ¹⁶⁵	56.96 ⁷
Nov. 5.5	45.707 ¹²²	27.40 ²⁷⁹	60.30 ¹⁷	52.37 ³³³	38.858 ²⁰¹	39.46 ²¹⁰	32.028 ¹³⁸	56.71 ²⁵
15.5	45.781 ⁷⁴	30.34 ²⁹⁴	60.29 ¹	55.78 ³⁴¹	39.012 ¹⁵⁴	41.52 ²⁰⁶	32.194 ¹⁰⁶	56.32 ³⁹
25.5	45.806 ²⁵	33.31 ²⁹⁷	60.08 ²¹	59.13 ³³⁵	39.116 ¹⁰⁴	43.49 ¹⁹⁷	32.209 ⁷⁵	55.83 ⁴⁹
Dec. 5.4	45.784 ²²	36.20 ²⁸⁹	59.69 ³⁹	62.28 ³¹⁵	39.166 ⁵⁰	45.34 ¹⁸⁵	32.253 ⁴⁴	55.26 ⁵⁷
15.4	45.715 ⁶⁹	38.88 ²⁶⁸	59.13 ⁵⁶	65.15 ²⁸⁷	39.161 ⁵	47.00 ¹⁶⁶	32.262 ⁹	54.64 ⁶²
25.4	45.602 ¹¹³	41.30 ²⁴²	58.41 ⁷²	67.61 ²⁴⁶	39.102 ⁵⁹	48.45 ¹⁴⁵	32.237 ²⁵	54.00 ⁶⁴
35.4	45.448 ¹⁶⁴	43.35 ²⁰⁵	57.56 ⁸⁵	69.59 ¹⁹⁸	38.990 ¹¹³	49.61 ¹¹⁶	32.179 ⁵⁸	53.35 ⁶⁵
Mean Place	41.552	43.88	56.939	65.55	31.876	26.37	27.115	40.90
Sec δ, Tan δ	1.376	-0.945	4.688	-4.580	1.542	+1.174	1.012	+0.154
D ₁ α, D ₂ α	+0.04	+0.04	-0.03	+0.20	+0.08	-0.05	+0.06	-0.01
D ₁ δ, D ₂ δ	+0.3	+0.8	+0.3	+0.8	+0.3	+0.8	+0.3	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	2 H. Camelop. Mag. 4.4		ξ Tauri. Mag. 3.8		f Tauri. Mag. 4.3		ε Eridani. Mag. 3.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 3 22	° ' " +59 39	h m 3 22	° ' " + 9 27	h m 3 26	° ' " +12 39	h m 3 29	° ' " - 9 43
	s	"	s	"	s	"	s	"
Jan. 0.4	33.578	47.70 140	48.658	6.44 62	26.012	39.52 49	8.676	56.17 128
10.3	33.382 196	49.10 99	48.585 73	5.82 62	25.941 71	39.03 49	8.589 87	57.43 128
20.3	33.127 255	50.09 99	48.483 102	5.21 61	25.839 102	38.53 50	8.474 115	58.49 128
30.3	32.825 302	50.63 54	48.354 129	4.64 57	25.710 129	38.02 51	8.334 140	59.34 128
Feb. 9.3	32.489 336	50.70 7	48.206 148	4.09 55	25.561 149	37.50 52	8.176 158	59.94 128
	353	39	158	49	161	50	169	35
19.2	32.136	50.31 85	48.048	3.60 44	25.400	37.00 48	8.007	60.29 128
Mar. 1.2	31.785 351	49.46 85	47.886 162	3.16 44	25.236 164	36.52 48	7.835 172	60.39 128
11.2	31.454 331	48.19 127	47.731 155	2.80 36	25.077 159	36.09 43	7.671 164	60.23 128
21.1	31.160 294	46.57 162	47.592 139	2.54 26	24.935 142	35.72 37	7.521 150	59.81 128
31.1	30.921 239	44.66 191	47.479 113	2.40 14	24.819 116	35.45 27	7.396 125	59.13 128
	174	213	79	0	82	16	94	93
Apr. 10.1	30.747	42.53 224	47.400 41	2.40 17	24.737 43	35.29 1	7.302 54	58.20 118
20.1	30.652 12	40.29 227	47.359 3	2.57 33	24.694 2	35.28 14	7.248 13	57.02 141
30.0	30.640 75	38.02 222	47.362 50	2.90 53	24.696 48	35.42 34	7.235 33	55.61 169
May 10.0	30.715 160	35.80 208	47.412 96	3.43 71	24.744 95	35.76 52	7.268 79	53.99 186
20.0	30.875 243	33.72 188	47.508 140	4.14 90	24.839 140	36.28 71	7.347 123	52.19 194
30.0	31.118	31.84 160	47.648 182	5.04 106	24.979 182	36.99 87	7.470 164	50.25 202
June 8.9	31.435 317	30.24 130	47.830 220	6.10 120	25.161 220	37.86 104	7.634 202	48.22 210
18.9	31.819 384	28.94 96	48.050 250	7.30 133	25.381 250	38.90 117	7.836 232	46.12 210
28.9	32.260 441	27.98 57	48.300 273	8.63 140	25.631 275	40.07 126	8.068 259	44.03 209
July 8.8	32.745 517	27.41 20	48.573 290	10.03 143	25.906 292	41.33 133	8.327 277	42.00 191
18.8	33.262 538	27.21 18	48.863 300	11.46 145	26.198 304	42.66 134	8.604 288	40.09 173
28.8	33.800 547	27.39 55	49.163 304	12.91 135	26.502 307	44.00 131	8.892 294	38.36 156
Aug. 7.8	34.347 545	27.94 90	49.467 301	14.26 127	26.809 303	45.31 125	9.186 292	36.85 123
17.7	34.892 532	28.84 123	49.768 293	15.53 112	27.112 297	46.56 113	9.478 285	35.63 91
27.7	35.424 514	30.07 154	50.061 279	16.65 96	27.409 284	47.69 101	9.763 273	34.72 55
Sept. 6.7	35.938	31.61 179	50.340 261	17.61 76	27.693 267	48.70 84	10.036 255	34.17 19
16.7	36.422 484	33.40 204	50.601 242	18.37 57	27.960 247	49.54 67	10.291 235	33.98 15
26.6	36.872 408	35.44 222	50.843 219	18.94 35	28.207 225	50.21 48	10.526 212	34.16 51
Oct. 6.6	37.280 362	37.66 248	51.062 195	19.29 14	28.432 200	50.69 28	10.738 186	34.67 55
16.6	37.642 310	40.03 253	51.257 167	19.43 5	28.632 174	50.97 13	10.924 158	35.52 113
26.5	37.952 253	42.51 253	51.424 140	19.38 22	28.806 147	51.10 2	11.082 129	36.65 134
Nov. 5.5	38.205 189	45.04 254	51.564 109	19.16 34	28.953 116	51.08 16	11.211 98	37.99 151
15.5	38.394 125	47.58 249	51.673 79	18.82 46	29.069 84	50.92 28	11.309 66	39.50 161
25.5	38.519 52	50.07 237	51.752 46	18.36 53	29.153 53	50.64 34	11.375 32	41.11 163
Dec. 5.4	38.571 19	52.44 218	51.798 12	17.83 59	29.206 16	50.30 41	11.407 2	42.74 169
15.4	38.552 93	54.62 194	51.810 22	17.24 61	29.222 19	49.89 44	11.405 36	44.34 151
25.4	38.459 161	56.56 161	51.788 56	16.63 61	29.203 54	49.45 48	11.369 69	45.85 137
35.4	38.298	58.17	51.732	16.02 61	29.149	48.97	11.300	47.22
Mean Place	29.918	33.58	46.625	3.61	23.923	36.02	6.792	53.62
Sec δ, Tan δ	1.980	+1.709	1.014	+0.167	1.025	+0.225	1.015	-0.171
Dψα, Dωα	+0.10	-0.07	+0.06	-0.01	+0.06	-0.01	+0.06	+0.01
Dψδ, Dωδ	+0.3	+0.8	+0.3	+0.8	+0.2	+0.8	+0.2	+0.8

APPARENT PLACES OF STARS, 1919.

347

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	τ^5 Eridani. Mag. 4.3		δ Persei. Mag. 3.1		δ Eridani. Mag. 3.7		ν Persei. Mag. 3.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 3 30	° ' " -21 53	h m 3 37	° ' " +47 31	h m 3 39	° ' " -10 1	h m 3 39	° ' " +42 19
	s	"	s	"	s	"	s	"
Jan. 0.4	14.346	79.48	12.035	57.86	23.978	75.70	43.921	35.64
10.3	14.246	81.08	11.923	58.87	23.901	77.01	43.828	36.43
20.3	14.115	82.39	11.763	59.57	23.793	78.11	43.690	36.97
30.3	13.958	83.38	11.563	59.94	23.659	79.01	43.513	37.22
Feb. 9.3	13.783	84.01	11.332	59.96	23.505	79.66	43.307	37.18
19.2	13.597	84.28	11.083	59.62	23.336	80.06	43.084	36.82
Mar. 1.2	13.408	84.19	10.828	58.94	23.163	80.20	42.855	36.17
11.2	13.225	83.76	10.583	57.94	22.993	80.07	42.633	35.26
21.2	13.058	82.97	10.362	56.67	22.838	79.69	42.432	34.10
31.1	12.915	81.85	10.178	55.19	22.705	79.04	42.264	32.80
Apr. 10.1	12.805	80.43	10.040	53.54	22.602	78.14	42.139	31.38
20.1	12.734	78.70	9.961	51.83	22.536	76.98	42.066	29.90
30.0	12.706	76.72	9.944	50.11	22.512	75.59	42.050	28.44
May 10.0	12.724	74.52	9.993	48.47	22.533	73.99	42.095	27.05
20.0	12.790	72.15	10.108	46.94	22.599	72.20	42.201	25.81
30.0	12.903	69.65	10.286	45.60	22.710	70.26	42.365	24.74
June 8.9	13.059	67.09	10.525	44.49	22.862	68.22	42.585	23.89
18.9	13.256	64.52	10.815	43.64	23.054	66.10	42.853	23.29
28.9	13.486	62.02	11.151	43.08	23.279	63.99	43.162	22.96
July 8.9	13.745	59.64	11.521	42.83	23.531	61.92	43.505	22.89
18.8	14.026	57.47	11.919	42.86	23.803	59.97	43.872	23.09
28.8	14.321	55.56	12.334	43.19	24.088	58.18	44.255	23.54
Aug. 7.8	14.623	53.98	12.757	43.81	24.381	56.62	44.646	24.24
17.7	14.926	52.78	13.181	44.67	24.674	55.35	45.038	25.14
27.7	15.223	52.00	13.599	45.77	24.962	54.38	45.423	26.22
Sept. 6.7	15.508	51.66	14.001	47.07	25.240	53.78	45.797	27.47
16.7	15.776	51.77	14.386	48.54	25.503	53.54	46.151	28.84
26.6	16.022	52.34	14.745	50.16	25.748	53.67	46.485	30.31
Oct. 6.6	16.243	53.33	15.077	51.89	25.971	54.15	46.792	31.85
16.6	16.437	54.71	15.375	53.70	26.169	54.97	47.070	33.44
26.6	16.601	56.41	15.637	55.57	26.341	56.09	47.315	35.05
Nov. 5.5	16.731	58.36	15.858	57.46	26.485	57.42	47.524	36.66
15.5	16.829	60.50	16.036	59.34	26.597	58.94	47.693	38.24
25.5	16.891	62.72	16.165	61.16	26.678	60.57	47.818	39.77
Dec. 5.4	16.916	64.94	16.244	62.90	26.725	62.23	47.898	41.21
15.4	16.905	67.07	16.269	64.49	26.737	63.85	47.929	42.52
25.4	16.858	69.07	16.238	65.90	26.713	65.40	47.910	43.65
35.4	16.775	70.84	16.154	67.06	26.656	66.82	47.842	44.60
Mean Place	12.499	74.13	9.027	47.01	22.040	73.01	41.113	25.99
Sec δ , Tan δ	1.078	-0.402	1.481	+1.093	1.016	-0.177	1.353	+0.911
$D\phi\alpha$, $D\omega\alpha$	+0.05	+0.02	+0.08	-0.04	+0.06	+0.01	+0.08	-0.04
$D\phi\delta$, $D\omega\delta$	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	5 H. Camelop. Mag. 4.7		7 Tauri. (Alcyone.) Mag. 3.0		7 ^s Eridani. Mag. 4.3		8 ^s Eridani. Mag. 4.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 3 41	° ' " +71 4	h m 3 42	° ' " +23 51	h m 3 43	° ' " -23 28	h m 3 46	° ' " -36 26
	s "	"	s "	"	s "	"	s "	"
Jan. 0.4	52.57	77.06	42.303	25.66	23.658	80.94	27.332	49.22
10.4	52.26	79.03	42.239	25.66	23.562	82.68	27.200	51.24
20.3	51.84	80.56	42.139	25.55	23.432	84.13	27.032	52.88
30.3	51.35	81.61	42.006	25.32	23.275	85.24	26.835	54.08
Feb. 9.3	50.79	82.13	41.849	24.98	23.097	85.98	26.613	54.83
19.2	50.22	82.09	41.676	24.54	22.905	86.35	26.379	55.11
Mar. 1.2	49.63	81.51	41.496	24.01	22.708	86.35	26.140	54.92
11.2	49.06	80.42	41.321	23.39	22.514	85.97	25.905	54.28
21.2	48.54	78.85	41.162	22.73	22.335	85.23	25.688	53.19
31.1	48.12	76.89	41.026	22.05	22.180	84.14	25.494	51.70
Apr. 10.1	47.77	74.62	40.926	21.40	22.056	82.73	25.335	49.84
20.1	47.55	72.11	40.868	20.81	21.970	81.01	25.217	47.63
30.1	47.44	69.47	40.855	20.32	21.926	79.04	25.146	45.13
May 10.0	47.47	66.81	40.892	19.96	21.929	76.82	25.126	42.40
20.0	47.63	64.23	40.980	19.77	21.980	74.42	25.158	39.50
30.0	47.91	61.79	41.116	19.76	22.078	71.88	25.243	36.47
June 8.9	48.32	59.56	41.297	19.94	22.221	69.27	25.378	33.41
18.9	48.83	57.62	41.519	20.30	22.404	66.67	25.561	30.40
28.9	49.43	56.03	41.775	20.85	22.624	64.13	25.785	27.49
July 8.9	50.11	54.81	42.059	21.57	22.875	61.70	26.045	24.77
18.8	50.85	54.01	42.364	22.42	23.148	59.49	26.333	22.33
28.8	51.63	53.62	42.681	23.38	23.440	57.58	26.644	20.24
Aug. 7.8	52.44	53.66	43.005	24.41	23.740	55.91	26.968	18.56
17.8	53.26	54.12	43.330	25.49	24.043	54.68	27.298	17.34
27.7	54.07	54.98	43.649	26.58	24.343	53.87	27.626	16.63
Sept. 6.7	54.86	56.24	43.956	27.64	24.634	53.50	27.945	16.47
16.7	55.62	57.86	44.250	28.65	24.909	53.62	28.247	16.85
26.6	56.34	59.80	44.525	29.59	25.165	54.21	28.529	17.78
Oct. 6.6	57.00	62.05	44.778	30.45	25.398	55.24	28.784	19.22
16.6	57.59	64.55	45.009	31.21	25.603	56.66	29.007	21.09
26.6	58.10	67.24	45.213	31.87	25.779	58.44	29.195	23.36
Nov. 5.5	58.51	70.08	45.388	32.44	25.924	60.49	29.344	25.93
15.5	58.83	73.00	45.533	32.91	26.034	62.73	29.453	28.70
25.5	59.05	75.95	45.643	33.31	26.107	65.07	29.518	31.57
Dec. 5.5	59.15	78.83	45.717	33.62	26.144	67.42	29.539	34.42
15.4	59.12	81.56	45.752	33.84	26.142	69.70	29.515	37.16
25.4	58.98	84.07	45.749	33.99	26.102	71.83	29.447	39.68
35.4	58.73	86.27	45.705	34.04	26.025	73.75	29.337	41.92
Mean Place	47.039	63.18	39.967	20.24	21.756	75.14	25.414	40.87
Sec δ , Tan δ	3.085	+2.919	1.093	+0.442	1.090	-0.435	1.243	-0.738
$D\psi\alpha$, $D\omega\alpha$	+0.12	-0.11	+0.07	-0.02	+0.05	+0.02	+0.04	+0.03
$D\psi\delta$, $D\omega\delta$	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Hydri. Mag. 3.2		ζ Persel. Mag. 2.9		θ H. Camelop. Mag. 5.2		ϵ Persel. Mag. 3.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m s 48	° ' " -74 28	h m s 49	° ' " +31 38	h m s 50	° ' " +60 52	h m s 52	° ' " +39 46
	s	"	s	"	s	"	s	"
Jan. 0.4	31.63	87.58 ²¹¹	4.704	45.66 ³⁶	17.16	34.50 ¹⁶⁵	27.615	45.55 ⁷⁴
10.4	30.97 ⁶⁶	89.69 ¹⁵⁸	4.637 ⁶⁷	46.02 ¹⁹	16.98 ¹⁸	36.15 ¹²⁷	27.539 ⁷⁶	46.29 ⁵²
20.3	30.23 ⁷⁴	91.27 ¹⁰¹	4.530 ¹⁰⁷	46.21 ²	16.75 ²³	37.42 ⁸⁷	27.417 ¹²²	46.81 ²⁷
30.3	29.40 ⁸³	92.28 ⁴³	4.389 ¹⁴¹	46.23 ¹⁷	16.45 ³⁴	38.29 ⁴¹	27.256 ¹⁹¹	47.08 ¹
Feb. 9.3	28.54 ⁸⁶	92.71 ¹⁵	4.219 ¹⁷⁰	46.06 ³⁶	16.11 ³⁶	38.70 ⁶	27.065 ²¹³	47.09 ²⁷
19.2	27.66 ⁸⁸	92.56 ⁷¹	4.031 ¹⁹⁶	45.70 ⁵⁴	15.75 ³⁸	38.64 ⁵²	26.852 ²²¹	46.82 ⁵³
Mar. 1.2	26.78 ⁸⁵	91.85 ¹²⁶	3.835 ¹⁹²	44.45 ⁷¹	15.37 ³⁶	38.12 ⁹⁵	26.631 ²¹⁶	46.29 ⁷⁹
11.2	25.93 ⁷⁹	90.59 ¹⁷⁵	3.643 ¹⁷⁷	43.62 ⁹²	15.01 ²⁸	37.17 ¹³⁷	26.415 ²⁰¹	45.50 ⁹⁹
21.2	25.14 ⁷³	88.84 ²²⁰	3.466 ¹⁴⁹	42.70 ⁹⁶	14.67 ²⁴	35.80 ¹⁷¹	26.214 ¹⁷⁰	44.51 ¹¹⁶
31.1	24.41 ⁶⁴	86.64 ²⁶⁰	3.317 ¹¹⁴	41.74 ⁹⁶	14.39 ²³	34.09 ¹⁹⁶	26.044 ¹³¹	43.35 ¹²⁶
Apr. 10.1	23.77 ⁵³	84.04 ²⁹⁴	3.203 ⁷⁰	40.78 ⁹¹	14.16 ¹⁴	32.13 ²¹⁶	25.913 ⁸³	42.09 ¹³³
20.1	23.24 ⁴⁰	81.10 ³¹⁹	3.133 ²⁰	39.87 ⁸⁰	14.02 ⁷	29.97 ²²⁵	25.830 ²⁹	40.76 ¹³¹
30.1	22.84 ²⁸	77.91 ³³⁹	3.113 ³³	39.07 ⁶⁶	13.95 ²	27.72 ²²⁶	25.801 ³⁰	39.45 ¹²⁵
May 10.0	22.56 ¹⁴	74.52 ³⁵²	3.146 ⁸⁶	38.41 ⁴⁹	13.97 ¹¹	25.46 ²²⁰	25.831 ⁸⁸	38.20 ¹¹³
20.0	22.42 ¹	71.00 ³⁵⁴	3.232 ¹³⁸	37.92 ²⁰	14.08 ²⁰	23.26 ²⁰⁴	25.919 ¹⁴⁶	37.07 ⁹⁸
30.0	22.41 ¹⁵	67.46 ³⁴⁹	3.370 ¹⁸⁷	37.63 ¹⁰	14.28 ²⁹	21.22 ¹⁸⁵	26.065 ¹⁹⁹	36.09 ⁷⁶
June 8.9	22.56 ²⁶	63.97 ³³⁶	3.557 ²³¹	37.53 ¹²	14.57 ³⁵	19.37 ¹⁵⁸	26.264 ²⁴⁷	35.33 ⁵⁶
18.9	22.84 ⁴⁰	60.61 ³¹³	3.788 ²⁶⁸	37.65 ³³	14.92 ⁴²	17.79 ¹²⁶	26.511 ²⁸⁹	34.77 ³¹
28.9	23.24 ⁵²	57.48 ²⁸³	4.056 ²⁹⁸	37.98 ⁵¹	15.34 ⁵¹	16.53 ⁵⁸	26.800 ³²²	34.46 ⁶
July 8.9	23.76 ⁶³	54.65 ²⁴³	4.354 ³²¹	38.49 ⁶⁰	15.81 ⁵¹	15.58 ²²	27.122 ³⁴⁸	34.40 ¹⁷
18.8	24.39 ⁷¹	52.22 ¹⁹⁷	4.675 ³³⁶	39.18 ⁸²	16.32 ⁵⁴	15.00 ¹⁵	27.470 ³⁶⁶	34.57 ⁴⁰
28.8	25.10 ⁷⁷	50.25 ¹⁴⁵	5.011 ³⁴⁵	40.00 ⁹⁴	16.86 ⁵⁶	14.78 ⁸⁵	27.836 ³⁷⁶	34.97 ⁶¹
Aug. 7.8	25.87 ⁸¹	48.80 ⁸⁶	5.356 ³⁴⁶	40.94 ¹⁰³	17.42 ⁵⁷	14.93 ⁸⁵	28.212 ³⁷⁹	35.58 ⁸⁰
17.8	26.68 ⁸²	47.94 ²⁶	5.702 ³⁴¹	41.97 ¹⁰⁸	17.99 ⁵⁶	15.42 ¹¹⁶	28.591 ³⁷⁶	36.38 ⁹⁵
27.7	27.50 ⁸²	47.68 ³⁸	6.043 ³³²	43.05 ¹¹⁰	18.55 ⁵⁶	16.27 ¹⁴⁴	28.967 ³⁶⁵	37.33 ¹⁰⁹
Sept. 6.7	28.32 ⁷⁸	48.06 ¹⁰⁰	6.375 ³¹⁷	44.15 ¹¹²	19.11 ⁵³	17.43 ¹⁷³	29.332 ³⁴⁹	38.42 ¹²¹
16.7	29.10 ⁷²	49.06 ¹⁵⁹	6.692 ²⁹⁸	45.27 ¹¹⁰	19.64 ⁴⁹	18.87 ¹⁹³	29.681 ³³¹	39.63 ¹²⁹
26.6	29.82 ⁶²	50.65 ²¹⁴	6.990 ²⁷⁸	46.37 ¹⁰⁷	20.13 ⁴⁷	20.59 ²¹⁵	30.012 ³⁰⁸	40.92 ¹³⁴
Oct. 6.6	30.44 ⁵³	52.79 ²⁶²	7.268 ²²⁶	47.44 ¹⁰³	20.60 ³⁷	22.52 ²²⁹	30.320 ²⁵¹	42.26 ¹⁴⁰
16.6	30.97 ⁴⁰	55.41 ³⁰¹	7.520 ²²⁶	48.47 ⁹⁸	21.02 ³⁷	24.67 ²⁴¹	30.602 ²⁸²	43.64 ¹³⁸
26.6	31.37 ²⁷	58.42 ³²³	7.746 ¹⁹⁵	49.45 ⁸²	21.39 ³¹	26.96 ²⁴⁷	30.853 ²¹⁸	45.04 ¹⁴⁰
Nov. 5.5	31.64 ¹⁰	61.70 ³⁴³	7.941 ¹⁶³	50.37 ⁸⁶	21.70 ²⁵	29.37 ²⁴⁷	31.071 ¹⁸⁰	46.44 ¹³⁸
15.5	31.74 ³	65.13 ³⁴⁷	8.103 ¹²⁵	51.23 ⁷⁹	21.95 ¹⁹	31.84 ²⁴²	31.251 ¹⁴⁰	47.82 ¹²⁴
25.5	31.71 ²⁰	68.60 ³³⁷	8.228 ⁴⁴	52.02 ⁶⁸	22.14 ¹¹	34.31 ²³¹	31.391 ⁹⁵	49.16 ¹²⁷
Dec. 5.5	31.51 ³³	71.97 ³¹⁴	8.313 ¹	52.70 ⁵⁸	22.25 ⁵	36.73 ²¹⁰	31.486 ⁵⁰	50.43 ⁸⁷
15.4	31.18 ⁴⁷	75.11 ²⁸³	8.357 ⁴⁴	53.28 ⁴⁶	22.28 ¹²	39.04 ¹⁸⁵	31.534 ²	51.59 ¹⁰⁴
25.4	30.71 ⁵⁹	77.94 ²⁴⁰	8.358 ¹	53.74 ⁴⁶	22.23 ¹²	41.14 ¹⁸⁵	31.532 ⁵⁰	52.63 ⁸⁷
35.4	30.12 ⁵⁹	80.34 ²⁴⁰	8.314 ⁴⁴	53.74 ⁴⁶	22.11 ¹²	42.99 ¹⁸⁵	31.482 ⁵⁰	53.50 ⁸⁷
Mean Place	28.590	74.95	2.169	38.89	13.126	22.62	24.826	37.36
Sec δ , Tan δ	8.739	-8.602	1.175	+0.616	2.055	+1.795	1.301	+0.833
$D\psi_a$, $D\omega_a$	-0.02	+0.13	+0.07	-0.02	+0.10	-0.06	+0.08	-0.03
$D\psi_\delta$, $D\omega_\delta$	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ξ Persei. Mag. 4.0		γ Eridani. Mag. 3.2		λ Tauri. Var. 3.3-4.2		δ Betelgeuse. Mag. 4.	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	D
	h m 3 53	° ' " +35 33	h m 3 54	° ' " -13 43	h m 3 56	° ' " +12 15	h m 3 57	-
	s	"	s	"	s	"	s	
Jan. 0.4	44.967	39.87	16.967	81.05	13.656	46.81	29.76	54
10.4	44.899 ⁶⁸	40.43 ⁵⁶	16.895 ⁷²	82.57 ¹⁸²	13.605 ⁵¹	46.31 ⁸⁰	29.46 ³⁰	51
20.3	44.788 ¹¹¹	40.80 ³⁷	16.789 ¹⁰⁶	83.87 ¹³⁰	13.518 ⁸⁷	45.80 ⁵¹	29.10 ³⁶	51
30.3	44.639 ¹⁴⁹	40.96 ¹⁶	16.655 ¹²⁴	84.91 ¹⁰⁴	13.399 ¹¹⁹	45.32 ⁴⁸	28.69 ⁴¹	54
Feb. 9.3	44.462 ¹⁷⁷	40.89 ⁷	16.497 ¹⁵⁸	85.67 ⁷⁶	13.255 ¹⁴⁴	44.84 ⁴⁸	28.25 ⁴⁴	54
	198 ³⁰		174 ⁴⁸		162 ⁴⁵		47 ⁴⁷	
19.3	44.264	40.59	16.323	86.15	13.093	44.39	27.78	54
Mar. 1.2	44.057 ²⁰⁷	40.08 ⁵¹	16.142 ¹⁸¹	86.33 ¹⁸	12.923 ¹⁷⁰	43.98 ⁴¹	27.32 ⁴⁶	54
11.2	43.853 ²⁰⁴	39.35 ⁷³	15.963 ¹⁷⁹	86.21 ¹²	12.754 ¹⁶⁹	43.60 ³⁸	26.86 ⁴⁶	54
21.2	43.664 ¹⁸⁹	38.46 ⁸⁹	15.796 ¹⁶⁷	85.81 ⁴⁰	12.598 ¹⁵⁶	43.29 ³¹	26.43 ⁴³	54
31.1	43.504 ¹⁶⁰	37.44 ¹⁰²	15.649 ¹⁴⁷	85.11 ⁷⁰	12.461 ¹³⁷	43.07 ²²	26.04 ³⁹	54
	124 ¹¹⁰		117 ⁹⁷		105 ¹²		34 ³⁴	
Apr. 10.1	43.380	36.34	15.532	84.14	12.356	42.95	25.70	54
20.1	43.302 ⁷⁸	35.21 ¹¹³	15.450 ⁸²	82.88 ¹²⁶	12.288 ⁶⁸	42.94 ¹	25.41 ²⁹	41
30.1	43.274 ²⁸	34.11 ¹¹⁰	15.410 ⁴⁰	81.39 ¹⁴⁹	12.262 ²⁶	43.08 ¹⁴	25.20 ²¹	41
May 10.0	43.302 ²⁸	33.09 ¹⁰²	15.413 ³	79.66 ¹⁷³	12.281 ¹⁹	43.39 ³¹	25.07 ¹³	41
20.0	43.386 ⁸⁴	32.19 ⁹⁰	15.462 ⁴⁹	77.75 ¹⁹¹	12.348 ⁶⁷	43.85 ⁴⁶	25.02 ⁵	41
	138 ⁷³		94 ²⁰⁷		112 ⁶⁵		3 ³	
30.0	43.524	31.46	15.556	75.68	12.460	44.50	25.05	39
June 8.9	43.714 ¹⁹⁰	30.91 ⁵⁵	15.694 ¹³⁸	73.51 ²¹⁷	12.616 ¹⁵⁶	45.29 ⁷⁹	25.16 ¹¹	39
18.9	43.948 ²³⁴	30.59 ³²	15.872 ¹⁷⁸	71.28 ²²³	12.811 ¹⁹⁵	46.22 ⁹³	25.35 ¹⁹	29
28.9	44.223 ²⁷⁵	30.48 ¹¹	16.084 ²¹²	69.06 ²²²	13.039 ²²⁸	47.28 ¹⁰⁶	25.61 ²⁶	29
July 8.9	44.529 ³⁰⁶	30.58 ¹⁰	16.324 ²⁴⁰	66.91 ²¹⁵	13.295 ²⁵⁶	48.43 ¹¹⁵	25.95 ³⁴	22
	331 ³³		265 ²⁰³		277 ¹²⁰		39 ³⁹	
18.8	44.860	30.91	16.589	64.88	13.572	49.63	26.34	21
28.8	45.209 ³⁴⁹	31.42 ⁵¹	16.869 ²⁸⁰	63.04 ¹⁸⁴	13.864 ²⁹²	50.84 ¹²¹	26.77 ⁴³	19
Aug. 7.8	45.566 ³⁵⁷	32.12 ⁷⁰	17.159 ²⁹⁰	61.46 ¹⁵⁸	14.165 ³⁰¹	52.01 ¹¹⁷	27.24 ⁴⁷	11
17.8	45.926 ³⁶⁰	32.97 ⁸⁵	17.452 ²⁹³	60.18 ¹²⁸	14.468 ³⁰³	53.12 ¹¹¹	27.73 ⁴⁹	19
27.7	46.283 ³⁵⁷	33.93 ⁹⁶	17.743 ²⁹¹	59.24 ⁹⁴	14.768 ³⁰⁰	54.13 ¹⁰¹	28.22 ⁴⁹	19
	346 ¹⁰⁶		284 ⁵⁵		291 ⁸⁸		49 ⁴⁹	
Sept. 6.7	46.629	34.99	18.027	58.69	15.059	55.01	28.71	19
16.7	46.962 ³³³	36.12 ¹¹³	18.298 ²⁷¹	58.54 ¹⁵	15.339 ²⁸⁰	55.70 ⁶⁹	29.19 ⁴⁸	19
26.6	47.277 ³¹⁵	37.30 ¹¹⁸	18.552 ²⁵⁴	58.79 ²⁵	15.604 ²⁶⁵	56.23 ⁵³	29.63 ⁴⁴	17
Oct. 6.6	47.570 ²⁹³	38.50 ¹²⁰	18.786 ²³⁴	59.43 ⁶⁴	15.849 ²⁴⁵	56.58 ³⁵	30.01 ³⁸	19
16.6	47.838 ²⁶⁸	39.70 ¹²⁰	18.997 ²¹¹	60.43 ¹⁰⁰	16.074 ²²⁵	56.73 ¹⁵	30.34 ³³	22
	240 ¹¹⁹		186 ¹³²		200 ¹		29 ²⁹	
26.6	48.078	40.89	19.183	61.75	16.274	56.72	30.63	24
Nov. 5.5	48.286 ²⁰⁸	42.05 ¹¹⁶	19.339 ¹⁵⁶	63.33 ¹⁵⁸	16.448 ¹⁷⁴	56.57 ¹⁵	30.83 ²⁰	28
15.5	48.460 ¹⁷⁴	43.18 ¹¹³	19.465 ¹²⁶	65.09 ¹⁷⁶	16.595 ¹⁴⁷	56.29 ²⁸	30.96 ¹³	31
25.5	48.595 ¹³⁵	44.27 ¹⁰⁹	19.559 ⁹⁴	66.97 ¹⁸⁸	16.709 ¹¹⁴	55.92 ³⁷	31.00 ⁴	34
Dec. 5.5	48.690 ⁹⁵	45.28 ¹⁰¹	19.617 ⁵⁸	68.89 ¹⁹²	16.790 ⁸¹	55.48 ⁴⁴	30.95 ⁵	38
	49 ⁹²		21 ¹⁹⁰		45 ⁴⁸		11 ¹¹	
15.4	48.739	46.20	19.638	70.79	16.835	55.00	30.84	41
25.4	48.742 ³	47.01 ⁸¹	19.623 ¹⁵	72.59 ¹⁸⁰	16.841 ⁶	54.50 ⁵⁰	30.65 ¹⁹	44
35.4	48.698 ⁴⁴	47.66 ⁶⁵	19.570 ⁵³	74.22 ¹⁶³	16.809 ³²	53.99 ⁵¹	30.38 ²⁷	47
Mean Place	42.305	32.63	14.987	77.23	11.446	44.79	27.451	41
Sec δ, Tan δ	1.229	+0.715	1.029	-0.244	1.023	+0.217	2.104	-1
D _{ψa} , D _{ωa}	+0.08	-0.03	+0.06	+0.01	+0.07	-0.01	+0.02	+0
D _{ψδ} , D _{ωδ}	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0

APPARENT PLACES OF STARS, 1919.

351

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Tauri. Mag. 3.9		α Tauri. Mag. 4.5		ε Persei. Mag. 4.0		δ Tauri. Mag. 5.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 3 58 s	° ' " + 5 45 "	h m 3 59 s	° ' " +21 51 "	h m 4 2 s	° ' " +47 29 "	h m 4 5 s	° ' " +26 16 "
Jan. 0.4	52.904	56.16	56.599	45.85	49.704	59.71	56.161	18.67
10.4	52.854	55.37	56.550	45.80	49.619	60.85	56.114	18.82
20.3	52.767	54.65	56.462	45.66	49.482	61.74	56.025	18.87
30.3	52.650	53.99	56.339	45.45	49.298	62.32	55.900	18.81
Feb. 9.3	52.508	53.42	56.189	45.14	49.076	62.57	55.745	18.62
19.3	52.347	52.95	56.020	44.77	48.830	62.48	55.571	18.31
Mar. 1.2	52.178	52.58	55.841	44.32	48.570	62.06	55.385	17.88
11.2	52.011	52.33	55.663	43.81	48.315	61.30	55.198	17.35
21.2	51.854	52.19	55.498	43.27	48.077	60.25	55.023	16.74
31.1	51.717	52.19	55.354	42.72	47.870	58.96	54.870	16.07
Apr. 10.1	51.610	52.35	55.242	42.19	47.706	57.48	54.749	15.38
20.1	51.538	52.66	55.169	41.72	47.595	55.87	54.668	14.71
30.1	51.508	53.15	55.140	41.34	47.545	54.21	54.633	14.10
May 10.0	51.522	53.82	55.159	41.09	47.559	52.58	54.647	13.59
20.0	51.581	54.66	55.228	40.98	47.640	51.02	54.712	13.21
30.0	51.686	55.66	55.346	41.02	47.785	49.59	54.827	12.99
June 9.0	51.834	56.83	55.507	41.25	47.990	48.35	54.989	12.93
18.9	52.019	58.10	55.711	41.64	48.251	47.32	55.194	13.04
28.9	52.239	59.46	55.950	42.19	48.561	46.55	55.437	13.33
July 8.9	52.487	60.87	56.220	42.88	48.910	46.05	55.710	13.78
18.8	52.756	62.29	56.511	43.69	49.291	45.82	56.007	14.37
28.8	53.040	63.67	56.819	44.59	49.695	45.86	56.321	15.10
Aug. 7.8	53.333	64.97	57.135	45.55	50.112	46.17	56.646	15.91
17.8	53.628	66.13	57.455	46.53	50.536	46.72	56.975	16.78
27.7	53.921	67.13	57.770	47.50	50.958	47.51	57.301	17.68
Sept. 6.7	54.207	67.92	58.078	48.42	51.371	48.50	57.621	18.59
16.7	54.482	68.49	58.374	49.28	51.770	49.68	57.929	19.48
26.7	54.740	68.81	58.655	50.06	52.151	51.01	58.223	20.33
Oct. 6.6	54.982	68.90	58.917	50.73	52.507	52.48	58.499	21.12
16.6	55.201	68.75	59.158	51.30	52.835	54.06	58.752	21.83
26.6	55.399	68.40	59.374	51.77	53.129	55.73	58.982	22.49
Nov. 5.5	55.570	67.87	59.565	52.15	53.387	57.45	59.184	23.08
15.5	55.713	67.19	59.724	52.44	53.601	59.20	59.356	23.61
25.5	55.825	66.41	59.851	52.64	53.769	60.94	59.495	24.08
Dec. 5.5	55.903	65.57	59.943	52.79	53.885	62.64	59.595	24.49
15.4	55.947	64.71	59.996	52.88	53.947	64.24	59.656	24.84
25.4	55.952	63.85	60.008	52.92	53.949	65.72	59.674	25.13
35.4	55.920	63.02	59.980	52.89	53.896	67.01	59.649	25.32
Mean Place	50.761	55.73	54.226	41.91	46.541	50.96	53.677	14.15
Sec δ, Tan δ	1.005	+0.101	1.078	+0.401	1.480	+1.091	1.115	+0.494
D _γ α, D _α α	+0.06	0.00	+0.07	-0.01	+0.09	-0.04	+0.37	-0.32
D _γ δ, D _α δ	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α^1 Eridani. Mag. 4.1		μ Tauri. Mag. 4.3		α Horologii. Mag. 3.3		α Reticuli. Mag. 3.	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	D
	h m 4 7	° ' " - 7 2	h m 4 11	° ' " + 8 41	h m 4 11	° ' " -42 29	h m 4 13	
Jan. 0.4	56.711	54.89	10.275	26.25	21.115	46.88	25.08	4
10.4	56.656 ⁵⁵	56.24 ¹²⁵	10.235 ⁴⁰	25.57 ⁶⁸	20.977 ¹³³	49.34 ²⁹³	24.78 ³⁰	4
20.3	56.567 ⁸⁰	57.40 ¹¹⁶	10.157 ⁷⁸	24.93 ⁶⁴	20.796 ¹⁸¹	51.19 ¹⁰⁵	24.42 ³⁶	5
30.3	56.445 ¹²²	58.37 ⁹⁷	10.045 ¹¹²	24.36 ⁵⁷	20.579 ²¹⁷	52.70 ¹⁸¹	23.99 ⁴³	5
Feb. 9.3	56.299 ¹⁴⁶	59.12 ⁷⁵	9.906 ¹³⁰	23.84 ⁵³	20.334 ²⁴⁵	53.72 ¹⁰³	23.53 ⁴⁶	5
19.3	56.133 ¹⁶⁶	59.65 ⁵³	9.747 ¹⁸⁰	23.38 ⁴⁶	20.067 ²⁶⁷	54.24 ⁸²	23.05 ⁴⁸	5
Mar. 1.2	55.958 ¹⁷⁵	59.94 ²⁹	9.577 ¹⁷⁰	23.01 ³⁷	19.792 ²⁷⁵	54.26 ²	22.56 ⁴⁹	5
11.2	55.782 ¹⁷⁶	60.01 ⁷	9.406 ¹⁷¹	22.71 ³⁰	19.518 ²⁷⁴	53.77 ⁴⁰	22.07 ⁴⁹	5
21.2	55.617 ¹⁶⁵	59.82 ¹⁹	9.244 ¹⁶²	22.52 ¹⁹	19.257 ²⁶¹	52.81 ⁶⁶	21.61 ⁴⁶	5
31.2	55.469 ¹⁴⁸	59.39 ⁴³	9.100 ¹⁴⁴	22.42 ¹⁰	19.019 ²³⁸	51.42 ¹³⁰	21.18 ⁴³	4
Apr. 10.1	55.348 ¹²¹	58.72 ⁶⁷	8.985 ¹¹⁵	22.45 ³	18.814 ²⁰⁵	49.60 ¹⁸³	20.81 ³⁷	4
20.1	55.262 ⁸⁶	57.83 ⁸⁰	8.904 ⁸¹	22.62 ¹⁷	18.650 ¹⁶⁴	47.40 ²²⁰	20.49 ³²	4
30.1	55.215 ⁴⁷	56.69 ¹¹⁴	8.864 ⁴⁰	22.93 ³¹	18.533 ¹¹⁷	44.88 ²⁸²	20.34 ²⁸	4
May 10.0	55.212 ³	55.35 ¹³⁴	8.868 ⁴	23.41 ⁴³	18.468 ⁶⁵	42.10 ²⁷³	20.06 ¹⁸	3
20.0	55.254 ⁴²	53.83 ¹⁸²	8.918 ⁵⁰	24.06 ⁶⁵	18.459 ⁹	39.11 ²⁶⁰	19.97 ⁹	3
30.0	55.340 ⁸⁶	52.13 ¹⁷⁰	9.014 ⁹⁶	24.85 ⁷⁹	18.507 ⁴⁸	35.96 ³¹²	19.97 ⁰	3
June 9.0	55.470 ¹³⁰	50.31 ¹⁸²	9.152 ¹³⁸	25.80 ⁹⁵	18.610 ¹⁰⁸	32.79 ³¹⁹	20.05 ⁸	2
18.9	55.639 ¹⁶⁹	48.41 ¹⁹⁰	9.330 ¹⁷⁸	26.87 ¹⁰⁷	18.765 ¹⁵⁵	29.62 ³¹⁷	20.21 ¹⁶	2
28.9	55.843 ²⁰⁴	46.48 ¹⁹³	9.544 ²¹⁴	28.05 ¹¹⁸	18.968 ²⁰³	26.55 ³⁰⁷	20.45 ²⁴	2
July 8.9	56.075 ²³²	44.56 ¹⁹²	9.785 ²⁴¹	29.29 ¹²⁴	19.214 ²⁴⁶	23.66 ²⁹⁰	20.76 ³¹	1
18.9	56.332 ²⁶⁷	42.73 ¹⁸³	10.051 ²⁶⁶	30.56 ¹²⁷	19.495 ²⁸¹	21.04 ²⁶²	21.13 ²⁷	1
28.8	56.605 ²⁷³	41.04 ¹⁶⁹	10.333 ²⁸²	31.81 ¹²⁵	19.806 ³¹¹	18.77 ²²⁷	21.56 ⁴³	1
Aug. 7.8	56.890 ²⁸⁵	39.53 ¹⁵¹	10.625 ²⁹²	32.99 ¹¹⁸	20.138 ³³²	16.91 ¹⁸⁶	22.02 ⁴⁶	1
17.8	57.180 ²⁹⁰	38.27 ¹²⁶	10.922 ²⁹⁷	34.08 ¹⁰⁹	20.481 ³⁴³	15.54 ¹³⁷	22.52 ⁵⁰	1
27.7	57.469 ²⁹⁹	37.28 ⁹⁹	11.218 ²⁹⁵	35.04 ⁹⁵	20.830 ³⁴⁹	14.71 ⁸³	23.03 ⁵¹	1
Sept. 6.7	57.752 ²⁸³	36.63 ⁶⁵	11.509 ²⁹¹	35.81 ⁷⁷	21.175 ³⁴⁵	14.43 ²⁶	23.54 ⁵¹	1
16.7	58.025 ²⁷³	36.32 ³¹	11.789 ²⁸⁰	36.40 ⁵⁹	21.510 ³³⁵	14.74 ³¹	24.03 ⁴⁹	1
26.7	58.283 ²⁶⁸	36.36 ⁴	12.057 ²⁶⁸	36.77 ³⁷	21.826 ³¹⁶	15.63 ⁸⁹	24.50 ⁴⁷	1
Oct. 6.6	58.525 ²⁴²	36.75 ³⁹	12.307 ²⁶⁰	36.92 ¹⁵	22.117 ²⁹¹	17.08 ¹⁴⁵	24.93 ⁴³	1
16.6	58.747 ²²²	37.47 ⁷²	12.538 ²³¹	36.87 ⁵	22.378 ²⁶¹	19.03 ¹⁹⁵	25.30 ³⁷	1
26.6	58.944 ¹⁹⁷	37.47 ¹⁰⁰	12.747 ²⁰⁹	36.87 ²⁵	22.602 ²³⁴	21.41 ²³⁸	25.62 ³²	1
Nov. 5.6	59.115 ¹⁷¹	38.47 ¹²⁵	12.932 ¹⁸⁵	36.62 ⁴¹	22.802 ¹⁸³	21.41 ²⁷⁴	25.62 ²³	1
15.5	59.259 ¹⁴⁴	39.72 ¹⁴²	13.089 ¹⁵⁷	36.21 ⁵⁴	22.785 ¹²⁸	24.15 ²⁹⁸	25.85 ¹⁶	1
25.5	59.369 ¹¹⁰	41.14 ¹⁵⁵	13.089 ¹²⁶	35.67 ⁶⁴	22.923 ⁹¹	27.13 ³¹¹	26.01 ⁸	1
Dec. 5.5	59.447 ⁷⁸	42.69 ¹⁶¹	13.215 ⁹³	35.03 ⁷¹	23.014 ⁴¹	30.24 ³¹⁴	26.09 ²	1
15.4	59.458 ⁴¹	44.30 ¹⁶⁰	13.308 ⁵⁷	34.32 ⁷²	23.065 ¹¹	33.38 ³⁰⁴	26.07 ⁹	1
25.4	59.492 ⁴	45.90 ¹⁵⁴	13.365 ¹⁸	33.60 ⁷³	23.044 ⁶¹	36.42 ²⁸⁶	25.96 ¹⁸	1
35.4	59.458 ³⁴	47.44 ¹⁴³	13.383 ²¹	32.87 ⁶⁹	22.983 ¹¹⁰	39.28 ²⁶⁶	25.80 ²⁶	1
Mean Place	54.644	52.24	8.056	25.69	19.047	37.85	22.602	
Sec δ , Tan δ	1.008	-0.124	1.012	+0.153	1.356	-0.916	2.179	
$D\alpha$, $D\alpha\alpha$	+0.06	0.00	+0.06	0.00	+0.04	+0.03	+0.02	
$D\delta$, $D\delta\delta$	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	

APPARENT PLACES OF STARS, 1919.

353

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Tauri. Mag. 3.9		δ Tauri. Mag. 3.9		ν^s Eridani. Mag. 4.1		δ Mensæ. Mag. 5.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 4 15	° ' " +15 25	h m 4 18	° ' " +17 21	h m 4 20	° ' " -34 11	h m 4 23	° ' " -80 23
Jan. 0.4	13.227	60.73	18.038	14.85	61.707	83.42	29.63	88.78
10.4	13.189	60.37	18.003	14.58	61.608	85.70	28.63	91.24
20.3	13.113	59.99	17.928	14.29	61.471	87.62	27.45	93.23
30.3	13.002	59.62	17.817	13.99	61.296	89.14	26.14	94.70
Feb. 9.3	12.863	59.24	17.677	13.65	61.092	90.23	24.73	95.59
19.3	12.701	58.86	17.514	13.30	60.868	90.88	23.27	95.94
Mar. 1.2	12.528	58.48	17.339	12.92	60.631	91.07	21.78	95.73
11.2	12.353	58.11	17.161	12.53	60.394	90.80	20.31	94.98
21.2	12.188	57.76	16.992	12.15	60.165	90.10	18.90	93.71
31.2	12.038	57.45	16.842	11.79	59.956	88.97	17.57	91.96
Apr. 10.1	11.920	57.22	16.720	11.48	59.775	87.45	16.38	89.79
20.1	11.836	57.07	16.633	11.25	59.631	85.57	15.32	87.23
30.1	11.794	57.03	16.589	11.11	59.529	83.37	14.43	84.39
May 10.0	11.797	57.12	16.590	11.10	59.475	80.89	13.75	81.26
20.0	11.847	57.37	16.638	11.21	59.471	78.20	13.27	77.98
30.0	11.944	57.76	16.734	11.49	59.520	75.36	13.01	74.59
June 9.0	12.085	58.30	16.874	11.91	59.617	72.42	12.97	71.17
18.9	12.268	58.99	17.055	12.48	59.762	69.46	13.16	67.84
28.9	12.487	59.80	17.273	13.18	59.950	66.56	13.57	64.64
July 8.9	12.734	60.71	17.522	13.98	60.177	63.80	14.17	61.67
18.9	13.006	61.69	17.795	14.87	60.436	61.26	14.97	59.04
28.8	13.295	62.71	18.085	15.81	60.721	59.02	15.93	56.82
Aug. 7.8	13.594	63.72	18.387	16.75	61.025	57.13	17.03	55.07
17.8	13.901	64.70	18.695	17.68	61.341	55.68	18.23	53.85
27.7	14.205	65.61	19.003	18.56	61.661	54.72	19.50	53.21
Sept. 6.7	14.504	66.41	19.305	19.34	61.979	54.28	20.79	53.21
16.7	14.795	67.07	19.599	20.01	62.288	54.38	22.05	53.83
26.7	15.072	67.59	19.881	20.56	62.584	55.03	23.26	55.05
Oct. 6.6	15.333	67.96	20.148	20.98	62.859	56.21	24.35	56.86
16.6	15.576	68.17	20.395	21.25	63.109	57.87	25.31	59.19
26.6	15.796	68.24	20.622	21.41	63.329	59.96	26.07	61.96
Nov. 5.6	15.992	68.19	20.822	21.45	63.516	62.39	26.64	65.10
15.5	16.159	68.04	20.995	21.40	63.664	65.09	26.96	68.45
25.5	16.296	67.79	21.138	21.27	63.772	67.94	27.05	71.91
Dec. 5.5	16.398	67.50	21.244	21.09	63.836	70.84	26.86	75.38
15.4	16.463	67.17	21.313	20.88	63.856	73.69	26.44	78.67
25.4	16.488	66.82	21.342	20.65	63.829	76.39	25.78	81.74
35.4	16.472	66.46	21.329	20.39	63.756	78.84	24.91	84.43
Mean Place	10.901	58.98	15.670	12.87	59.644	75.70	24.703	77.28
Sec δ , Tan δ	1.037	+0.276	1.048	+0.313	1.209	-0.680	5.999	-5.915
$D\mu_a$, $D\mu_\alpha$	+0.07	-0.01	+0.07	-0.01	+0.04	+0.02	-0.08	+0.18
$D\mu_\delta$, $D\mu_\delta$	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ϵ Tauri. Mag. 3.6			m Persei. Mag. 6.1			α Tauri. (Aldebaran.) Mag. 1.1			α Doradus. Mag. 3.5		
	Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.	
	h m 4 23	° ' " +19 0		h m 4 27	° ' " +42 53		h m 4 31	° ' " +16 20		h m 4 32	° ' " -55 15	
	s	"		s	"		s	"		s	"	
Jan. 0.4	55.502	8.69	45.760	37.61	18.633	52.15	17.063	53.88				
10.4	55.471	8.50	45.713	38.65	18.608	51.82	16.868	56.57				
20.4	55.400	8.29	45.614	39.49	18.542	51.50	16.616	58.83				
30.3	55.291	8.04	45.467	40.10	18.439	51.17	16.315	60.62				
Feb. 9.3	55.152	7.76	45.280	40.46	18.304	50.84	15.974	61.88				
19.3	54.989	7.44	45.062	40.53	18.145	50.50	15.606	62.80				
Mar. 1.2	54.812	7.08	44.827	40.31	17.970	50.16	15.223	62.78				
11.2	54.631	6.70	44.588	39.82	17.791	49.81	14.838	62.40				
21.2	54.458	6.30	44.358	39.05	17.618	49.48	14.465	61.50				
31.2	54.304	5.91	44.152	38.06	17.462	49.17	14.116	60.11				
Apr. 10.1	54.178	5.54	43.981	36.89	17.332	48.93	13.804	58.25				
20.1	54.085	5.24	43.856	35.59	17.235	48.74	13.539	55.98				
30.1	54.036	5.03	43.783	34.22	17.179	48.65	13.328	53.94				
May 10.1	54.032	4.91	43.768	32.84	17.168	48.67	13.181	50.41				
20.0	54.076	4.93	43.815	31.51	17.204	48.83	13.100	47.25				
30.0	54.167	5.09	43.922	30.27	17.286	49.13	13.088	43.94				
June 9.0	54.304	5.40	44.086	29.18	17.413	49.56	13.147	40.83				
18.9	54.483	5.84	44.303	28.25	17.582	50.13	13.272	37.14				
28.9	54.699	6.42	44.568	27.53	17.788	50.82	13.463	33.94				
July 8.9	54.946	7.13	44.873	27.02	18.024	51.61	13.712	30.78				
18.9	55.217	7.91	45.210	26.75	18.288	52.46	14.014	27.89				
28.8	55.508	8.76	45.573	26.68	18.570	53.36	14.360	25.45				
Aug. 7.8	55.811	9.63	45.952	26.84	18.865	54.25	14.740	23.39				
17.8	56.121	10.49	46.342	27.19	19.169	55.12	15.146	21.87				
27.8	56.431	11.32	46.735	27.73	19.474	55.92	15.567	20.91				
Sept. 6.7	56.737	12.08	47.125	28.44	19.776	56.62	15.992	20.56				
16.7	57.036	12.73	47.506	29.29	20.072	57.21	16.411	20.83				
26.7	57.323	13.29	47.874	30.27	20.357	57.66	16.811	21.75				
Oct. 6.6	57.596	13.72	48.223	31.35	20.629	57.97	17.186	23.25				
16.6	57.849	14.04	48.551	32.53	20.884	58.13	17.523	25.31				
26.6	58.083	14.24	48.851	33.79	21.119	58.17	17.815	27.86				
Nov. 5.6	58.291	14.34	49.122	35.10	21.330	58.09	18.054	30.81				
15.5	58.472	14.36	49.355	36.45	21.515	57.92	18.232	34.05				
25.5	58.621	14.32	49.546	37.82	21.669	57.68	18.347	37.40				
Dec. 5.5	58.735	14.23	49.692	39.19	21.788	57.39	18.394	40.92				
15.5	58.811	14.10	49.785	40.52	21.869	57.08	18.373	44.31				
25.4	58.845	13.95	49.825	41.78	21.909	56.76	18.281	47.52				
35.4	58.838	13.78	49.810	42.91	21.908	56.44	18.124	50.43				
Mean Place	53.088	6.69	42.688	31.72	16.239	51.07	14.699	43.91				
Sec δ , Tan δ	1.058	+0.344	1.365	+0.929	1.042	+0.293	1.753	-1.439				
$D\psi\alpha$, $D\omega\alpha$	+0.07	-0.01	+0.08	-0.02	+0.07	-0.01	+0.03	+0.03				
$D\psi\delta$, $D\omega\delta$	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.1	+0.9				

APPARENT PLACES OF STARS, 1919.

355

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ν Eridani. Mag. 4.1		53 Eridani. Mag. 4.0		τ Tauri. Mag. 4.3		Groombridge 848. Mag. 6.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 4 32	° ' / — 3 30	h m 4 34	° ' / — 14 27	h m 4 37	° ' / + 22 48	h m 4 37	° ' / + 75 47
	s	"	s	"	s	"	s	"
Jan. 0.4	18.397	64.05	30.256	45.66	25.417	11.33	62.25	54.55
10.4	18.363	65.33	30.212	47.42	25.397	11.34	61.98	57.06
20.4	18.291	66.45	30.129	48.94	25.333	11.32	61.56	59.25
30.3	18.183	67.42	30.010	50.21	25.229	11.24	61.00	61.02
Feb. 9.3	18.047	68.20	29.861	51.21	25.092	11.10	60.33	62.31
19.3	17.887	68.79	29.689	51.90	24.927	10.88	59.58	63.08
Mar. 1.3	17.714	69.17	29.504	52.30	24.746	10.59	58.79	63.28
11.2	17.536	69.34	29.313	52.38	24.559	10.24	57.98	62.91
21.2	17.363	69.31	29.128	52.15	24.377	9.83	57.20	62.01
31.2	17.206	69.05	28.959	51.63	24.212	9.38	56.49	60.59
Apr. 10.1	17.072	68.59	28.812	50.80	24.073	8.91	55.87	58.74
20.1	16.971	67.91	28.698	49.70	23.968	8.47	55.38	56.52
30.1	16.907	67.03	28.622	48.34	23.907	8.07	55.03	54.03
May 10.1	16.885	65.94	28.588	46.73	23.891	7.75	54.84	51.35
20.0	16.908	64.67	28.598	44.92	23.923	7.54	54.82	48.59
30.0	16.975	63.24	28.653	42.94	24.003	7.44	54.96	45.82
June 9.0	17.085	61.68	28.752	40.83	24.131	7.47	55.27	43.14
19.0	17.235	60.01	28.892	38.65	24.301	7.66	55.74	40.62
28.9	17.420	58.30	29.070	36.44	24.511	7.96	56.34	38.34
July 8.9	17.637	56.58	29.281	34.27	24.753	8.39	57.07	36.35
18.9	17.879	54.90	29.519	32.23	25.023	8.93	57.90	34.70
28.8	18.142	53.34	29.779	30.34	25.313	9.55	58.82	33.42
Aug. 7.8	18.419	51.92	30.053	28.70	25.619	10.22	59.82	32.53
17.8	18.702	50.72	30.338	27.34	25.932	10.92	60.86	32.05
27.8	18.989	49.75	30.627	26.33	26.250	11.61	61.93	31.99
Sept. 6.7	19.275	49.08	30.915	25.70	26.565	12.28	63.01	32.35
16.7	19.554	48.72	31.197	25.48	26.875	12.89	64.08	33.12
26.7	19.823	48.68	31.469	25.68	27.174	13.43	65.11	34.29
Oct. 6.7	20.077	48.97	31.726	26.28	27.461	13.90	66.10	35.84
16.6	20.316	49.57	31.966	27.28	27.731	14.28	67.02	37.72
26.6	20.533	50.44	32.184	28.62	27.981	14.58	67.86	39.93
Nov. 5.6	20.728	51.55	32.376	30.26	28.208	14.81	68.60	42.42
15.5	20.896	52.84	32.541	32.11	28.406	14.99	69.22	45.12
25.5	21.034	54.26	32.673	34.12	28.573	15.12	69.70	47.98
Dec. 5.5	21.138	55.74	32.771	36.21	28.705	15.23	70.03	50.92
15.5	21.205	57.23	32.830	38.29	28.798	15.32	70.20	53.88
25.4	21.233	58.68	32.849	40.29	28.847	15.38	70.19	56.75
35.4	21.221	60.03	32.827	42.16	28.851	15.41	70.03	59.44
Mean Place	16.223	61.44	28.138	41.10	22.890	9.45	54.413	45.95
Sec δ , Tan δ	1.002	-0.061	1.033	-0.258	1.085	+0.420	4.076	+3.951
$D\phi\alpha$, $D\omega\alpha$	+0.06	0.00	+0.05	+0.01	+0.07	-0.01	+0.18	-0.09
$D\phi\delta$, $D\omega\delta$	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Caeli. Mag. 4.5		4 Camelop. Mag. 5.4		μ Eridani. Mag. 4.2		π^3 Orionis. Mag. 3.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 4 37	" " -42 0	h m 4 41	" " +56 36	h m 4 41	" " - 3 23	h m 4 45	" " + 6 0
	s "	" "	s "	" "	s "	" "	s "	" "
Jan. 0.4	59.164	73.96	18.944	60.07	29.289	70.49	28.799	14.35
10.4	59.053	76.54	18.880	61.82	29.263	71.80	28.784	13.32
20.4	58.896	78.75	18.743	63.32	29.197	72.95	28.728	12.73
30.3	58.696	80.54	18.540	64.52	29.095	73.94	28.635	12.11
Feb. 9.3	58.461	81.86	18.282	65.36	28.963	74.74	28.508	11.58
19.3	58.201	82.69	17.982	65.82	28.805	75.34	28.357	11.11
Mar. 1.3	57.926	83.01	17.656	65.85	28.632	75.75	28.188	10.75
11.2	57.647	82.85	17.322	65.47	28.454	75.94	28.012	10.50
21.2	57.375	82.20	16.998	64.69	28.278	75.93	27.840	10.35
31.2	57.121	81.08	16.702	63.55	28.118	75.70	27.682	10.32
Apr. 10.1	56.895	79.53	16.449	62.11	27.979	75.26	27.545	10.41
20.1	56.705	77.60	16.252	60.41	27.871	74.61	27.440	10.64
30.1	56.561	75.30	16.123	58.53	27.800	73.76	27.372	11.01
May 10.1	56.467	72.69	16.068	56.55	27.770	72.71	27.346	11.53
20.0	56.426	69.85	16.090	54.54	27.784	71.47	27.365	12.21
30.0	56.440	66.82	16.191	52.57	27.842	70.08	27.428	13.03
June 9.0	56.509	63.70	16.367	50.70	27.944	68.55	27.535	13.98
19.0	56.631	60.55	16.614	48.99	28.085	66.92	27.682	15.04
28.9	56.803	57.46	16.925	47.48	28.264	65.25	27.865	16.19
July 8.9	57.020	54.50	17.292	46.22	28.475	63.54	28.082	17.39
18.9	57.276	51.76	17.705	45.22	28.712	61.90	28.324	18.61
28.8	57.564	49.34	18.156	44.51	28.970	60.34	28.588	19.78
Aug. 7.8	57.878	47.31	18.634	44.09	29.242	58.94	28.866	20.90
17.8	58.209	45.73	19.131	43.97	29.524	57.74	29.153	21.90
27.8	58.551	44.67	19.637	44.15	29.810	56.79	29.445	22.75
Sept. 6.7	58.895	44.16	20.145	44.60	30.096	56.12	29.737	23.40
16.7	59.234	44.24	20.647	45.33	30.376	55.77	30.024	23.85
26.7	59.561	44.91	21.134	46.30	30.648	55.73	30.303	24.06
Oct. 6.7	59.868	46.15	21.602	47.51	30.908	56.02	30.571	24.04
16.6	60.151	47.92	22.042	48.96	31.151	56.63	30.823	23.79
26.6	60.400	50.17	22.449	50.60	31.376	57.50	31.058	23.34
Nov. 5.6	60.613	52.82	22.814	52.39	31.578	58.63	31.271	22.72
15.5	60.785	55.75	23.131	54.32	31.753	59.94	31.460	21.95
25.5	60.909	58.89	23.392	56.35	31.900	61.37	31.618	21.09
Dec. 5.5	60.984	62.09	23.590	58.43	32.015	62.88	31.744	20.18
15.5	61.007	65.25	23.717	60.51	32.090	64.39	31.834	19.25
25.4	60.978	68.26	23.771	62.52	32.125	65.86	31.883	18.34
35.4	60.897	71.04	23.749	64.39	32.123	67.24	31.891	17.48
Mean Place	56.985	65.45	14.985	53.56	27.089	67.64	26.492	15.62
Sec δ , Tan δ	1.346	-0.901	1.817	+1.517	1.002	-0.059	1.007	+0.120
$D\phi\alpha$, $D\omega\alpha$	+0.04	+0.02	+0.10	-0.03	+0.06	0.00	+0.06	0.00
$D\phi\delta$, $D\omega\delta$	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9

APPARENT PLACES OF STARS, 1919.

357

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	9 Camelop. Mag. 4.4		ι Tauri. Mag. 5.1		π ³ Orionis. Mag. 3.9		ι Aurigæ. Mag. 2.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 4 45	° ' " +66 12	h m 4 46	° ' " +18 42	h m 4 50	° ' " + 2 18	h m 4 51	° ' " +33 2
	s	"	s	"	s	"	s	"
Jan. 0.4	64.49	32.02	40.506	11.80	4.150	30.70	45.778	23.12
10.4	64.38	34.21	40.493	11.59	4.135	29.65	45.768	23.70
20.4	64.18	36.14	40.438	11.37	4.079	28.70	45.708	24.19
30.3	63.88	37.70	40.342	11.16	3.985	27.87	45.601	24.56
Feb. 9.3	63.51	38.85	40.211	10.93	3.858	27.20	45.455	24.78
19.3	63.09	39.54	40.055	10.69	3.707	26.66	45.277	24.84
Mar. 1.3	62.63	39.75	39.881	10.39	3.536	26.26	45.078	24.73
11.2	62.15	39.45	39.698	10.09	3.359	26.02	44.870	24.43
21.2	61.69	38.68	39.517	9.77	3.184	25.93	44.664	23.96
31.2	61.27	37.46	39.353	9.45	3.023	26.00	44.474	23.35
Apr. 10.2	60.90	35.85	39.212	9.15	2.882	26.24	44.312	22.62
20.1	60.61	33.93	39.103	8.89	2.772	26.64	44.186	21.81
30.1	60.40	31.76	39.036	8.70	2.698	27.21	44.104	20.96
May 10.1	60.30	29.43	39.010	8.61	2.665	27.96	44.070	20.12
20.0	60.29	27.03	39.032	8.62	2.676	28.87	44.089	19.32
30.0	60.39	24.62	39.101	8.75	2.731	29.93	44.161	18.60
June 9.0	60.59	22.30	39.216	8.98	2.830	31.13	44.284	17.99
19.0	60.89	20.13	39.372	9.37	2.967	32.43	44.455	17.51
28.9	61.28	18.16	39.568	9.87	3.143	33.80	44.669	17.17
July 8.9	61.74	16.46	39.795	10.45	3.351	35.21	44.921	17.00
18.9	62.27	15.03	40.050	11.13	3.584	36.60	45.204	16.96
28.9	62.85	13.95	40.328	11.86	3.841	37.94	45.512	17.06
Aug. 7.8	63.48	13.20	40.620	12.59	4.112	39.16	45.838	17.29
17.8	64.13	12.79	40.923	13.32	4.393	40.25	46.176	17.63
27.8	64.80	12.76	41.230	14.00	4.680	41.14	46.520	18.06
Sept. 6.7	65.47	13.08	41.537	14.62	4.967	41.78	46.866	18.55
16.7	66.14	13.74	41.841	15.13	5.252	42.18	47.208	19.10
26.7	66.80	14.73	42.138	15.55	5.529	42.30	47.542	19.68
Oct. 6.7	67.43	16.05	42.420	15.84	5.795	42.14	47.865	20.29
16.6	68.02	17.66	42.689	16.02	6.045	41.73	48.171	20.91
26.6	68.57	19.53	42.940	16.08	6.279	41.07	48.458	21.55
Nov. 5.6	69.06	21.63	43.168	16.06	6.492	40.21	48.720	22.21
15.5	69.48	23.93	43.370	15.96	6.680	39.19	48.954	22.88
25.5	69.81	26.38	43.543	15.80	6.838	38.05	49.153	23.57
Dec. 5.5	70.07	28.90	43.680	15.63	6.964	36.85	49.313	24.26
15.5	70.23	31.45	43.778	15.44	7.052	35.64	49.429	24.95
25.4	70.28	33.93	43.835	15.24	7.103	34.47	49.496	25.62
35.4	70.24	36.26	43.849	15.02	7.111	33.36	49.514	26.24
Mean Place	59.338	25.02	38.026	11.17	1.877	32.88	42.964	20.63
Sec δ, Tan δ	2.479	+2.268	1.056	+0.339	1.001	+0.040	1.193	+0.650
D _ψ α, D _ω α	+0.12	-0.05	+0.07	-0.01	+0.06	0.00	+0.08	-0.01
D _ψ δ, D _ω δ	+0.1	+0.9	+0.1	+0.9	+0.1	+1.0	+0.1	+1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ϵ Aurigæ. Var. 3.0-4.5		β Camelop. Mag. 4.2		ζ Aurigæ. Mag. 3.9		ϵ Tauri. Mag. 4.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 4 56	° ' " +43 42	h m 4 56	° ' " +60 19	h m 4 56	° ' " +40 57	h m 4 58	° ' " +2
	s	"	s	"	s	"	s	"
Jan. 0.4	12.435	20.69	16.72	87.50	51.878	35.48	17.735	31.5
10.4	12.421 ¹⁴	21.84 ¹¹⁵	16.67 ⁵	89.49 ¹⁹⁹	51.867 ¹¹	36.49 ¹⁰¹	17.734 ¹	31.5
20.4	12.348 ⁷³	22.86 ¹⁰²	16.53 ¹⁴	41.24 ¹⁷⁵	51.801 ⁶⁶	37.38 ⁸⁹	17.687 ⁴⁷	31.5
30.3	12.221 ¹²⁷	23.68 ⁸²	16.32 ²¹	42.69 ¹⁴⁵	51.683 ¹¹⁸	38.09 ⁷¹	17.598 ⁸⁰	31.1
Feb. 9.3	12.048 ¹⁷³	24.27 ⁵⁰	16.04 ²⁸	43.79 ¹¹⁰	51.519 ¹⁶⁴	38.80 ⁵¹	17.471 ¹³⁷	31.0
	211	32	34	69	199	26	157	
19.3	11.837	24.59	15.70	44.48	51.320	38.86	17.314	30.8
Mar. 1.3	11.602 ²³⁵	24.64 ⁵	15.34 ³⁶	44.73 ²⁵	51.097 ²²³	38.88 ²	17.138 ¹⁷⁶	30.6
11.2	11.356 ²⁴⁶	24.39 ²⁵	14.96 ³⁸	44.53 ³⁰	50.863 ²³⁴	38.63 ²⁶	16.951 ¹⁸⁷	30.4
21.2	11.112 ²⁴⁴	23.87 ⁵²	14.59 ³⁷	43.91 ⁶²	50.631 ²³²	38.14 ⁴⁹	16.766 ¹⁸⁵	30.1
31.2	10.886 ²²⁶	23.08 ⁷⁹	14.24 ³⁵	42.87 ¹⁰⁴	50.416 ²¹⁵	37.41 ⁷³	16.594 ¹⁷²	29.7
	195	100	29	138	187	92	180	
Apr. 10.2	10.691 ¹⁵⁵	22.08	13.95 ²⁵	41.49 ¹⁶⁹	50.229 ¹⁴⁷	36.49 ¹⁰⁷	16.444 ¹¹⁸	29.4
20.1	10.536 ¹⁰⁴	20.91 ¹¹⁷	13.70 ¹⁷	39.80 ¹⁹¹	50.062 ¹⁰⁰	35.42 ¹¹⁸	16.326 ⁷⁹	29.0
30.1	10.432 ⁴⁸	19.62 ¹²⁹	13.53 ¹⁰	37.89 ²⁰⁸	49.982 ⁴⁵	34.24 ¹²²	16.247 ²⁵	28.7
May 10.1	10.384 ¹¹	18.26 ¹³⁶	13.43 ¹	35.81 ²¹⁵	49.937 ¹²	33.02 ¹²²	16.212 ¹²	28.5
20.0	10.395 ⁷¹	16.90 ¹³²	13.42 ⁹	33.66 ²¹⁵	49.949 ⁶⁹	31.80 ¹¹⁷	16.224 ⁶⁰	28.5
30.0	10.466 ¹³⁰	15.58 ¹²³	13.51 ¹⁶	31.51 ²⁰⁷	50.018 ¹²⁶	30.63 ¹⁰⁸	16.284 ¹⁰⁶	28.5
June 9.0	10.596 ¹⁸⁷	14.35 ¹¹⁰	13.67 ²³	29.44 ¹⁹⁷	50.144 ¹⁷⁹	29.55 ⁹⁶	16.390 ¹⁴⁹	28.5
19.0	10.783 ²³⁵	13.25 ⁹⁴	13.90 ³¹	27.47 ¹⁷⁸	50.323 ²²⁷	28.59 ⁸⁰	16.539 ¹⁸⁸	28.5
28.9	11.018 ²⁷⁹	12.31 ⁷⁶	14.21 ³⁸	25.69 ¹⁵⁵	50.550 ²⁷⁰	27.79 ⁶³	16.727 ²²⁴	28.5
July 8.9	11.297 ³¹⁷	11.55 ⁵⁸	14.59 ⁴³	24.14 ¹²⁹	50.820 ³⁰⁵	27.16 ⁴⁵	16.951 ²⁵²	29.5
18.9	11.614 ³⁴⁷	10.97 ³⁷	15.02 ⁴⁸	22.85 ¹⁰²	51.125 ³³³	26.71 ²⁶	17.203 ²⁷⁵	29.6
28.9	11.961 ³⁶⁸	10.60 ¹⁷	15.50 ⁵¹	21.83 ⁷¹	51.458 ³⁵⁶	26.45 ⁹	17.478 ²⁹³	30.5
Aug. 7.8	12.329 ³⁸⁴	10.43 ¹	16.01 ⁵⁴	21.12 ⁴¹	51.814 ³⁶⁹	26.36 ⁹	17.771 ³⁰⁵	30.8
17.8	12.713 ³⁹³	10.44 ²⁰	16.55 ⁵⁵	20.71 ⁹	52.183 ³⁷⁸	26.45 ²⁴	18.076 ³¹⁰	31.5
27.8	13.106 ³⁹⁶	10.64 ³⁶	17.10 ⁵⁶	20.62 ²²	52.561 ³⁸⁰	26.69 ³⁸	18.386 ³¹³	31.5
Sept. 6.7	13.502 ³⁹⁴	11.00 ⁵²	17.66 ⁵⁶	20.84 ⁵¹	52.941 ³⁷⁷	27.07 ⁵¹	18.699 ³¹⁰	32.4
16.7	13.896 ³⁸⁵	11.52 ⁶⁷	18.22 ⁵⁴	21.35 ⁸¹	53.318 ³⁷⁰	27.58 ⁶³	19.009 ³⁰³	32.5
26.7	14.281 ³⁷³	12.19 ⁷⁹	18.76 ⁵³	22.16 ¹⁰⁹	53.688 ³⁵⁸	28.21 ⁷⁴	19.312 ²⁹⁴	33.5
Oct. 6.7	14.654 ³⁵⁴	12.98 ⁹¹	19.29 ⁵⁰	23.25 ¹³⁵	54.046 ³⁴¹	28.95 ⁸²	19.606 ²⁹⁰	33.5
16.6	15.008 ³³³	13.89 ¹⁰²	19.79 ⁴⁷	24.60 ¹⁵⁸	54.387 ³²⁰	29.77 ⁹¹	19.886 ²⁶³	33.7
26.6	15.341 ³⁰⁵	14.91 ¹¹²	20.26 ⁴³	26.18 ¹⁷⁹	54.707 ²⁹³	30.68 ⁹⁸	20.149 ²⁴³	33.8
Nov. 5.6	15.646 ²⁷¹	16.03 ¹²¹	20.69 ³⁷	27.97 ¹⁹⁸	55.000 ²⁶¹	31.66 ¹⁰⁵	20.392 ²¹⁷	33.9
15.6	15.917 ²³¹	17.24 ¹²⁷	21.06 ³¹	29.95 ²¹²	55.261 ²²³	32.71 ¹¹²	20.609 ¹⁸⁷	33.8
25.5	16.148 ¹⁸⁴	18.51 ¹³¹	21.37 ²⁴	32.07 ²²⁰	55.484 ¹⁸⁰	33.83 ¹¹⁴	20.796 ¹⁵²	33.8
Dec. 5.5	16.332 ¹³³	19.82 ¹³²	21.61 ¹⁷	34.27 ²²⁴	55.664 ¹³¹	34.97 ¹¹⁵	20.948 ¹¹³	33.8
15.5	16.465 ⁷⁸	21.14 ¹³⁰	21.78 ⁷	36.51 ²²¹	55.795 ⁷⁷	36.12 ¹¹⁴	21.061 ⁶⁹	33.7
25.4	16.543 ¹⁸	22.44 ¹²²	21.85 ¹	38.72 ²⁰⁶	55.872 ²¹	37.26 ¹⁰⁸	21.130 ²⁵	33.7
35.4	16.561	23.66	21.84	40.80	55.893	38.34	21.155	33.6
Mean Place	9.224	17.12	12.329	32.10	48.782	32.32	15.176	31.0
Sec δ , Tan δ	1.383	+0.956	2.020	+1.755	1.324	+0.868	1.075	+0.5
$D\psi\alpha$, $D\omega\alpha$	+0.09	-0.02	+0.11	-0.03	+0.08	-0.02	+0.07	-0.0
$D\psi\delta$, $D\omega\delta$	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

APPARENT PLACES OF STARS, 1919.

359

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	11 Orionis. Mag. 4.6		η Aurigæ. Mag. 3.3		ε Leporis. Mag. 3.3		β Eridani. Mag. 2.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 4 59	° ' +15 17	h m 5 0	° ' +41 7	h m 5 2	° ' -22 28	h m 5 3	° ' - 5 11
	s	"	s	"	s	"	s	"
Jan. 0.4	58.812	31.99	53.051	37.24	4.072	50.24	54.293	28.15
10.4	58.813	31.59	53.044	38.27	4.037	52.44	54.283	29.61
20.4	58.769	31.23	52.981	39.18	3.959	54.40	54.231	30.93
30.4	58.683	30.90	52.866	39.94	3.841	56.04	54.141	32.04
Feb. 9.3	58.561	30.59	52.704	40.48	3.688	57.35	54.015	32.96
19.3	58.411	30.30	52.506	40.78	3.509	58.31	53.863	33.66
Mar. 1.3	58.239	30.03	52.283	40.83	3.310	58.89	53.690	34.14
11.2	58.058	29.77	52.048	40.61	3.102	59.09	53.508	34.39
21.2	57.878	29.53	51.815	40.14	2.895	58.91	53.326	34.41
31.2	57.711	29.33	51.598	39.44	2.700	58.37	53.155	34.20
Apr. 10.2	57.565	29.17	51.407	38.54	2.525	57.49	53.003	33.79
20.1	57.449	29.06	51.256	37.49	2.378	56.26	52.880	33.13
30.1	57.370	29.08	51.153	36.32	2.268	54.73	52.791	32.27
May 10.1	57.334	29.10	51.104	35.09	2.198	52.93	52.741	31.21
20.1	57.342	29.29	51.110	33.87	2.173	50.87	52.784	29.94
30.0	57.396	29.58	51.175	32.69	2.193	48.63	52.771	28.52
June 9.0	57.495	29.99	51.296	31.59	2.259	46.24	52.850	26.97
19.0	57.636	30.52	51.471	30.61	2.368	43.77	52.970	25.30
28.9	57.816	31.15	51.694	29.77	2.518	41.28	53.128	23.59
July 8.9	58.029	31.86	51.960	29.11	2.704	38.83	53.318	21.87
18.9	58.270	32.62	52.262	28.62	2.922	36.50	53.539	20.18
28.9	58.535	33.41	52.593	28.31	3.166	34.37	53.781	18.61
Aug. 7.8	58.816	34.19	52.946	28.17	3.431	32.51	54.042	17.19
17.8	59.108	34.93	53.315	28.20	3.711	30.98	54.315	15.99
27.8	59.406	35.58	53.692	28.40	4.002	29.84	54.596	15.03
Sept. 6.8	59.707	36.14	54.073	28.73	4.296	29.13	54.880	14.37
16.7	60.005	36.57	54.453	29.19	4.589	28.88	55.163	14.04
26.7	60.298	36.85	54.825	29.77	4.877	29.12	55.441	14.04
Oct. 6.7	60.581	36.97	55.186	30.47	5.154	29.84	55.710	14.40
16.6	60.851	36.96	55.531	31.25	5.416	31.02	55.965	15.08
26.6	61.105	36.81	55.856	32.13	5.659	32.61	56.205	16.06
Nov. 5.6	61.339	36.54	56.155	33.08	5.877	34.56	56.424	17.30
15.6	61.547	36.19	56.421	34.12	6.067	36.79	56.619	18.75
25.5	61.728	35.77	56.650	35.21	6.224	39.21	56.785	20.34
Dec. 5.5	61.875	35.33	56.835	36.35	6.343	41.75	56.917	22.01
15.5	61.984	34.88	56.972	37.51	6.422	44.30	57.014	23.70
25.5	62.052	34.44	57.054	38.65	6.458	46.78	57.070	25.33
35.4	62.076	34.03	57.080	39.74	6.449	49.10	57.084	26.88
Mean Place	56.357	32.63	49.935	34.42	1.889	44.32	52.046	24.44
Sec δ, Tan δ	1.037	+0.273	1.328	+0.873	1.082	-0.414	1.004	-0.091
D _ψ α, D _ω α	+0.07	0.00	+0.08	-0.02	+0.05	+0.01	+0.06	0.00
D _ψ δ, D _ω δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	μ Aurigæ. Mag. 4.8		19 H. Camelopard. Mag. 5.2		μ Leporis. Mag. 3.8		β Orionis. (Rigel.) Mag. 0.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 5 7	° ' " +38 23	h m 5 9	° ' " +79 8	h m 5 9	° ' " -16 17	h m 5 10	° ' " - 8 17
	s	"	s	"	s	"	s	"
Jan. 0.4	55.975	25.31	21.15	33.72	19.757	68.94	40.989	43.53
10.4	55.980	26.20	20.92	36.51	19.738	68.98	40.988	45.17
20.4	55.927	27.00	20.48	39.04	19.678	70.71	40.954	46.04
30.4	55.824	27.66	19.83	41.20	19.577	72.22	40.754	47.89
Feb. 9.3	55.675	28.15	19.02	42.93	19.441	73.44	40.635	48.92
19.3	55.489	28.44	18.08	44.15	19.275	74.85	40.475	49.00
Mar. 1.3	55.277	28.51	17.05	44.81	19.091	74.94	40.301	50.22
11.2	55.052	28.34	15.97	44.89	18.895	75.19	40.116	50.49
21.2	54.827	27.95	14.91	44.39	18.690	75.12	39.931	50.51
31.2	54.617	27.35	13.90	43.35	18.513	74.75	39.754	50.26
Apr. 10.2	54.430	26.56	12.99	41.80	18.346	74.05	39.597	49.78
20.1	54.281	25.64	12.22	39.82	18.208	73.06	39.468	49.94
30.1	54.176	24.62	11.63	37.49	18.101	71.78	39.371	48.08
May 10.1	54.122	23.55	11.21	34.89	18.035	70.25	39.313	46.89
20.1	54.123	22.47	11.02	32.11	18.012	68.50	39.295	45.59
30.0	54.178	21.44	11.02	29.24	18.033	66.56	39.328	43.94
June 9.0	54.288	20.47	11.25	26.38	18.097	64.46	39.397	42.24
19.0	54.449	19.62	11.67	23.60	18.204	62.27	39.508	40.44
28.9	54.658	18.90	12.30	21.00	18.351	60.05	39.658	38.59
July 8.9	54.909	18.33	13.10	18.61	18.532	57.85	39.842	36.73
18.9	55.194	17.91	14.05	16.52	18.744	55.75	40.055	34.93
28.9	55.508	17.66	15.14	14.76	18.982	53.79	40.292	33.26
Aug. 7.8	55.845	17.55	16.34	13.35	19.240	52.07	40.549	31.75
17.8	56.198	17.58	17.63	12.35	19.513	50.62	40.819	30.47
27.8	56.560	17.74	18.97	11.77	19.795	49.51	41.098	29.45
Sept. 6.8	56.927	18.03	20.36	11.61	20.083	48.79	41.382	28.79
16.7	57.293	18.42	21.76	11.87	20.370	48.49	41.665	28.47
26.7	57.654	18.89	23.13	12.56	20.653	48.63	41.945	28.50
Oct. 6.7	58.004	19.45	24.48	13.67	20.927	49.20	42.216	28.93
16.6	58.340	20.09	25.75	15.18	21.187	50.20	42.475	29.00
26.6	58.659	20.80	26.94	17.05	21.431	51.57	42.719	30.78
Nov. 5.6	58.953	21.58	28.00	19.27	21.653	53.28	42.943	32.17
15.6	59.218	22.42	28.93	21.79	21.849	55.24	43.142	33.78
25.5	59.447	23.32	29.68	24.54	22.015	57.41	43.312	35.54
Dec. 5.5	59.636	24.26	30.24	27.47	22.146	59.67	43.450	37.39
15.5	59.777	25.23	30.60	30.48	22.239	61.95	43.551	39.27
25.5	59.866	26.21	30.72	33.50	22.289	64.18	43.611	41.10
35.4	59.901	27.15	30.62	36.41	22.296	66.29	43.628	42.83
Mean Place	52.945	23.39	10.862	28.38	17.549	61.71	38.656	39.27
Sec δ , Tan δ	1.276	+0.792	5.308	+5.213	1.042	-0.292	1.011	-0.146
$D_{\mu a}$, $D_{\mu s}$	+0.08	-0.01	+0.20	-0.08	+0.05	0.00	+0.06	0.00
$D_{\beta s}$, $D_{\beta s}$	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

APPARENT PLACES OF STARS, 1919.

361

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Aurigæ. (Capella.) Mag. 0.2		λ Aurigæ. Mag. 4.8		τ Orionis. Mag. 3.7		σ Columbae. Mag. 4.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 5 10	° ' " +45 54	h m 5 13	° ' " +40 1	h m 5 13	° ' " - 6 55	h m 5 14	° ' " -34 58
	s	"	s	"	s	"	s	"
Jan. 0.4	45.522	63.90	29.559	44.03	42.633	55.58	35.862	33.30
10.4	45.523	65.20	29.570	45.00	42.630	57.16	35.812	36.00
20.4	45.462	66.36	29.523	45.88	42.585	58.59	35.713	38.40
30.4	45.342	67.35	29.423	46.62	42.499	59.80	35.570	40.45
Feb. 9.3	45.171	68.10	29.275	47.19	42.377	60.80	35.387	42.08
19.3	44.958	68.60	29.089	47.55	42.226	61.56	35.173	43.29
Mar. 1.3	44.717	68.78	28.874	47.67	42.054	62.08	34.938	44.04
11.3	44.459	68.66	28.645	47.54	41.871	62.36	34.691	44.33
21.2	44.203	68.25	28.415	47.17	41.686	62.40	34.442	44.16
31.2	43.960	67.55	28.198	46.58	41.510	62.19	34.204	43.55
Apr. 10.2	43.746	66.60	28.004	45.77	41.353	61.75	33.986	42.51
20.1	43.571	65.43	27.847	44.81	41.223	61.06	33.797	41.08
30.1	43.446	64.12	27.735	43.74	41.125	60.16	33.645	39.26
May 10.1	43.377	62.70	27.674	42.59	41.066	59.04	33.536	37.12
20.1	43.368	61.23	27.668	41.42	41.049	57.74	33.474	34.71
30.0	43.422	59.78	27.720	40.27	41.075	56.26	33.462	32.07
June 9.0	43.536	58.38	27.826	39.19	41.144	54.64	33.499	29.28
19.0	43.708	57.09	27.985	38.21	41.254	52.93	33.584	26.39
29.0	43.933	55.94	28.192	37.35	41.403	51.14	33.716	23.49
July 8.9	44.205	54.94	28.443	36.64	41.584	49.35	33.890	20.65
18.9	44.518	54.13	28.730	36.08	41.797	47.61	34.104	17.96
28.9	44.865	53.52	29.048	35.69	42.032	45.99	34.350	15.51
Aug. 7.8	45.236	53.10	29.390	35.46	42.288	44.52	34.622	13.38
17.8	45.626	52.89	29.749	35.37	42.557	43.28	34.915	11.62
27.8	46.030	52.86	30.118	35.43	42.836	42.29	35.224	10.32
Sept. 6.8	46.439	53.02	30.493	35.63	43.119	41.62	35.541	9.53
16.7	46.848	53.35	30.869	35.93	43.402	41.29	35.860	9.27
26.7	47.252	53.85	31.240	36.35	43.681	41.32	36.175	9.59
Oct. 6.7	47.645	54.51	31.602	36.86	43.953	41.70	36.480	10.46
16.6	48.024	55.30	31.950	37.47	44.213	42.43	36.770	11.88
26.6	48.381	56.24	32.281	38.18	44.459	43.49	37.037	13.78
Nov. 5.6	48.712	57.31	32.587	38.96	44.687	44.81	37.277	16.10
15.6	49.009	58.50	32.865	39.82	44.887	46.36	37.483	18.77
25.5	49.266	59.79	33.107	40.75	45.060	48.07	37.653	21.68
Dec. 5.5	49.476	61.14	33.306	41.75	45.202	49.86	37.780	24.74
15.5	49.633	62.54	33.458	42.79	45.307	51.67	37.860	27.82
25.5	49.730	63.95	33.557	43.83	45.370	53.44	37.890	30.83
35.4	49.766	65.31	33.599	44.85	45.392	55.10	37.869	33.66
Mean Place	42.164	61.38	26.457	42.40	40.376	51.42	33.610	26.15
Sec δ , Tan δ	1.437	+1.033	1.306	+0.840	1.007	-0.121	1.220	-0.700
$D_{\phi\alpha}$, $D_{\omega\alpha}$	+0.09	-0.01	+0.08	-0.01	+0.06	0.00	+0.04	+0.01
$D_{\phi\delta}$, $D_{\omega\delta}$	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Orionis. (Bellatrix.) Mag. 1.7		β Tauri. Mag. 1.8		17 Camelop. Mag. 5.8		β Leporis. Mag. 3.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 5 20	° ' " + 6 16	h m 5 21	° ' " +28 32	h m 5 22	° ' " +62 59	h m 5 24	° ' " -20 48
	s	"	s	"	s	"	s	"
Jan. 0.4	49.528	35.57	12.980	24.68	35.78	67.62	48.719	29.00
10.4	49.542	34.64	13.001	25.02	35.76	69.81	48.708	31.20
20.4	49.511	33.81	12.972	25.34	35.66	71.82	48.651	33.20
30.4	49.438	33.11	12.894	25.62	35.46	73.56	48.552	35.04
Feb. 9.3	49.328	32.51	12.772	25.82	35.18	74.99	48.416	36.41
19.3	49.187	32.02	12.615	25.93	34.84	76.02	48.248	37.56
Mar. 1.3	49.022	31.65	12.433	25.92	34.45	76.61	48.058	38.29
11.3	48.845	31.41	12.235	25.79	34.04	76.75	47.855	38.64
21.2	48.665	31.26	12.035	25.53	33.62	76.43	47.648	38.65
31.2	48.494	31.24	11.844	25.17	33.22	75.67	47.449	38.31
Apr. 10.2	48.340	31.33	11.674	24.71	32.86	74.50	47.266	37.60
20.1	48.213	31.57	11.533	24.18	32.56	72.97	47.110	36.57
30.1	48.118	31.93	11.431	23.61	32.32	71.16	46.987	35.24
May 10.1	48.063	32.42	11.373	23.04	32.16	69.11	46.901	33.62
20.1	48.050	33.05	11.363	22.49	32.09	66.93	46.857	31.75
30.0	48.080	33.82	11.402	21.99	32.12	64.68	46.859	29.67
June 9.0	48.153	34.70	11.490	21.57	32.24	62.42	46.903	27.44
19.0	48.268	35.68	11.625	21.25	32.44	60.23	46.992	25.10
29.0	48.420	36.74	11.802	21.03	32.72	58.18	47.121	22.72
July 8.9	48.605	37.85	12.017	20.91	33.08	56.30	47.288	20.36
18.9	48.821	38.96	12.265	20.89	33.50	54.65	47.488	18.08
28.9	49.060	40.04	12.539	20.96	33.99	53.24	47.715	15.96
Aug. 7.8	49.319	41.05	12.836	21.11	34.51	52.12	47.966	14.11
17.8	49.592	41.94	13.147	21.31	35.07	51.30	48.234	12.55
27.8	49.874	42.66	13.469	21.57	35.66	50.78	48.514	11.34
Sept. 6.8	50.161	43.21	13.797	21.83	36.26	50.59	48.803	10.55
16.7	50.450	43.53	14.126	22.10	36.87	50.71	49.095	10.21
26.7	50.735	43.62	14.452	22.37	37.47	51.14	49.385	10.35
Oct. 6.7	51.015	43.47	14.772	22.62	38.06	51.90	49.668	10.95
16.7	51.286	43.10	15.081	22.85	38.63	52.94	49.940	12.02
26.6	51.542	42.51	15.377	23.07	39.17	54.27	50.196	13.51
Nov. 5.6	51.781	41.73	15.653	23.31	39.67	55.86	50.432	15.35
15.6	51.998	40.82	15.904	23.55	40.11	57.69	50.641	17.52
25.5	52.189	39.82	16.125	23.80	40.50	59.73	50.820	19.88
Dec. 5.5	52.347	38.76	16.311	24.09	40.81	61.92	50.965	22.39
15.5	52.469	37.69	16.455	24.41	41.04	64.21	51.069	24.93
25.5	52.550	36.65	16.554	24.75	41.17	66.53	51.130	27.43
35.4	52.588	35.68	16.603	25.10	41.22	68.80	51.145	29.80
Mean Place	47.145	38.37	10.218	24.94	30.964	64.74	46.481	23.22
Sec δ , Tan δ	1.006	+0.110	1.138	+0.544	2.203	+1.963	1.070	-0.380
$D\mu\alpha$, $D\omega\alpha$	+0.06	0.00	+0.08	-0.01	+0.11	-0.02	+0.05	0.00
δ , $D\omega\delta$	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

APPARENT PLACES OF STARS. 1919.

363

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	χ Aurigæ. Mag. 4.9		δ Orionis. Mag. 2.5		Groombridge 966. Mag. 6.4		α Leporis. Mag. 2.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 5 27	° ' +32 7	h m 5 27	° ' - 0 21	h m 5 28	° ' +74 59	h m 5 29	° ' -17 52
	s "	"	s "	"	s "	"	s "	"
Jan. 0.5	30.149	59.65	54.398	32.87	60.92	36.81	11.698	51.39
10.4	30.175	60.20	54.414	34.17	60.85	39.52	11.695	53.54
20.4	30.150	60.74	54.385	35.33	60.62	42.02	11.648	55.49
30.4	30.071	61.19	54.313	36.34	60.22	44.23	11.557	57.16
Feb. 9.3	29.949	61.55	54.204	37.18	59.70	46.05	11.428	58.54
19.3	29.788	61.79	54.064	37.83	59.07	47.41	11.267	59.60
Mar. 1.3	29.600	61.90	53.899	38.31	58.35	48.27	11.084	60.33
11.3	29.395	61.82	53.721	38.59	57.60	48.58	10.887	60.71
21.2	29.187	61.61	53.540	38.71	56.83	48.34	10.686	60.76
31.2	28.987	61.24	53.365	38.64	56.09	47.58	10.491	60.47
Apr. 10.2	28.807	60.73	53.207	38.39	55.41	46.31	10.312	59.85
20.2	28.656	60.13	53.073	37.97	54.82	44.60	10.160	58.93
30.1	28.545	59.44	52.972	37.36	54.35	42.51	10.038	57.70
May 10.1	28.479	58.71	52.908	36.57	54.01	40.14	9.955	56.22
20.1	28.462	57.99	52.884	35.62	53.81	37.55	9.913	54.48
30.0	28.495	57.30	52.904	34.51	53.78	34.85	9.913	52.54
June 9.0	28.576	56.68	52.966	33.28	53.90	32.11	9.957	50.44
19.0	28.708	56.13	53.068	31.95	54.16	29.41	10.044	48.24
29.0	28.883	55.66	53.208	30.55	54.58	26.83	10.171	45.99
July 8.9	29.097	55.31	53.383	29.12	55.12	24.42	10.334	43.74
18.9	29.348	55.06	53.588	27.71	55.78	22.27	10.529	41.59
28.9	29.626	54.94	53.816	26.37	56.55	20.38	10.753	39.57
Aug. 7.9	29.928	54.90	54.066	25.15	57.40	18.82	10.999	37.77
17.8	30.247	54.93	54.331	24.09	58.32	17.62	11.263	36.27
27.8	30.577	55.06	54.606	23.23	59.31	16.80	11.540	35.10
Sept. 6.8	30.917	55.22	54.888	22.64	60.33	16.35	11.825	34.31
16.7	31.258	55.41	55.172	22.32	61.35	16.32	12.114	33.96
26.7	31.599	55.65	55.455	22.29	62.38	16.68	12.401	34.05
Oct. 6.7	31.932	55.90	55.733	22.58	63.40	17.45	12.683	34.60
16.7	32.257	56.19	56.002	23.15	64.37	18.60	12.955	35.59
26.6	32.567	56.50	56.258	23.99	65.28	20.12	13.212	36.97
Nov. 5.6	32.856	56.85	56.497	25.07	66.13	21.98	13.450	38.72
15.6	33.122	57.22	56.715	26.33	66.88	24.17	13.663	40.76
25.6	33.358	57.67	56.906	27.72	67.52	26.61	13.848	43.00
Dec. 5.5	33.555	58.15	57.066	29.18	68.02	29.27	13.998	45.37
15.5	33.711	58.68	57.189	30.66	68.38	32.05	14.109	47.79
25.5	33.821	59.24	57.272	32.11	68.57	34.89	14.177	50.17
35.4	33.878	59.80	57.311	33.47	68.60	37.68	14.201	52.42
Mean Place	27.279	59.98	52.066	29.08	53.086	33.91	9.448	45.87
Sec δ , Tan δ	1.181	+0.628	1.000	-0.006	3.862	+3.730	1.051	-0.323
$D_{\phi a}$, $D_{\omega a}$	+0.08	-0.01	+0.06	0.00	+0.16	-0.03	+0.05	0.00
$D_{\phi \delta}$, $D_{\omega \delta}$	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ϕ^1 Orionis. Mag. 4.5		ι Orionis. Mag. 2.9		ϵ Orionis. Mag. 1.8		ζ Tauri. Mag. 3.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 5 30	° ' " + 9 26	h m 5 31	° ' " - 5 57	h m 5 32	° ' " - 1 15	h m 5 32	° ' " + 21 3
Jan. 0.5	24.799	5.61	30.525	48.13	8.496	13.34	50.809	37.27
10.4	24.823	4.84	30.540	49.73	8.514	14.70	50.841	37.18
20.4	24.802	4.17	30.509	51.17	8.488	15.92	50.824	37.12
30.4	24.737	3.58	30.436	52.41	8.419	16.98	50.760	37.07
Feb. 9.3	24.633	3.09	30.324	53.45	8.311	17.86	50.653	37.03
19.3	24.497	2.69	30.181	54.25	8.172	18.54	50.512	36.97
Mar. 1.3	24.335	2.38	30.014	54.83	8.008	19.04	50.343	36.89
11.3	24.158	2.16	29.833	55.16	7.830	19.34	50.158	36.78
21.2	23.978	2.01	29.647	55.27	7.648	19.46	49.969	36.59
31.2	23.803	1.95	29.468	55.13	7.472	19.39	49.786	36.38
Apr. 10.2	23.646	1.97	29.305	54.77	7.312	19.12	49.621	36.14
20.2	23.513	2.09	29.165	54.19	7.175	18.68	49.482	35.90
30.1	23.413	2.33	29.058	53.37	7.071	18.04	49.377	35.67
May 10.1	23.351	2.67	28.987	52.36	7.003	17.23	49.313	35.47
20.1	23.331	3.12	28.957	51.15	6.976	16.25	49.294	35.32
30.0	23.354	3.68	28.968	49.78	6.991	15.11	49.320	35.24
June 9.0	23.421	4.37	29.022	48.27	7.049	13.84	49.391	35.24
19.0	23.529	5.14	29.116	46.64	7.146	12.48	49.507	35.32
29.0	23.676	5.99	29.249	44.96	7.282	11.04	49.663	35.49
July 8.9	23.856	6.89	29.417	43.26	7.452	9.58	49.855	35.74
18.9	24.068	7.81	29.615	41.61	7.653	8.14	50.079	36.05
28.9	24.304	8.72	29.839	40.04	7.878	6.77	50.330	36.40
Aug. 7.9	24.561	9.57	30.083	38.62	8.124	5.52	50.602	36.77
17.8	24.833	10.32	30.345	37.41	8.387	4.45	50.890	37.13
27.8	25.115	10.95	30.617	36.45	8.661	3.58	51.189	37.47
Sept. 6.8	25.403	11.43	30.897	35.79	8.941	2.98	51.497	37.76
16.7	25.694	11.70	31.180	35.46	9.225	2.67	51.806	37.96
26.7	25.985	11.79	31.462	35.47	9.508	2.65	52.115	38.09
Oct. 6.7	26.270	11.67	31.740	35.84	9.787	2.95	52.419	38.13
16.7	26.547	11.33	32.009	36.56	10.057	3.56	52.716	38.09
26.6	26.812	10.82	32.265	37.58	10.314	4.43	53.001	37.97
Nov. 5.6	27.061	10.15	32.504	38.89	10.556	5.56	53.269	37.79
15.6	27.289	9.36	32.721	40.42	10.776	6.87	53.515	37.58
25.6	27.490	8.49	32.913	42.11	10.971	8.31	53.733	37.36
Dec. 5.5	27.660	7.58	33.072	43.89	11.134	9.84	53.920	37.14
15.5	27.794	6.67	33.194	45.70	11.260	11.38	54.068	36.95
25.5	27.888	5.80	33.275	47.47	11.347	12.89	54.173	36.80
35.4	27.937	4.99	33.314	49.14	11.390	14.32	54.231	36.69
Mean Place	22.364	8.49	28.228	43.68	6.163	9.33	48.190	39.09
Sec δ , Tan δ	1.014	+0.166	1.005	-0.104	1.000	-0.022	1.072	+0.386
$D\psi\alpha$, $D\omega\alpha$	+0.07	0.00	+0.06	0.00	+0.06	0.00	+0.07	0.00
$D\psi\delta$, $D\omega\delta$	+0.1	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

APPARENT PLACES OF STARS, 1919.

365

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Orionis. Mag. 2.0		α Columbe. Mag. 2.8		ο Aurigæ. Mag. 5.5		ζ Leporis. Mag. 3.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 5 36	° ' " - 1 58	h m 5 36	° ' " -34 6	h m 5 39	° ' " +49 47	h m 5 43	° ' " -14 50
	s	"	s	"	s	"	s	"
Jan. 0.5	42.615 ²²	68.62 ¹⁴²	45.260 ²⁵	66.70 ²⁸²	41.028 ³⁷	32.09 ¹⁵⁶	19.362 ¹⁵	69.76 ²⁰⁸
10.4	42.637 ²⁴	70.04 ¹²⁸	45.235 ⁷⁶	69.52 ²⁵⁴	41.065 ³⁴	33.65 ¹⁴⁷	19.377 ³²	71.84 ¹⁹⁰
20.4	42.613 ⁶⁶	71.32 ¹¹⁰	45.159 ¹²³	72.06 ²²⁰	41.031 ¹⁰²	35.12 ¹³³	19.345 ⁷⁶	73.74 ¹⁶⁴
30.4	42.547 ¹⁰⁵	72.42 ⁹²	45.036 ¹⁶⁷	74.26 ¹⁸³	40.929 ¹⁶¹	36.45 ¹¹⁰	19.269 ¹¹⁶	75.38 ¹³⁸
Feb. 9.3	42.442 ¹³⁷	73.34 ⁷¹	44.869 ²⁰¹	76.09 ¹⁴¹	40.768 ²¹³	37.55 ⁸⁵	19.153 ¹⁴³	76.76 ¹⁰⁷
19.3	42.305 ¹⁶³	74.05 ⁵²	44.668 ²²⁶	77.50 ⁹⁶	40.555 ²⁵²	38.40 ⁵⁴	19.005 ¹⁷⁵	77.83 ⁷⁶
Mar. 1.3	42.142 ¹⁷⁷	74.57 ³³	44.442 ²⁴²	78.46 ⁵¹	40.303 ²⁷⁵	38.94 ²¹	18.830 ¹⁹⁰	78.59 ⁴⁶
11.3	41.965 ¹⁸²	74.90 ¹²	44.200 ²⁴⁷	78.97 ⁶	40.028 ²⁸⁴	39.15 ¹³	18.640 ¹⁹⁶	79.05 ¹³
21.2	41.783 ¹⁷⁸	75.02 ⁷	43.953 ²⁴¹	79.03 ³⁹	39.744 ²⁷⁵	39.02 ⁴⁶	18.444 ¹⁹²	79.18 ¹⁸
31.2	41.605 ¹⁶²	74.95 ²⁷	43.712 ²²⁵	78.64 ⁸³	39.469 ²⁵²	38.56 ⁷⁷	18.252 ¹⁷⁹	79.00 ⁴⁷
Apr. 10.2	41.443 ¹³⁹	74.68 ⁴⁷	43.487 ¹⁹⁸	77.81 ¹²³	39.217 ²¹⁶	37.79 ¹⁰⁴	18.073 ¹⁵⁴	78.53 ⁷⁸
20.2	41.304 ¹⁰⁸	74.21 ⁶⁴	43.289 ¹⁶⁵	76.58 ¹⁶¹	39.001 ¹⁶⁹	36.75 ¹²⁷	17.919 ¹²⁶	77.75 ¹⁰⁶
30.1	41.196 ⁷¹	73.57 ⁸⁴	43.124 ¹²⁵	74.97 ¹⁹⁶	38.832 ¹¹³	35.48 ¹⁴⁵	17.794 ⁹¹	76.69 ¹³⁰
May 10.1	41.125 ³²	72.73 ¹⁰⁰	42.999 ⁸¹	73.01 ²²⁵	38.719 ⁵²	34.03 ¹⁵⁵	17.703 ⁴⁹	75.39 ¹⁵⁵
20.1	41.093 ¹¹	71.73 ¹¹⁵	42.918 ³⁴	70.76 ²⁵¹	38.667 ¹²	32.48 ¹⁶³	17.664 ⁸	73.84 ¹⁷⁴
30.0	41.104 ⁵²	70.58 ¹³⁰	42.884 ¹⁴	68.25 ²⁶⁸	38.679 ⁷⁷	30.85 ¹⁶¹	17.646 ³⁵	72.10 ¹⁹¹
June 9.0	41.156 ⁹²	69.28 ¹³⁹	42.898 ⁶³	65.57 ²³⁰	38.756 ¹⁴¹	29.24 ¹⁵⁸	17.681 ⁷⁶	70.19 ²⁰²
19.0	41.248 ¹³²	67.89 ¹⁴⁶	42.961 ¹⁰⁸	62.77 ²⁸⁵	38.897 ¹⁹⁸	27.66 ¹⁵⁰	17.757 ¹¹⁶	68.17 ²⁰⁸
29.0	41.380 ¹⁶⁶	66.43 ¹⁴³	43.069 ¹⁵¹	59.92 ²⁸²	39.095 ²⁵¹	26.16 ¹³⁸	17.873 ¹⁵²	66.09 ²⁰⁹
July 8.9	41.546 ¹⁹⁶	64.95 ¹⁴³	43.220 ¹⁸⁹	57.10 ²⁷⁰	39.346 ²⁹⁸	24.78 ¹²¹	18.025 ¹⁸⁴	64.00 ²⁰³
18.9	41.742 ²²²	63.47 ¹³⁸	43.409 ²²⁵	54.40 ²⁶⁰	39.644 ³³⁹	23.57 ¹⁰⁴	18.209 ²¹³	61.97 ¹⁹¹
28.9	41.964 ²⁴³	62.09 ¹²⁶	43.634 ²⁶⁵	51.90 ²²²	39.983 ³⁷¹	22.53 ⁸⁵	18.422 ²³⁶	60.06 ¹⁷⁰
Aug. 7.9	42.207 ²⁶¹	60.83 ¹¹⁰	43.889 ²⁷⁸	49.68 ¹⁸⁷	40.354 ³⁹⁹	21.68 ⁶⁵	18.658 ²⁵⁵	58.36 ¹⁴⁷
17.8	42.468 ²⁷¹	59.73 ⁸⁶	44.167 ²⁹⁷	47.81 ¹⁴³	40.753 ⁴¹⁷	21.03 ⁴⁵	18.913 ²⁶⁹	56.89 ¹¹⁴
27.8	42.739 ²⁷⁹	58.87 ⁶²	44.464 ³⁰⁹	46.38 ⁹³	41.170 ⁴³⁰	20.58 ²⁴	19.182 ²⁸⁰	55.75 ⁷⁸
Sept. 6.8	43.018 ²⁸³	58.25 ³¹	44.773 ³¹⁶	45.45 ⁴²	41.600 ⁴³⁷	20.34 ⁴	19.462 ²⁸⁴	54.97 ³⁸
16.7	43.301 ²⁸³	57.94 ¹	45.089 ³¹⁷	45.03 ¹⁴	42.037 ⁴³⁹	20.30 ¹⁶	19.746 ²⁸⁶	54.59 ⁴
26.7	43.584 ²⁷⁹	57.95 ³¹	45.406 ³¹¹	45.17 ⁷¹	42.476 ⁴³⁴	20.46 ³⁶	20.032 ²⁸⁴	54.63 ⁴⁷
Oct. 6.7	43.863 ²⁷²	58.26 ⁶⁴	45.717 ²⁹⁹	45.88 ¹⁷⁶	42.910 ⁴²³	20.82 ⁷⁶	20.316 ²⁶³	55.10 ¹²⁹
16.7	44.135 ²⁵⁹	58.90 ⁹⁰	46.016 ²⁸³	47.13 ¹⁷⁶	43.333 ⁴⁰⁶	21.37 ⁷⁶	20.592 ²⁶³	55.99 ¹²⁹
26.6	44.394 ²⁴⁴	59.80 ¹¹⁷	46.299 ²⁶⁹	48.89 ²²¹	43.739 ³⁸³	22.13 ⁹³	20.855 ²⁴⁷	57.28 ¹⁶³
Nov. 5.6	44.638 ²²⁴	60.97 ¹³⁴	46.558 ²³⁰	51.10 ²⁵⁸	44.122 ³⁵⁰	23.06 ¹¹²	21.102 ²²⁶	58.91 ¹⁹¹
15.6	44.862 ¹⁹⁸	62.31 ¹⁵⁰	46.788 ¹⁹³	53.68 ²⁸⁵	44.472 ³¹⁰	24.18 ¹²⁸	21.328 ¹⁹⁷	60.82 ²¹³
25.6	45.060 ¹⁶⁶	63.81 ¹⁵³	46.981 ¹⁵²	56.53 ³⁰⁴	44.782 ²⁶³	25.46 ¹⁴²	21.525 ¹⁶⁵	62.95 ²²⁵
Dec. 5.5	45.226 ¹³⁰	65.39 ¹⁶⁰	47.133 ¹⁰⁷	59.57 ³¹⁰	45.045 ²⁰⁶	26.88 ¹⁵²	21.690 ¹²⁷	65.20 ²³¹
15.5	45.356 ⁹²	66.99 ¹⁵⁶	47.240 ⁵⁷	62.67 ³⁰⁶	45.251 ¹⁴³	28.40 ¹⁵⁹	21.817 ⁸⁶	67.51 ²²⁷
25.5	45.448 ⁴⁷	68.55 ¹⁴³	47.297 ⁵	65.73 ²⁹³	45.394 ⁷⁶	29.99 ¹⁵⁹	21.903 ⁴⁰	69.78 ²¹⁸
35.4	45.495	70.03	47.302	68.66	45.470	31.58	21.943	71.96
Mean Place	40.282	64.42	42.954	60.00	37.398	31.94	17.080	64.39
Sec δ, Tan δ	1.001	-0.035	1.208	-0.677	1.549	+1.183	1.035	-0.265
Dψα, Dωα	+0.06	0.00	+0.04	0.00	+0.09	-0.01	+0.05	0.00
Dψδ, Dωδ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	κ Orionis. Mag. 2.2		δ Doradus. Mag. 4.5		ν Aurigæ. Mag. 4.2		δ Leporis. Mag. 3.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 5 43	° ' " - 9 41	h m 5 44	° ' " - 65 45	h m 5 45	° ' " + 39 7	h m 5 47	° ' " - 20 32
Jan. 0.5	57.177	55.83	40.76	64.89	55.632	32.96	52.525	72.07
10.4	57.198	57.68	40.58	68.27	55.681	33.93	52.537	74.47
20.4	57.173	59.33	40.30	71.34	55.670	34.86	52.501	76.64
30.4	57.104	60.79	39.94	74.02	55.601	35.72	52.420	78.59
Feb. 9.4	56.996	61.99	39.50	76.25	55.480	36.45	52.297	80.15
19.3	56.855	62.94	39.00	77.98	55.314	37.02	52.140	81.41
Mar. 1.3	56.688	63.62	38.46	79.17	55.113	37.39	51.958	82.32
11.3	56.505	64.03	37.90	79.82	54.892	37.54	51.758	82.87
21.2	56.315	64.17	37.33	79.92	54.661	37.46	51.553	83.05
31.2	56.130	64.04	36.76	79.46	54.435	37.14	51.347	82.87
Apr. 10.2	55.959	63.65	36.22	78.49	54.228	36.62	51.157	82.33
20.2	55.810	63.00	35.72	77.03	54.050	35.91	50.990	81.47
30.1	55.691	62.12	35.28	75.11	53.909	35.05	50.852	80.29
May 10.1	55.608	60.99	34.91	72.80	53.817	34.07	50.750	78.82
20.1	55.563	59.67	34.61	70.12	53.775	33.04	50.688	77.09
30.1	55.561	58.16	34.39	67.15	53.787	31.97	50.668	75.13
June 9.0	55.600	56.50	34.26	63.98	53.853	30.91	50.691	73.00
19.0	55.680	54.73	34.23	60.68	53.969	29.90	50.758	70.75
29.0	55.800	52.89	34.30	57.32	54.135	28.97	50.868	68.42
July 8.9	55.954	51.04	34.44	54.01	54.346	28.14	51.011	66.11
18.9	56.139	49.24	34.67	50.84	54.596	27.43	51.191	63.86
28.9	56.353	47.54	34.98	47.91	54.881	26.83	51.401	61.76
Aug. 7.9	56.589	46.00	35.37	45.31	55.192	26.35	51.636	59.86
17.8	56.843	44.69	35.82	43.13	55.528	25.99	51.891	58.26
27.8	57.111	43.65	36.31	41.45	55.881	25.75	52.164	57.01
Sept. 6.8	57.388	42.94	36.86	40.33	56.243	25.62	52.447	56.15
16.8	57.670	42.59	37.41	39.84	56.612	25.59	52.737	55.74
26.7	57.954	42.61	37.98	39.99	56.981	25.65	53.029	55.80
Oct. 6.7	58.235	43.02	38.54	40.79	57.349	25.82	53.319	56.33
16.7	58.509	43.82	39.06	42.25	57.711	26.09	53.601	57.34
26.6	58.771	44.97	39.55	44.30	58.058	26.45	53.872	58.79
Nov. 5.6	59.019	46.41	39.99	46.88	58.388	26.92	54.124	60.61
15.6	59.245	48.12	40.35	49.90	58.692	27.49	54.355	62.77
25.6	59.445	50.01	40.63	53.26	58.965	28.18	54.556	65.16
Dec. 5.5	59.613	52.01	40.82	56.85	59.198	28.96	54.723	67.72
15.5	59.745	54.06	40.90	60.53	59.389	29.83	54.852	70.34
25.5	59.836	56.07	40.89	64.19	59.525	30.77	54.936	72.92
35.5	59.883	57.99	40.77	67.70	59.606	31.75	54.975	75.41
Mean Place	54.876	50.84	37.517	57.32	52.513	34.19	50.243	66.28
Sec δ , Tan δ	1.015	-0.171	2.436	-2.222	1.289	+0.813	1.070	-0.382
$D\psi\alpha$, $D_{\omega\alpha}$	+0.06	0.00	0.00	+0.01	+0.08	0.00	+0.05	0.00
$D\psi\delta$, $D_{\omega\delta}$	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

APPARENT PLACES OF STARS, 1919.

367

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Time.	α Orionis. (Betelgeux.) Var. 1.0-1.4		η Leporis. Mag. 3.8		δ Aurigæ. Mag. 3.9		β Aurigæ. Mag. 2.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 5 50	° ' " + 7 23	h m 5 52	° ' " -14 10	h m 5 52	° ' " +54 16	h m 5 53	° ' " +44 56
	s	"	s	"	s	"	s	"
0.5	49.618	31.03	45.222	59.10	55.476	47.84	38.645	24.84
10.4	49.659 41	30.10 93	45.247 25	61.19 209	55.531 55	49.65 181	38.702 57	26.14 130
20.4	49.654 5	29.27 83	45.225 22	63.09 190	55.507 24	51.38 173	38.693 0	27.40 126
30.4	49.605 49	28.58 69	45.157 68	64.75 166	55.406 101	52.96 158	38.621 72	28.56 116
3. 9.4	49.513 92	28.00 58	45.049 108	66.15 140	55.237 169	54.33 137	38.491 130	29.57 101
	128	46	142	110	229	108	180	80
19.3	49.385	27.54 35	44.907	67.25 79	55.008	55.41 76	38.311	30.37 57
r. 1.3	49.230 155	27.19 23	44.737 170	68.04 50	54.734 274	56.17 39	38.092 219	30.94 28
11.3	49.057 173	26.96 13	44.550 187	68.54 18	54.430 304	56.56 3	37.848 244	31.22 0
21.3	48.876 181	26.83 3	44.355 195	68.72 13	54.114 316	56.59 36	37.592 251	31.22 29
31.2	48.699 177	26.80 7	44.163 181	68.59 42	53.803 291	56.23 72	37.341 235	30.93 56
r. 10.2	48.535 143	26.87 19	43.982 158	68.17 72	53.512 254	55.51 105	37.106 203	30.37 81
20.2	48.392 112	27.06 29	43.824 130	67.45 98	53.258 205	54.46 131	36.903 163	29.56 101
30.1	48.280 76	27.35 41	43.694 96	66.47 125	53.053 146	53.15 154	36.740 113	28.55 119
y 10.1	48.204 37	27.76 53	43.598 56	65.22 147	52.907 82	51.61 171	36.627 59	27.36 129
20.1	48.167 5	28.29 64	43.542 15	63.75 169	52.825 12	49.90 181	36.568 0	26.07 135
30.1	48.172 46	28.93 75	43.527 27	62.06 183	52.813 58	48.09 186	36.568 57	24.72 137
ie 9.0	48.218 88	29.68 83	43.554 68	60.23 196	52.871 126	46.23 184	36.625 114	23.35 135
19.0	48.306 126	30.51 91	43.622 108	58.27 203	52.997 193	44.39 178	36.739 168	22.00 128
29.0	48.432 161	31.42 94	43.730 143	56.24 204	53.190 251	42.61 167	36.907 218	20.72 118
y 8.9	48.593 192	32.36 95	43.873 177	54.20 200	53.441 305	40.94 153	37.125 262	19.54 108
18.9	48.785 219	33.31 93	44.050 206	52.20 188	53.746 352	39.41 136	37.387 299	18.46 94
28.9	49.004 241	34.24 86	44.256 230	50.32 160	54.098 392	38.05 116	37.686 331	17.52 80
z. 7.9	49.245 260	35.10 74	44.486 250	48.63 145	54.490 423	36.89 95	38.017 357	16.72 63
17.8	49.505 272	35.84 61	44.736 265	47.18 115	54.913 449	35.94 72	38.374 376	16.09 49
27.8	49.777 281	36.45 42	45.001 277	46.03 79	55.362 466	35.22 50	38.750 390	15.60 33
it. 6.8	50.058 287	36.87 22	45.278 282	45.24 41	55.828 477	34.72 26	39.140 400	15.27 17
16.8	50.345 290	37.09 0	45.560 285	44.83 1	56.305 482	34.46 2	39.540 403	15.10 3
26.7	50.635 288	37.09 24	45.845 284	44.84 44	56.787 480	34.44 23	39.943 402	15.07 14
6.7	50.923 283	36.85 45	46.129 279	45.28 86	57.267 473	34.67 46	40.345 394	15.21 30
16.7	51.206 274	36.40 66	46.408 269	46.14 125	57.740 455	35.13 71	40.739 382	15.51 44
26.6	51.480 259	35.74 83	46.677 252	47.39 160	58.195 431	35.84 95	41.121 364	15.95 61
v. 5.6	51.739 242	34.91 96	46.929 232	48.99 188	58.626 398	36.79 117	41.485 338	16.56 77
15.6	51.981 217	33.95 105	47.161 206	50.87 211	59.024 355	37.96 137	41.823 303	17.33 92
25.6	52.198 188	32.90 110	47.367 175	52.98 223	59.379 304	39.33 155	42.126 262	18.25 106
z. 5.5	52.386 152	31.80 110	47.542 137	55.21 229	59.683 242	40.88 171	42.388 212	19.31 119
15.5	52.538 111	30.70 105	47.679 95	57.50 227	59.925 173	42.59 180	42.600 155	20.50 127
25.5	52.649 68	29.65 98	47.774 51	59.77 218	60.098 97	44.39 183	42.755 92	21.77 131
35.5	52.717	28.67	47.825	61.95	60.195	46.22	42.847	23.08
Place	47.179	34.96	42.926	53.70	51.520	48.70	35.268	26.34
Tan δ	1.008	+0.130	1.032	-0.253	1.713	+1.391	1.413	+0.998
$D_{\omega\alpha}$	+0.06	0.00	+0.05	0.00	+0.10	0.00	+0.09	0.00
$D_{\omega\delta}$	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Aurigæ. Mag. 2.7		1 Geminorum. Mag. 4.3		1 G. Puppis. Mag. 6.2		γ Orionis. Mag. 4.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 5 54	° ' " +37 12	h m 5 59	° ' " +23 16	h m 6 2	° ' " -45 1	h m 6 2	° ' " +14 4
Jan. 0.5	14.927 ⁵⁸	27.36 ⁸⁵	14.488 ⁵⁹	4.46 ⁰	11.025 ²⁴	76.22 ³²⁸	59.407 ⁵⁸	41.22 ⁵⁸
10.4	14.985 ²	28.21 ⁸⁴	14.547 ⁸	4.46 ⁵	11.001 ⁸⁵	79.48 ²⁸⁹	59.465 ⁹	40.70 ³⁹
20.4	14.983 ⁵⁸	29.05 ⁷⁹	14.555 ⁴³	4.51 ⁹	10.916 ¹⁴³	82.47 ²⁶⁵	59.474 ³⁹	40.38 ³⁹
30.4	14.925 ¹¹¹	29.84 ⁶⁸	14.512 ⁹⁰	4.60 ¹⁰	10.773 ¹⁹⁴	85.12 ²²⁷	59.435 ⁸⁴	39.92 ⁸⁴
Feb. 9.4	14.814 ¹⁵⁵	30.52 ⁵⁶	14.422 ¹²⁹	4.70 ¹⁰	10.579 ²³⁵	87.39 ¹⁸¹	59.351 ¹²²	39.65 ¹²²
19.3	14.659 ¹⁹⁰	31.08 ³⁸	14.293 ¹⁶¹	4.80 ⁶	10.344 ²⁷⁰	89.20 ¹³⁴	59.229 ¹⁸¹	39.46 ¹⁸¹
Mar. 1.3	14.469 ²¹³	31.46 ¹⁸	14.132 ¹⁸²	4.86 ¹	10.074 ²⁹²	90.54 ⁸⁴	59.078 ¹⁷⁴	39.30 ¹⁷⁴
11.3	14.256 ²²⁵	31.64 ²	13.950 ¹⁹²	4.87 ⁶	9.782 ³⁰²	91.38 ³³	58.904 ¹⁸²	39.19 ¹⁸²
21.3	14.031 ²²¹	31.62 ²⁵	13.758 ¹⁹⁰	4.81 ¹¹	9.480 ³⁰¹	91.71 ¹⁷	58.722 ¹⁸²	39.10 ¹⁸²
31.2	13.810 ²⁰⁴	31.37 ⁴³	13.568 ¹⁷⁸	4.70 ¹⁸	9.179 ²⁸⁸	91.54 ⁶⁴	58.540 ¹⁷⁰	39.04 ¹⁷⁰
Apr. 10.2	13.606 ¹⁷⁷	30.94 ⁶⁰	13.390 ¹⁵⁴	4.52 ²³	8.891 ²⁶⁴	90.90 ¹¹³	58.370 ¹⁴⁹	39.01 ¹⁴⁹
20.2	13.429 ¹⁴²	30.34 ⁷⁶	13.236 ¹²³	4.29 ²⁵	8.627 ²³¹	89.77 ¹⁵⁶	58.221 ¹¹⁹	39.01 ¹¹⁹
30.1	13.287 ⁹⁷	29.58 ⁸⁶	13.113 ⁸⁵	4.04 ²⁶	8.396 ¹⁹¹	88.21 ¹⁹⁶	58.102 ⁸⁵	39.06 ⁸⁵
May 10.1	13.190 ⁴⁶	28.72 ⁹³	13.028 ⁴³	3.78 ²¹	8.205 ¹⁴⁴	86.25 ²³⁰	58.017 ⁴⁵	39.16 ⁴⁵
20.1	13.144 ⁴	27.79 ⁹⁶	12.985 ²	3.54 ²¹	8.061 ⁹²	83.95 ²⁶²	57.972 ³	39.32 ³
30.1	13.148 ⁵⁶	26.83 ⁹⁵	12.987 ⁴⁶	3.33 ¹⁷	7.969 ⁴¹	81.33 ²⁸⁴	57.969 ⁴⁰	39.57 ⁴⁰
June 9.0	13.204 ¹⁰⁶	25.88 ⁹²	13.033 ⁹¹	3.16 ¹²	7.928 ¹⁴	78.49 ³⁰²	58.009 ⁸²	39.57 ⁸²
19.0	13.310 ¹⁵⁵	24.96 ⁸⁵	13.124 ¹³³	3.04 ⁶	7.942 ⁶⁸	75.47 ³⁰⁹	58.091 ¹²¹	40.26 ¹²¹
29.0	13.465 ¹⁹⁹	24.11 ⁷⁸	13.257 ¹⁷¹	2.98 ⁰	8.010 ¹¹⁷	72.38 ²⁰⁹	58.212 ¹⁵⁸	40.68 ¹⁵⁸
July 9.0	13.664 ²³⁶	23.33 ⁶⁸	13.428 ²⁰⁵	2.98 ⁶	8.127 ¹⁶⁸	69.29 ¹⁸⁹	58.370 ¹⁸⁹	41.17 ¹⁸⁹
18.9	13.900 ²⁷¹	22.65 ⁵⁶	13.633 ²³³	3.04 ⁹	8.295 ²¹²	66.30 ²⁸⁴	58.559 ²¹⁸	41.68 ²¹⁸
28.9	14.171 ²⁹⁹	22.09 ⁴⁸	13.866 ²⁵⁸	3.13 ¹¹	8.507 ²⁵³	63.46 ²⁵²	58.777 ²⁴¹	42.19 ²⁴¹
Aug. 7.9	14.470 ³²¹	21.61 ³⁷	14.124 ²⁷⁹	3.24 ¹¹	8.760 ²⁸⁴	60.94 ²¹⁷	59.018 ²⁶²	42.67 ²⁶²
17.8	14.791 ³³⁸	21.24 ²⁷	14.403 ²⁹²	3.35 ¹⁰	9.044 ³¹⁵	58.77 ¹⁷⁴	59.280 ²⁷⁵	43.09 ²⁷⁵
27.8	15.129 ³⁵¹	20.97 ¹⁹	14.695 ³⁰⁵	3.45 ⁶	9.359 ³³⁵	57.03 ¹²²	59.555 ²⁸⁶	43.42 ²⁸⁶
Sept. 6.8	15.480 ³⁵⁸	20.78 ¹¹	15.000 ³¹¹	3.51 ¹	9.694 ³⁵¹	55.81 ⁶⁶	59.841 ²⁹⁴	43.63 ²⁹⁴
16.8	15.838 ³⁶¹	20.67 ²	15.311 ³¹⁴	3.52 ⁶	10.045 ³⁵⁷	55.15 ⁵	60.135 ²⁹⁸	43.72 ²⁹⁸
26.7	16.199 ³⁶⁰	20.65 ⁵	15.625 ³¹⁴	3.46 ¹²	10.402 ³⁵⁷	55.10 ⁵⁶	60.433 ²⁹⁹	43.66 ²⁹⁹
Oct. 6.7	16.559 ³⁵⁴	20.70 ¹³	15.939 ³¹¹	3.34 ¹⁸	10.759 ³⁴⁸	55.66 ¹¹⁷	60.732 ²⁹⁶	43.45 ²⁹⁶
16.7	16.913 ³⁴⁴	20.83 ²³	16.250 ³⁰²	3.16 ²⁵	11.107 ³³³	56.83 ¹⁷⁵	61.028 ²⁸⁸	43.09 ²⁸⁸
26.7	17.257 ³²⁸	21.06 ³¹	16.552 ²⁸⁹	2.91 ²⁶	11.440 ³⁰⁷	58.58 ²²⁷	61.316 ²⁷⁷	42.59 ²⁷⁷
Nov. 5.6	17.585 ³⁰⁵	21.37 ⁴¹	16.841 ²⁷¹	2.65 ²⁷	11.747 ²⁷⁴	60.85 ²⁷²	61.593 ²⁵⁸	41.99 ²⁵⁸
15.6	17.890 ²⁷⁷	21.78 ⁵²	17.112 ²⁴⁶	2.38 ²⁶	12.021 ²³⁵	63.57 ³⁰⁷	61.851 ²³⁷	41.30 ²³⁷
25.6	18.167 ²³⁹	22.30 ⁶²	17.358 ²¹⁴	2.12 ²¹	12.256 ¹⁸⁵	66.64 ³³¹	62.088 ²⁰⁶	40.58 ²⁰⁶
Dec. 5.5	18.406 ¹⁹⁵	22.92 ⁷³	17.572 ¹⁷⁸	1.91 ¹⁶	12.441 ¹³²	69.95 ³⁴⁴	62.294 ¹⁷¹	39.85 ¹⁷¹
15.5	18.601 ¹⁴⁵	23.65 ⁷⁹	17.750 ¹³⁴	1.75 ¹⁰	12.573 ⁷⁴	73.39 ³⁴⁵	62.465 ¹³⁰	39.17 ¹³⁰
25.5	18.746 ⁸⁹	24.44 ⁸⁵	17.884 ⁸⁷	1.65 ²	12.647 ¹²	76.84 ³³⁵	62.595 ⁸⁴	38.53 ⁸⁴
35.5	18.835	25.29	17.971	1.63	12.659	80.19	62.679	37.97
Mean Place	11.868	29.40	11.800	7.77	8.534	69.72	56.863	45.24
Sec δ , Tan δ	1.256	+0.759	1.089	+0.430	1.415	-1.001	1.034	+0.264
$D\psi\alpha$, $D\omega\alpha$	+0.08	0.00	+0.07	0.00	+0.03	0.00	+0.07	0.00
$D\psi\delta$, $D\omega\delta$	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

APPARENT PLACES OF STARS, 1919.

369

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	22 H. Camelop. Mag. 4.7		7 Geminorum. Var. 3.2-4.2		3 Lynceis. Mag. 4.4		5 Canis Majoris. Mag. 3.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 6 9	° ' +69 20	h m 6 9	° ' +22 31	h m 6 12	° ' +59 2	h m 6 17	° ' -30 1
	s	"	s	"	s	"	s	"
Jan. 0.5	61.50	59.55	62.024	49.12	33.189	28.75	14.484	42.93
10.5	61.57 7	62.08 253	62.093 69	49.06 6	33.277 88	30.81 206	14.512 28	45.81 288
20.4	61.53 4	64.54 246	62.110 17	49.07 1	33.274 3	32.82 201	14.487 25	48.48 267
30.4	61.36 17	66.83 229	62.077 33	49.13 6	33.183 91	34.71 189	14.411 76	50.88 240
Feb. 9.4	61.07 29	68.84 201	61.996 81	49.23 10	33.010 173	36.39 168	14.289 122	52.94 206
	40	166	123	10	244	141	163	168
19.3	60.67	70.50	61.873	49.33	32.766	37.80	14.126	54.62
Mar. 1.3	60.21 46	71.75 125	61.718 155	49.40 7	32.465 301	38.86 106	13.932 194	55.90 128
11.3	59.69 52	72.53 78	61.540 178	49.44 4	32.125 340	39.54 68	13.715 217	56.77 87
21.3	59.14 55	72.81 28	61.350 190	49.43 1	31.763 362	39.81 27	13.486 229	57.22 45
31.2	58.59 58	72.59 22	61.160 190	49.37 6	31.401 362	39.65 16	13.256 230	57.23 1
	52	71	180	12	346	56	220	40
Apr. 10.2	58.07	71.88	60.980	49.25	31.055	39.09	13.036	56.83
20.2	57.59 48	70.72 116	60.822 158	49.09 16	30.744 311	38.15 94	12.833 203	56.02 81
30.2	57.20 39	69.15 157	60.694 128	48.90 19	30.481 263	36.87 128	12.657 176	54.83 119
May 10.1	56.88 32	67.24 191	60.601 93	48.69 21	30.279 202	35.29 158	12.514 143	53.29 154
20.1	56.66 22	65.05 219	60.550 51	48.50 19	30.148 131	33.50 179	12.410 104	51.44 185
	12	238	8	18	86	196	62	213
30.1	56.54	62.67	60.542	48.32	30.092	31.54	12.348	49.31
June 9.0	56.54 0	60.17 260	60.578 36	48.19 13	30.113 21	29.48 206	12.330 18	46.96 235
19.0	56.66 12	57.61 256	60.658 80	48.10 9	30.211 98	27.38 210	12.356 26	44.45 251
29.0	56.88 22	55.07 264	60.779 121	48.06 4	30.383 172	25.30 208	12.426 70	41.83 262
July 9.0	57.20 32	52.62 245	60.938 159	48.07 1	30.626 243	23.30 200	12.537 111	39.20 263
	42	231	193	4	306	189	150	258
18.9	57.62	50.31	61.131	48.11	30.932	21.41	12.687	36.62
28.9	58.13 51	48.20 211	61.354 223	48.18 7	31.294 362	19.68 173	12.871 184	34.17 245
Aug. 7.9	58.70 57	46.31 189	61.603 249	48.27 9	31.704 410	18.14 154	13.087 216	31.94 223
17.9	59.33 63	44.71 160	61.872 269	48.34 7	32.157 453	16.81 133	13.330 243	30.00 194
27.8	60.02 69	43.40 131	62.157 285	48.39 5	32.642 485	15.73 108	13.597 267	28.44 156
	72	99	298	0	510	84	284	114
Sept. 6.8	60.74	42.41	62.455	48.39	33.152	14.89	13.881	27.30
16.8	61.50 76	41.76 65	62.763 306	48.33 6	33.680 528	14.32 57	14.179 298	26.66 64
26.7	62.27 77	41.48 28	63.075 312	48.19 14	34.221 541	14.03 29	14.486 307	26.54 12
Oct. 6.7	63.04 77	41.55 7	63.389 314	47.98 21	34.764 543	14.01 2	14.795 309	26.96 42
16.7	63.80 76	41.99 44	63.701 312	47.71 27	35.300 536	14.29 28	15.100 305	27.93 97
	74	81	304	23	524	56	298	147
26.7	64.54	42.80	64.005	47.38	35.824	14.85	15.398	29.40
Nov. 5.6	65.24 70	43.98 118	64.300 295	47.02 26	36.325 501	15.71 86	15.681 283	31.34 194
15.6	65.89 65	45.50 152	64.577 277	46.65 37	36.792 467	16.85 114	15.941 260	33.68 234
25.6	66.47 58	47.33 183	64.831 254	46.29 36	37.213 421	18.24 139	16.174 233	36.35 267
Dec. 5.6	66.96 49	49.44 211	65.054 223	45.97 32	37.579 366	19.88 164	16.370 196	39.24 289
	39	233	188	23	300	183	154	301
15.5	67.35	51.77	65.242	45.74	37.879	21.71	16.524	42.25
25.5	67.63 28	54.24 247	65.387 145	45.56 18	38.100 221	23.69 198	16.632 108	45.28 303
35.5	67.79 16	56.80 256	65.484 97	45.47 9	38.237 137	25.76 207	16.690 58	48.25 297
Mean Place	55.461	61.52	59.344	53.15	28.801	31.41	12.133	37.07
Loc δ, Tan δ	2.835	+2.653	1.083	+0.415	1.944	+1.667	1.155	-0.578
Δα, Δαα	+0.13	+0.01	+0.07	0.00	+0.11	+0.01	+0.03	0.00
Δδ, Δδδ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	μ Geminorum. Mag. 3.2		ψ^1 Aurigæ. Mag. 5.1		β Canis Majoris. Mag. 2.0		δ Monoceros. Mag. 4.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	D
	h m 6 18	" ' s +22 33	h m 6 18	" ' s +49 19	h m 6 19	" ' s -17 54	h m 6 19	
Jan. 0.5	6.329	78	18.40	8	43.405	93	47.13	154
10.5	6.407	25	18.32	1	43.498	20	48.67	154
20.4	6.432	25	18.33	1	43.518	20	50.21	154
30.4	6.406	26	18.40	7	43.466	52	51.68	147
Feb. 9.4	6.332	74	18.50	10	43.349	117	53.02	134
		117		12		177		113
19.3	6.215		18.62		43.172		54.15	
Mar. 1.3	6.065	150	18.72	10	42.947	225	55.03	88
11.3	5.889	176	18.79	7	42.689	258	55.61	58
21.3	5.700	180	18.82	3	42.412	277	55.88	27
31.2	5.510	190	18.79	3	42.134	278	55.81	7
		181		9		266		39
Apr. 10.2	5.329		18.70		41.868		55.42	
20.2	5.168	161	18.56	14	41.627	241	54.72	70
30.2	5.035	133	18.39	17	41.426	201	53.76	96
May 10.1	4.937	98	18.20	19	41.273	153	52.56	120
20.1	4.880	57	18.01	19	41.176	97	51.19	137
		15		17		39		150
30.1	4.865		17.84		41.137		49.69	
June 9.0	4.894	29	17.69	15	41.159	22	48.11	158
19.0	4.966	72	17.58	11	41.243	84	46.49	162
29.0	5.079	113	17.52	6	41.386	143	44.89	160
July 9.0	5.231	152	17.49	3	41.583	197	43.35	154
		186		0		216		146
18.9	5.417		17.49		41.829		41.89	
28.9	5.633	216	17.52	3	42.120	291	40.54	135
Aug. 7.9	5.875	242	17.56	4	42.448	325	39.34	120
17.9	6.139	264	17.58	2	42.809	361	38.28	106
27.8	6.420	281	17.57	1	43.197	388	37.39	89
		295		6		408		71
Sept. 6.8	6.715		17.51		43.605		36.68	
16.8	7.021	306	17.38	13	44.028	423	36.14	54
26.7	7.333	312	17.19	19	44.460	432	35.79	35
Oct. 6.7	7.648	315	16.93	26	44.896	436	35.62	17
16.7	7.962	314	16.60	33	45.332	436	35.69	7
		309		39		427		27
26.7	8.271		16.21		45.759		35.96	
Nov. 5.6	8.569	298	15.79	42	46.170	411	36.43	47
15.6	8.852	283	15.37	42	46.556	386	37.13	70
25.6	9.112	260	14.96	41	46.910	354	38.04	91
Dec. 5.6	9.345	233	14.60	36	47.221	311	39.16	112
		195		29		260		128
15.5	9.540		14.31		47.481		40.44	
25.5	9.692	152	14.10	21	47.680	199	41.87	143
35.5	9.798	106	13.99	11	47.813	133	43.39	152
Mean Place	3.648	22.93	39.790	50.77	7.938	53.01	28.585	
Sec δ , Tan δ	1.083	+0.415	1.534	+1.164	1.051	-0.323	1.003	
$D\psi\alpha$, $D\omega\alpha$	+0.07	0.00	+0.09	+0.01	+0.05	0.00	+0.06	
$D\psi\delta$, $D\omega\delta$	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	

APPARENT PLACES OF STARS, 1919.

371

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Argus. (Canopus.) Mag. -0.9		10 Monocerotis. Mag. 5.0		ν Geminorum. Mag. 4.1		8 Lynceis. Mag. 6.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 6 22	° ' " -52 38	h m 6 23	° ' " - 4 42	h m 6 24	° ' " +20 15	h m 6 30	° ' " +61 32
	s	"	s	"	s	"	s	"
Jan. 0.5	11.946	69.67	60.009	45.19	11.868	47.54	22.24	70.59
10.5	11.925	73.18	60.072	46.91	11.951	47.32	22.36	72.75
20.4	11.832	76.47	60.088	48.46	11.982	47.19	22.39	74.91
30.4	11.672	79.45	60.057	49.84	11.962	47.13	22.32	76.97
Feb. 9.4	11.451	82.04	59.982	50.99	11.893	47.14	22.15	78.85
19.4	11.178	84.18	59.867	51.93	11.782	47.18	21.90	80.47
Mar. 1.3	10.863	85.85	59.722	52.63	11.637	47.24	21.59	81.76
11.3	10.519	87.01	59.553	53.12	11.465	47.29	21.23	82.67
21.3	10.160	87.64	59.372	53.36	11.281	47.32	20.84	83.15
31.2	9.798	87.74	59.189	53.39	11.094	47.32	20.44	83.19
Apr. 10.2	9.446	87.33	59.014	53.20	10.914	47.28	20.06	82.80
20.2	9.115	86.42	58.855	52.80	10.753	47.22	19.70	81.99
30.2	8.817	85.03	58.720	52.20	10.618	47.14	19.40	80.80
May 10.1	8.560	83.20	58.617	51.40	10.518	47.05	19.16	79.28
20.1	8.351	80.97	58.550	50.42	10.456	46.97	18.98	77.50
30.1	8.198	78.41	58.521	49.27	10.436	46.91	18.88	75.50
June 9.1	8.103	75.58	58.530	47.99	10.459	46.89	18.86	73.35
19.0	8.067	72.53	58.578	46.60	10.524	46.90	18.92	71.13
29.0	8.093	69.37	58.664	45.13	10.630	46.95	19.06	68.89
July 9.0	8.179	66.17	58.787	43.63	10.772	47.04	19.29	66.68
18.9	8.325	63.03	58.941	42.15	10.950	47.15	19.58	64.57
28.9	8.524	60.05	59.124	40.73	11.158	47.27	19.93	62.57
Aug. 7.9	8.774	57.30	59.334	39.44	11.391	47.39	20.34	60.75
17.9	9.069	54.91	59.564	38.33	11.647	47.47	20.80	59.14
27.8	9.402	52.95	59.812	37.43	11.920	47.50	21.30	57.75
Sept. 6.8	9.768	51.50	60.076	36.82	12.207	47.47	21.83	56.61
16.8	10.156	50.62	60.350	36.51	12.505	47.35	22.39	55.74
26.8	10.560	50.35	60.631	36.53	12.811	47.13	22.96	55.17
Oct. 6.7	10.968	50.72	60.916	36.90	13.121	46.81	23.54	54.90
16.7	11.370	51.75	61.201	37.60	13.431	46.40	24.12	54.93
26.7	11.759	53.38	61.482	38.64	13.735	45.92	24.70	55.29
Nov. 5.6	12.121	55.58	61.753	39.95	14.032	45.37	25.25	55.98
15.6	12.447	58.28	62.009	41.50	14.314	44.83	25.77	56.97
25.6	12.727	61.38	62.244	43.22	14.576	44.28	26.25	58.29
Dec. 5.6	12.952	64.78	62.451	45.06	14.808	43.76	26.67	59.88
15.5	13.114	68.37	62.624	46.94	15.006	43.30	27.02	61.70
25.5	13.208	72.01	62.757	48.80	15.163	42.91	27.28	63.72
35.5	13.232	75.60	62.847	50.58	15.273	42.65	27.46	65.87
Mean Place	9.229	63.89	57.646	39.69	9.231	52.52	17.588	75.02
Sec δ , Tan δ	1.649	-1.311	1.003	-0.082	1.066	+0.368	2.099	+1.846
D_{α}, D_{ω}	+0.03	-0.01	+0.06	0.00	+0.07	0.00	+0.11	+0.02
D_{δ}, D_{ω}	0.0	+1.0	0.0	+1.0	0.0	+1.0	-0.1	+1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ϵ Canis Majoris. Mag. 4.5		23 H. Camelop. Mag. 5.6		γ Geminorum. Mag. 1.9		δ Aurigæ. Mag. 5.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 6 31	° ' " -22 53	h m 6 32	° ' " +79 38	h m 6 33	° ' " +16 27	h m 6 33	° ' " +39 27
	s	"	s	"	s	"	s	"
Jan. 0.5	42.054 52	62.96 266	37.03 19	74.83 291	4.571 89	64.69 49	5.989 105	43.63 36
10.5	42.106 2	65.62 246	37.22 7	77.74 287	4.660 38	64.20 27	6.094 42	44.57 19
20.4	42.108 47	68.08 222	37.15 31	80.61 273	4.698 13	63.83 26	6.136 19	45.57 13
30.4	42.061 94	70.30 193	36.84 54	83.34 246	4.685 60	63.57 17	6.117 79	46.57 56
Feb. 9.4	41.967 135	72.23 159	36.30 74	85.80 211	4.625 104	63.40 11	6.038 131	47.53 58
19.4	41.832 169	73.82 123	35.56 92	87.91 166	4.521 138	63.29 4	5.907 174	48.38 70
Mar. 1.3	41.663 191	75.05 87	34.64 103	89.57 116	4.383 164	63.25 2	5.733 207	49.06 22
11.3	41.472 206	75.92 50	33.61 110	90.73 62	4.219 179	63.23 1	5.526 226	49.60 28
21.3	41.266 209	76.42 10	32.51 113	91.35 3	4.040 183	63.24 2	5.300 231	49.89 27
31.2	41.057 204	76.52 25	31.38 110	91.38 52	3.857 177	63.26 2	5.069 223	49.96 27
Apr. 10.2	40.853 187	76.27 61	30.28 104	90.86 106	3.680 160	63.28 3	4.846 203	49.79 29
20.2	40.666 163	75.66 94	29.24 91	89.80 155	3.520 136	63.31 4	4.643 172	49.40 28
30.2	40.503 133	74.72 128	28.33 78	88.25 199	3.384 104	63.35 7	4.471 134	48.82 27
May 10.1	40.370 99	73.44 157	27.55 60	86.26 233	3.280 66	63.42 9	4.337 88	48.05 29
20.1	40.271 60	71.87 181	26.95 39	83.93 264	3.214 28	63.51 14	4.249 39	47.16 30
30.1	40.211 18	70.06 203	26.56 20	81.29 282	3.186 15	63.65 17	4.210 11	46.17 19
June 9.1	40.193 23	68.03 219	26.36 2	78.47 295	3.201 55	63.82 23	4.221 62	45.11 18
19.0	40.216 63	65.84 230	26.38 22	75.52 298	3.256 93	64.05 26	4.283 112	44.02 19
29.0	40.279 102	63.54 233	26.60 43	72.54 294	3.349 131	64.31 28	4.395 158	42.93 107
July 9.0	40.381 137	61.21 230	27.03 63	69.60 284	3.480 165	64.59 29	4.553 200	41.86 12
18.9	40.518 171	58.91 221	27.66 80	66.76 266	3.645 194	64.88 29	4.753 237	40.85 46
28.9	40.689 201	56.70 201	28.46 97	64.10 244	3.839 221	65.17 25	4.990 271	39.89 46
Aug. 7.9	40.890 227	54.69 177	29.43 110	61.66 215	4.060 242	65.42 20	5.261 299	39.00 49
17.9	41.117 250	52.92 144	30.53 122	59.51 185	4.302 263	65.62 12	5.560 322	38.20 71
27.8	41.367 267	51.48 106	31.75 133	57.66 148	4.565 276	65.74 2	5.882 341	37.49 64
Sept. 6.8	41.634 281	50.42 62	33.08 140	56.18 110	4.841 289	65.76 11	6.223 357	36.85 55
16.8	41.915 292	49.80 16	34.48 145	55.08 69	5.130 297	65.65 25	6.580 366	36.30 46
26.8	42.207 297	49.64 35	35.93 147	54.39 26	5.427 303	65.40 37	6.946 372	35.84 36
Oct. 6.7	42.504 297	49.99 84	37.40 146	54.13 18	5.730 304	65.03 51	7.318 375	35.48 35
16.7	42.801 293	50.83 131	38.86 144	54.31 63	6.034 301	64.52 61	7.693 372	35.23 15
26.7	43.094 282	52.14 175	40.30 136	54.94 107	6.335 296	63.91 73	8.065 361	35.10 14
Nov. 5.6	43.376 264	53.89 212	41.66 127	56.01 149	6.631 282	63.18 77	8.426 344	35.10 18
15.6	43.640 242	56.01 241	42.93 114	57.50 189	6.913 261	62.41 78	8.770 319	35.26 47
25.6	43.882 209	58.42 264	44.07 99	59.39 226	7.174 235	61.63 77	9.089 287	35.58 47
Dec. 5.6	44.091 172	61.06 275	45.06 78	61.65 255	7.409 201	60.86 71	9.376 244	36.05 46
15.5	44.263 129	63.81 278	45.84 57	64.20 276	7.610 162	60.15 64	9.620 195	36.70 77
25.5	44.392 81	66.59 272	46.41 32	66.96 290	7.772 115	59.51 54	9.815 138	37.48 77
35.5	44.473	69.31	46.73	69.86	7.887	58.97	9.953	38.28
Mean Place	39.717	57.30	26.159	79.04	1.997	70.22	2.854	48.82
Sec δ , Tan δ	1.086	-0.422	5.568	+5.477	1.043	+0.296	1.295	+0.821
$D\psi\alpha$, $D\omega\alpha$	+0.05	0.00	+0.20	+0.05	+0.07	0.00	+0.08	+0.01
$D\psi\delta$, $D\omega\delta$	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

APPARENT PLACES OF STARS, 1919.

373

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Time.	ν Argus. Mag. 3.2		S Monocerotis. Mag. 4.7		ε Geminorum. Mag. 3.2		ξ Geminorum. Mag. 3.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 6 35	° ' " -43 7	h m 6 36	° ' " + 9 58	h m 6 38	° ' " +25 12	h m 6 40	° ' " +12 58
	s	"	s	"	s	"	s	"
i. 0.5	19.572	33.13	33.541	12.40	59.704	39.35	47.156	56.64
10.5	19.597	36.51	33.628	11.51	59.805	39.40	47.249	55.92
20.4	19.561	39.70	33.666	10.74	59.851	39.55	47.292	55.32
30.4	19.464	42.59	33.654	10.12	59.844	39.78	47.285	54.85
b. 9.4	19.313	45.14	33.596	9.62	59.786	40.05	47.231	54.49
19.4	19.114	47.28	33.497	9.24	59.682	40.34	47.134	54.25
r. 1.3	18.877	48.97	33.362	8.99	59.540	40.61	47.001	54.09
11.3	18.611	50.20	33.202	8.82	59.369	40.82	46.841	54.00
21.3	18.329	50.93	33.028	8.75	59.180	40.97	46.666	53.97
31.3	18.042	51.17	32.848	8.75	58.986	41.04	46.486	53.99
r. 10.2	17.761	50.92	32.674	8.82	58.798	41.03	46.310	54.05
20.2	17.497	50.21	32.516	8.97	58.627	40.94	46.150	54.14
30.2	17.259	49.03	32.381	9.20	58.480	40.77	46.012	54.29
y 10.1	17.055	47.44	32.277	9.49	58.367	40.53	45.905	54.48
20.1	16.891	45.46	32.208	9.86	58.292	40.27	45.833	54.72
30.1	16.774	43.15	32.177	10.30	58.258	39.98	45.800	55.01
ne 9.1	16.703	40.56	32.186	10.82	58.268	39.68	45.806	55.36
19.0	16.683	37.77	32.233	11.39	58.321	39.39	45.851	55.76
29.0	16.713	34.84	32.320	12.01	58.414	39.12	45.935	56.19
ly 9.0	16.793	31.85	32.442	12.66	58.548	38.87	46.055	56.65
19.0	16.920	28.89	32.597	13.32	58.718	38.65	46.209	57.12
28.9	17.093	26.05	32.780	13.95	58.919	38.43	46.392	57.56
g. 7.9	17.306	23.44	32.991	14.52	59.148	38.22	46.602	57.96
17.9	17.557	21.13	33.223	14.99	59.402	37.98	46.834	58.27
27.8	17.839	19.21	33.475	15.34	59.676	37.74	47.087	58.47
pt. 6.8	18.148	17.76	33.741	15.52	59.966	37.46	47.354	58.55
16.8	18.478	16.85	34.020	15.53	60.271	37.13	47.635	58.47
26.8	18.823	16.51	34.306	15.34	60.586	36.76	47.925	58.22
t. 6.7	19.176	16.77	34.600	14.95	60.906	36.34	48.222	57.80
16.7	19.528	17.66	34.896	14.36	61.230	35.89	48.521	57.22
26.7	19.872	19.14	35.190	13.59	61.552	35.41	48.820	56.47
v. 5.7	20.200	21.16	35.477	12.67	61.867	34.92	49.112	55.62
15.6	20.502	23.67	35.751	11.64	62.168	34.46	49.393	54.67
25.6	20.770	26.58	36.006	10.53	62.450	34.06	49.654	53.68
c. 5.6	20.996	29.78	36.236	9.40	62.704	33.73	49.891	52.70
15.5	21.172	33.17	36.433	8.29	62.923	33.51	50.095	51.74
25.5	21.293	36.65	36.591	7.24	63.101	33.40	50.259	50.85
35.5	21.355	40.09	36.704	6.29	63.230	33.39	50.379	50.07
Place	17.056	27.75	31.054	18.15	56.975	45.15	44.633	62.57
, Tan δ	1.370	-0.937	1.015	+0.176	1.105	+0.471	1.026	+0.230
D _{αα}	+0.04	-0.01	+0.07	0.00	+0.07	+0.01	+0.07	0.00
D _{αδ}	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ψ^5 Aurigæ. Mag. 5.3		α Canis Majoris. (Sirius.) Mag. -1.6		18 Monocerotis. Mag. 4.7		43 Camelop. Mag. 5.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 6 40	° ' s +43 39	h m 6 41	° ' s -16 36	h m 6 43	° ' s + 2 29	h m 6 44	° ' s +68
	s	"	s	"	s	"	s	"
Jan. 0.5	57.576 ¹¹⁹	28.10	36.911 ⁶⁵	21.79	40.631 ⁸⁸	60.63 ¹³⁷	64.67 ¹⁸	58.58 ¹⁸
10.5	57.695 ⁵²	29.29 ¹¹⁹	36.976 ¹⁵	24.22 ²⁴³	40.719 ⁴⁰	59.26 ¹²¹	64.85 ⁵	61.07 ⁵
20.4	57.747 ¹³	30.54 ¹²⁵	36.991 ³⁵	26.48 ²²⁶	40.759 ⁹	58.05 ¹⁰⁶	64.90 ⁸	63.51 ⁸
30.4	57.734 ⁷⁷	31.79 ¹¹⁸	36.956 ⁸⁰	28.49 ¹⁷⁴	40.750 ⁵⁵	56.99 ⁸⁸	64.82 ²²	66.0 ³¹
Feb. 9.4	57.657 ¹³⁴	32.97 ¹⁰⁷	36.876 ¹²⁰	30.23 ¹⁴⁶	40.695 ⁹⁶	56.11 ⁶⁹	64.60 ³¹	68.2 ³¹
19.4	57.523 ¹⁸³	34.04 ⁹⁰	36.756 ¹⁵⁵	31.69 ¹¹²	40.599 ¹³²	55.42 ⁵²	64.29 ⁴⁰	70.2 ⁴⁰
Mar. 1.3	57.340 ²¹⁸	34.94 ⁶⁷	36.601 ¹⁷⁸	32.81 ⁸⁰	40.467 ¹⁵⁷	54.90 ³⁶	63.89 ⁴⁸	71.8 ⁴⁸
11.3	57.122 ²³⁹	35.61 ⁴³	36.423 ¹⁹²	33.61 ⁴⁸	40.310 ¹⁷³	54.54 ¹⁸	63.41 ⁵²	73.0 ⁵²
21.3	56.883 ²⁴⁸	36.04 ¹⁵	36.231 ¹⁹⁸	34.09 ¹⁴	40.137 ¹⁷⁸	54.36 ⁴	62.89 ⁵⁴	73.7 ⁵⁴
31.3	56.635 ²⁴³	36.19 ¹³	36.033 ¹⁹²	34.23 ¹⁸	39.959 ¹⁷⁴	54.32 ¹¹	62.35 ⁵³	74.0 ⁵³
Apr. 10.2	56.392 ²²¹	36.06 ³⁸	35.841 ¹⁷⁸	34.05 ⁴⁷	39.785 ¹⁶¹	54.43 ²⁶	61.82 ⁵⁰	73.7 ⁵⁰
20.2	56.171 ¹⁹³	35.68 ⁶⁴	35.663 ¹⁵⁴	33.58 ⁷⁹	39.624 ¹³⁸	54.69 ³⁹	61.32 ⁴⁵	73.0 ⁴⁵
30.2	55.978 ¹⁵²	35.04 ⁸⁴	35.509 ¹²⁵	32.79 ¹⁰⁶	39.486 ¹⁰⁹	55.08 ⁵³	60.87 ³⁷	71.8 ³⁷
May 10.1	55.826 ¹⁰⁶	34.20 ¹⁰³	35.384 ⁹²	31.73 ¹³⁰	39.377 ⁷⁶	55.61 ⁶⁶	60.50 ²⁸	70.2 ²⁸
20.1	55.720 ⁵⁴	33.17 ¹¹⁷	35.292 ⁵⁴	30.43 ¹⁵³	39.301 ³⁹	56.27 ⁷⁷	60.22 ¹⁹	68.3 ¹⁹
30.1	55.666 ⁰	32.00 ¹²⁶	35.238 ¹⁴	28.90 ¹⁷³	39.262 ²	57.04 ⁸⁸	60.03 ⁹	66.1 ⁹
June 9.1	55.666 ⁵⁴	30.74 ¹³¹	35.224 ²⁵	27.17 ¹⁸⁶	39.260 ³⁷	57.92 ⁹⁶	59.94 ²	63.7 ²
19.0	55.720 ¹⁰⁵	29.43 ¹³⁴	35.249 ⁶³	25.31 ¹⁹⁶	39.297 ⁷⁵	58.88 ¹⁰²	59.96 ¹²	61.1 ¹²
29.0	55.825 ¹⁵⁶	28.09 ¹³¹	35.312 ¹⁰¹	23.35 ¹⁹⁹	39.372 ¹⁰⁹	59.90 ¹⁰⁶	60.08 ²⁴	58.6 ²⁴
July 9.0	55.981 ²⁰¹	26.78 ¹²⁷	35.413 ¹³⁵	21.36 ¹⁹⁷	39.481 ¹⁴²	60.96 ¹⁰⁵	60.32 ³²	56.6 ³²
19.0	56.182 ²⁴²	25.51 ¹²²	35.548 ¹⁶⁷	19.39 ¹⁸⁸	39.623 ¹⁷²	62.01 ¹⁰⁰	60.64 ⁴¹	53.1 ⁴¹
28.9	56.424 ²⁷⁷	24.29 ¹¹²	35.715 ¹⁹⁴	17.51 ¹⁷¹	39.795 ¹⁹⁷	63.01 ⁹¹	61.05 ⁵⁰	51.1 ⁵⁰
Aug. 7.9	56.701 ³¹⁰	23.17 ¹⁰⁴	35.909 ²²⁰	15.80 ¹⁵⁰	39.992 ²²¹	63.92 ⁷⁹	61.55 ⁶²	48.4 ⁶²
17.9	57.011 ³³⁵	22.13 ⁹⁴	36.129 ²⁴¹	14.30 ¹²⁰	40.213 ²⁴¹	64.71 ⁶⁰	62.11 ⁶²	46.4 ⁶²
27.8	57.346 ³⁵⁷	21.19 ⁸²	36.370 ²⁵⁹	13.10 ⁸⁶	40.454 ²⁵⁷	65.31 ³⁹	62.73 ⁶⁷	45.1 ⁶⁷
Sept. 6.8	57.703 ³⁷⁴	20.37 ⁷⁰	36.629 ²⁷²	12.24 ⁴⁸	40.711 ²⁷⁰	65.70 ¹⁴	63.40 ⁷²	43.1 ⁷²
16.8	58.077 ³⁸⁷	19.67 ⁵⁷	36.901 ²⁸³	11.76 ⁴	40.981 ²⁸⁰	65.84 ¹³	64.12 ⁷⁴	42.1 ⁷⁴
26.8	58.464 ³⁹⁵	19.10 ⁴⁴	37.184 ²⁸⁹	11.72 ⁴¹	41.261 ²⁸⁷	65.71 ³⁹	64.86 ⁷⁶	41.1 ⁷⁶
Oct. 6.7	58.859 ³⁹⁹	18.66 ²⁸	37.473 ²⁹⁰	12.13 ¹²⁸	41.548 ²⁸⁹	65.32 ⁹¹	65.62 ⁷⁵	41.1 ⁷⁵
16.7	59.258 ³⁹⁵	18.38 ¹³	37.763 ²⁸⁸	12.98 ¹²⁸	41.838 ²⁸⁹	64.64 ⁹¹	66.38 ⁷⁵	41.1 ⁷⁵
26.7	59.653 ³⁸⁷	18.25 ⁵	38.051 ²⁷⁸	14.26 ¹⁶⁶	42.127 ²⁸³	63.73 ¹¹⁵	67.13 ⁷³	41.1 ⁷³
Nov. 5.7	60.040 ³⁷⁰	18.30 ²⁵	38.329 ²⁶³	15.92 ²⁰¹	42.410 ²⁷²	62.58 ¹³⁴	67.86 ⁶⁸	42.1 ⁶⁸
15.6	60.410 ³⁴³	18.55 ⁴⁴	38.592 ²⁴²	17.93 ²²⁵	42.682 ²⁵²	61.24 ¹⁴⁶	68.54 ⁶³	43.1 ⁶³
25.6	60.753 ³¹⁰	18.99 ⁶⁵	38.834 ²¹³	20.18 ²⁴²	42.934 ²²⁹	59.78 ¹⁵³	69.17 ⁵⁶	44.1 ⁵⁶
Dec. 5.6	61.063 ²⁶⁷	19.64 ⁸²	39.047 ¹⁷⁸	22.60 ²⁵⁴	43.163 ¹⁹⁶	58.25 ¹⁵⁶	69.73 ⁴⁷	46.1 ⁴⁷
15.5	61.330 ²¹⁴	20.46 ¹⁰⁰	39.225 ¹³⁷	25.14 ²⁵⁶	43.359 ¹⁵⁸	56.69 ¹⁵¹	70.20 ³⁷	48.1 ³⁷
25.5	61.544 ¹⁵⁴	21.46 ¹¹⁴	39.362 ⁹²	27.70 ²⁴⁹	43.517 ¹¹⁴	55.18 ¹⁴¹	70.57 ²⁴	50.1 ²⁴
35.5	61.698	22.60	39.454	30.19	43.631	53.77	70.81	53.1
Mean Place	54.280	33.91	34.720	15.03	38.219	66.60	58.824	64.1
Sec δ , Tan δ	1.382	+0.954	1.044	-0.298	1.001	+0.044	2.788	+2.1
$D\psi\alpha$, $D\omega\alpha$	+0.09	+0.01	+0.05	0.00	+0.06	0.00	+0.13	+0.1
$D\psi\delta$, $D\omega\delta$	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.1

APPARENT PLACES OF STARS, 1919.

375

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Pictoris. Mag. 3.3		θ Geminorum. Mag. 3.6		τ Argus. Mag. 2.8		15 Lyncis. Mag. 4.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 6 47	° ' -61 51	h m 6 47	° ' +34 3	h m 6 47	° ' -50 30	h m 6 50	° ' +58 31
	s "	"	s "	"	s "	"	s "	"
Jan. 0.5	24.90	20.07	30.101	30.31	58.254	69.58	20.486	43.63
10.5	24.88	23.79	30.219	30.89	58.281	73.18	20.641	45.61
20.5	24.77	27.34	30.278	31.57	58.237	76.59	20.704	47.64
30.4	24.57	30.63	30.277	32.31	58.126	79.74	20.678	49.64
Feb. 9.4	24.30	33.57	30.220	33.04	57.952	82.56	20.564	51.52
19.4	23.96	36.10	30.112	33.73	57.723	84.96	20.372	53.20
Mar. 1.3	23.57	38.15	29.960	34.34	57.449	86.91	20.114	54.61
11.3	23.13	39.71	29.777	34.83	57.141	88.38	19.805	55.67
21.3	22.66	40.75	29.573	35.17	56.812	89.34	19.463	56.36
31.3	22.18	41.24	29.361	35.33	56.474	89.77	19.107	56.64
Apr. 10.2	21.70	41.19	29.153	35.31	56.139	89.70	18.755	56.50
20.2	21.24	40.63	28.960	35.11	55.820	89.13	18.425	55.96
30.2	20.81	39.56	28.795	34.76	55.527	88.07	18.133	55.05
May 10.2	20.43	38.00	28.663	34.27	55.268	86.55	17.891	53.80
20.1	20.10	36.01	28.570	33.65	55.052	84.62	17.711	52.26
30.1	19.83	33.63	28.523	32.95	54.884	82.33	17.597	50.49
June 9.1	19.63	30.91	28.523	32.19	54.768	79.71	17.555	48.55
19.0	19.50	27.93	28.569	31.40	54.708	76.87	17.586	46.49
29.0	19.46	24.78	28.660	30.60	54.706	73.84	17.688	44.36
July 9.0	19.49	21.54	28.794	29.80	54.758	70.74	17.861	42.23
19.0	19.59	18.30	28.967	29.02	54.866	67.64	18.098	40.15
28.9	19.76	15.15	29.177	28.28	55.028	64.65	18.395	38.15
Aug. 7.9	20.01	12.21	29.417	27.56	55.240	61.85	18.745	36.27
17.9	20.33	9.57	29.686	26.89	55.498	59.35	19.141	34.56
27.9	20.70	7.32	29.977	26.24	55.797	57.23	19.578	33.02
Sept. 6.8	21.12	5.55	30.289	25.62	56.130	55.58	20.049	31.69
16.8	21.59	4.34	30.616	25.03	56.491	54.47	20.547	30.61
26.8	22.08	3.74	30.955	24.48	56.872	53.96	21.067	29.77
Oct. 6.7	22.59	3.80	31.303	23.97	57.265	54.07	21.598	29.20
16.7	23.10	4.51	31.656	23.51	57.661	54.83	22.136	28.93
26.7	23.59	5.88	32.007	23.13	58.050	56.22	22.671	28.95
Nov. 5.7	24.06	7.86	32.353	22.83	58.421	58.19	23.194	29.28
15.6	24.48	10.39	32.686	22.65	58.764	60.69	23.693	29.94
25.6	24.85	13.39	32.997	22.59	59.069	63.64	24.157	30.90
Dec. 5.6	25.15	16.74	33.281	22.67	59.325	66.92	24.574	32.17
15.6	25.37	20.36	33.526	22.92	59.525	70.44	24.931	33.71
25.5	25.51	24.10	33.727	23.31	59.661	74.08	25.216	35.46
35.5	25.55	27.86	33.875	23.84	59.730	77.72	25.419	37.39
Mean Place	21.711	15.66	27.161	36.69	55.561	64.85	16.215	50.18
Sec δ , Tan δ	2.120	-1.869	1.207	+0.676	1.573	-1.214	1.915	+1.634
$D\psi\alpha$, $D\omega\alpha$	+0.01	-0.03	+0.08	+0.01	+0.03	-0.02	+0.10	+0.02
$D\psi\delta$, $D\omega\delta$	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Canis Majoris. Mag. 4.2		ϵ Canis Majoris. Mag. 1.6		ζ Geminorum. Var. 3.7-4.3		σ^2 Canis Majoris Mag. 3.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 6 50	° ' " -11 56	h m 6 55	° ' " -28 51	h m 6 59	° ' " +20 41	h m 6 59	° ' " -23 42
	s	"	s	"	s	"	s	"
Jan. 0.5	27.962 ⁸³	15.82 ²¹⁹	28.903 ⁷²	44.92 ²⁹⁸	20.992 ¹¹⁸	17.80 ²⁹	40.876 ⁸²	55.97 ²³
10.5	28.045 ³⁴	18.01 ²⁰³	28.975 ¹⁸	47.90 ²⁸³	21.110 ⁶⁶	17.51 ¹⁵	40.958 ³⁰	58.76 ⁷³
20.5	28.079 ¹⁶	20.04 ¹⁸³	28.993 ³⁵	50.73 ²⁵⁸	21.176 ¹³	17.36 ⁴	40.988 ²¹	61.37 ⁷⁴
30.4	28.063 ⁶²	21.87 ¹⁵⁷	28.958 ⁸⁵	53.31 ²³⁰	21.189 ⁸⁸	17.32 ⁶	40.967 ⁷¹	63.78 ¹²²
Feb. 9.4	28.001 ¹⁰³	23.44 ¹³²	28.873 ¹³⁰	55.61 ¹⁹⁴	21.151 ⁸⁶	17.38 ¹²	40.896 ¹¹⁵	65.90 ¹⁴⁶
19.4	27.898 ¹³⁸	24.76 ¹⁰²	28.743 ¹⁶⁸	57.55 ¹⁵⁶	21.065 ¹²⁶	17.50 ¹⁷	40.781 ¹³²	67.70 ¹⁶²
Mar. 1.3	27.760 ¹⁶⁶	25.78 ⁷⁴	28.575 ²¹⁵	59.11 ¹¹⁷	20.939 ¹⁵⁶	17.67 ¹⁷	40.629 ¹⁸⁰	69.15 ¹⁸⁰
11.3	27.594 ¹⁸¹	26.52 ⁴⁵	28.380 ²¹⁵	60.28 ⁷⁷	20.783 ¹⁷⁵	17.84 ¹⁷	40.449 ¹⁹⁸	70.23 ¹⁹⁸
21.3	27.413 ¹⁸⁸	26.97 ¹⁶	28.165 ²²²	61.05 ³⁴	20.608 ¹⁸⁵	18.01 ¹⁴	40.251 ²⁰⁷	70.94 ²⁰⁷
31.3	27.225 ¹⁸⁵	27.13 ¹²	27.943 ²²⁰	61.39 ⁶	20.423 ¹⁸³	18.15 ¹⁰	40.044 ²⁰⁶	71.27 ²⁰⁶
Apr. 10.2	27.040 ¹⁷²	27.01 ³⁹	27.723 ²⁰⁷	61.33 ⁴⁵	20.240 ¹⁷⁰	18.25 ⁵	39.838 ¹⁹⁵	71.23 ¹⁹⁵
20.2	26.868 ¹⁵²	26.62 ⁶⁶	27.516 ¹⁸⁸	60.88 ⁸⁵	20.070 ¹⁵⁰	18.30 ¹	39.643 ¹⁷⁶	70.31 ¹⁷⁶
30.2	26.716 ¹²⁴	25.96 ⁹⁰	27.328 ¹⁵⁹	60.03 ¹²¹	19.920 ¹²¹	18.31 ²	39.467 ¹⁴⁹	70.05 ¹⁴⁹
May 10.2	26.592 ⁹³	25.06 ¹¹⁴	27.169 ¹²⁷	58.82 ¹⁵⁶	19.799 ⁸⁶	18.29 ⁴	39.318 ⁸¹	68.95 ¹⁰⁷
20.1	26.499 ⁵⁷	23.92 ¹³³	27.042 ⁹⁰	57.26 ¹⁸³	19.713 ⁴⁹	18.25 ⁵	39.202 ¹¹⁶	67.50 ¹⁴⁰
30.1	26.442 ¹⁹	22.59 ¹⁵¹	26.952 ⁵⁰	55.43 ²¹⁰	19.664 ⁸	18.20 ⁶	39.121 ⁴⁴	65.88 ¹⁶⁸
June 9.1	26.423 ¹⁹	21.08 ¹⁶⁶	26.902 ⁸	53.33 ²²⁹	19.656 ³²	18.14 ⁵	39.077 ⁴	63.98 ²⁰¹
19.0	26.442 ⁵⁶	19.42 ¹⁷⁴	26.894 ³³	51.04 ²⁴³	19.688 ⁷¹	18.09 ⁵	39.073 ³⁶	61.68 ²³¹
29.0	26.498 ¹²⁷	17.68 ¹⁷⁸	26.927 ⁷³	48.61 ²⁵⁰	19.759 ¹¹⁰	18.04 ⁴	39.109 ⁷⁴	59.66 ²⁵¹
July 9.0	26.590 ¹⁵⁷	15.89 ¹⁷¹	27.000 ¹¹¹	46.11 ²⁵⁰	19.869 ¹⁴³	18.00 ⁴	39.183 ¹¹¹	57.36 ²⁵³
19.0	26.717 ¹⁵⁷	14.11 ¹⁷¹	27.111 ¹⁴⁸	43.61 ²⁴²	20.012 ¹⁷⁶	17.96 ⁶	39.294 ¹⁴⁵	55.08 ²⁶¹
28.9	26.874 ¹⁸⁴	12.40 ¹⁵⁷	27.259 ¹⁸¹	41.19 ²²⁵	20.188 ²⁰⁴	17.90 ⁸	39.439 ¹⁷⁷	52.86 ²⁶⁸
Aug. 7.9	27.058 ²¹¹	10.83 ¹³⁹	27.440 ²¹²	38.94 ²⁰¹	20.392 ²²⁹	17.82 ¹³	39.616 ²⁰⁵	50.80 ²⁸⁴
17.9	27.269 ²³¹	9.44 ¹¹²	27.652 ²³⁸	36.93 ¹⁶⁸	20.621 ²⁵²	17.69 ²⁰	39.821 ²³⁰	48.96 ³⁰²
27.9	27.500 ²⁵¹	8.32 ⁸²	27.890 ²⁶³	35.25 ¹²⁸	20.873 ²⁶⁹	17.49 ²⁷	40.051 ²⁵⁴	47.42 ³¹⁷
Sept. 6.8	27.751 ²⁶⁵	7.50 ⁴⁷	28.153 ²⁸²	33.97 ⁸⁴	21.142 ²⁸⁶	17.22 ³⁶	40.305 ²⁷¹	46.25 ³²⁵
16.8	28.016 ²⁷⁸	7.03 ⁸	28.435 ²⁹⁵	33.13 ³³	21.428 ²⁹⁸	16.86 ⁴⁵	40.576 ²⁸⁶	45.50 ³²⁸
26.8	28.294 ²⁸⁶	6.95 ³³	28.730 ³⁰⁸	32.80 ¹⁹	21.726 ³⁰⁹	16.41 ⁵⁵	40.862 ²⁹⁷	45.22 ³²²
Oct. 6.7	28.580 ²⁹⁰	7.28 ¹¹³	29.038 ³¹¹	32.99 ⁷³	22.035 ³¹⁴	15.86 ⁷²	41.159 ³⁰²	45.44 ³²⁰
16.7	28.870 ²⁸⁹	8.02 ¹⁴⁸	29.349 ³¹⁰	33.72 ¹²⁶	22.349 ³¹⁶	15.22 ⁷²	41.461 ³⁰²	46.15 ³²⁰
26.7	29.159 ²⁸³	9.15 ¹⁴⁸	29.659 ³⁰¹	34.98 ¹⁷⁴	22.665 ³¹²	14.50 ⁷⁵	41.763 ²⁹⁷	47.35 ³⁰⁶
Nov. 5.7	29.442 ²⁷¹	10.63 ¹⁷⁹	29.960 ²⁸⁷	36.72 ²¹⁸	22.977 ³⁰³	13.75 ⁷⁷	42.060 ²⁸³	49.01 ³⁰⁷
15.6	29.713 ²⁵²	12.42 ²⁰⁵	30.247 ²⁶⁴	38.90 ²⁵³	23.280 ²⁸⁷	12.98 ⁷⁴	42.343 ²⁶²	51.08 ³²⁸
25.6	29.965 ²²⁷	14.47 ²²⁰	30.511 ²³⁵	41.43 ²⁸⁰	23.567 ²⁶²	12.24 ⁶⁸	42.605 ²³⁵	53.46 ³⁰⁵
Dec. 5.6	30.192 ¹⁹³	16.67 ²²⁹	30.746 ¹⁹⁵	44.23 ²⁹⁸	23.829 ²³¹	11.56 ⁶⁰	42.840 ²⁰⁰	56.11 ²⁷⁹
15.6	30.385 ¹⁵³	18.96 ²³¹	30.941 ¹⁵¹	47.21 ³⁰⁶	24.060 ¹⁹²	10.96 ⁴⁸	43.040 ¹⁵⁸	58.90 ²⁸⁶
25.5	30.538 ¹⁰⁹	21.27 ²²⁵	31.092 ¹⁰²	50.27 ³⁰²	24.252 ¹⁴⁵	10.48 ³⁶	43.198 ¹¹⁰	61.76 ²⁸³
35.5	30.647	23.52	31.194	53.29	24.397	10.12	43.308	64.59
Mean Place	25.623	10.00	26.532	39.69	18.369	24.79	38.530	50.58
Sec δ , Tan δ	1.022	-0.212	1.142	-0.551	1.069	+0.378	1.092	-0.439
$D\psi_a$, $D\omega_a$	+0.06	0.00	+0.05	-0.01	+0.07	+0.01	+0.05	-0.01
$D\psi_\delta$, $D\omega_\delta$	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

APPARENT PLACES OF STARS, 1919.

377

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Canis Majoris. Mag. 4.1		δ Canis Majoris. Mag. 2.0		63 Aurigæ. Mag. 5.1		51 Geminorum. Mag. 5.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 7 0	° ' -15 30	h m 7 5	° ' -26 15	h m 7 6	° ' +39 26	h m 7 8	° ' +16 17
	s 7.983	" 51.43	s 8.165	" 54.78	s 8.338	" 66.41	s 45.855	" 43.73
Jan. 0.5	90	240	85	291	144	86	124	60
10.5	8.073	53.83	8.250	57.69	8.482	67.27	45.979	43.13
20.5	8.113	56.08	8.282	60.46	8.566	68.25	46.052	42.68
30.4	8.103	58.11	8.262	62.99	8.585	69.30	46.073	42.37
Feb. 9.4	58	179	71	225	44	107	80	17
	8.045	59.90	8.191	65.24	8.541	70.37	46.043	42.20
	101	149	116	131	101	101	76	8
19.4	7.944	61.39	8.075	67.15	8.440	71.38	45.967	42.12
Mar. 1.4	137	119	154	158	149	91	116	1
	7.807	62.58	7.921	68.73	8.291	72.29	45.851	42.13
11.3	7.642	63.46	7.738	69.92	8.104	73.04	45.704	42.20
21.3	7.459	64.02	7.536	70.71	7.890	73.61	45.535	42.30
31.3	7.268	64.26	7.323	71.12	7.664	73.95	45.356	42.42
	190	6	212	1	227	11	178	13
Apr. 10.2	7.078	64.20	7.111	71.13	7.437	74.06	45.178	42.55
20.2	6.899	63.83	6.910	70.75	7.224	73.93	45.012	42.68
30.2	6.741	63.16	6.727	70.00	7.034	73.58	44.862	42.80
May 10.2	134	93	157	110	156	56	122	13
	6.607	62.23	6.570	68.90	6.878	73.02	44.740	42.93
20.1	6.504	61.04	6.444	67.49	6.762	72.28	44.649	43.07
	67	141	91	171	72	88	54	14
30.1	6.437	59.63	6.353	65.78	6.690	71.40	44.595	43.21
June 9.1	31	163	52	196	24	99	17	16
	6.406	58.00	6.301	63.82	6.666	70.41	44.578	43.37
19.1	6.413	56.24	6.288	61.66	6.690	69.34	44.602	43.55
29.0	6.457	54.36	6.316	59.36	6.762	68.21	44.663	43.74
July 9.0	81	193	66	237	118	116	95	19
	6.538	52.43	6.382	56.99	6.880	67.05	44.758	43.93
	115	193	103	238	161	115	131	18
19.0	6.653	50.50	6.485	54.61	7.041	65.90	44.889	44.11
28.9	6.799	48.64	6.623	52.29	7.242	64.76	45.052	44.27
Aug. 7.9	177	172	172	215	235	111	190	11
	6.976	46.92	6.795	50.14	7.477	63.65	45.242	44.38
17.9	7.180	45.39	6.997	48.20	7.745	62.58	45.457	44.43
27.9	7.406	44.13	7.225	46.57	8.040	61.57	45.695	44.38
	246	94	253	126	318	96	257	17
Sept. 6.8	7.652	43.19	7.478	45.31	8.358	60.61	45.952	44.21
16.8	7.916	42.63	7.750	44.48	8.697	59.72	46.225	43.91
26.8	8.194	42.48	8.039	44.13	9.054	58.91	46.512	43.48
Oct. 6.8	287	28	300	17	368	71	298	57
	8.481	42.76	8.339	44.30	9.422	58.20	46.810	42.91
16.7	8.774	43.49	8.646	44.98	9.797	57.59	47.116	42.19
	294	114	308	119	379	49	309	83
26.7	9.068	44.63	8.954	46.17	10.176	57.10	47.425	41.36
Nov. 5.7	290	154	302	166	376	35	306	92
	9.358	46.17	9.256	47.83	10.552	56.75	47.731	40.44
15.6	9.636	48.04	9.546	49.92	10.917	56.59	48.030	39.47
25.6	9.895	50.19	9.814	52.37	11.262	56.60	48.316	38.48
Dec. 5.6	234	235	242	271	317	22	262	96
	10.129	52.54	10.056	55.08	11.579	56.82	48.578	37.52
	201	247	205	288	280	42	233	89
15.6	10.330	55.01	10.261	57.96	11.859	57.24	48.811	36.63
25.5	10.491	57.51	10.423	60.92	12.091	57.85	49.006	35.84
35.5	10.607	59.97	10.538	63.87	12.270	58.65	49.157	35.18
Mean Place	5.649	45.69	5.807	49.59	5.255	74.30	43.313	51.06
Sec δ , Tan δ	1.038	-0.278	1.115	-0.494	1.295	+0.823	1.042	+0.292
$D_{\gamma\alpha}$, $D_{\alpha\alpha}$	+0.05	0.00	+0.05	-0.01	+0.08	+0.02	+0.08	+0.01
$D_{\gamma\delta}$, $D_{\alpha\delta}$	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

APPARENT PLACES OF STARS, 1910.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ^4 Volantis. Mag. 3.9		λ Geminorum. Mag. 3.6		ϵ Argus. Mag. 2.7		δ Geminorum. Mag. 3.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 7 9	° ' " -70 21	h m 7 13	° ' " +16 40	h m 7 14	° ' " -36 56	h m 7 15	° ' " +22
	s	"	s	"	s	"	s	"
Jan. 0.5	30.30	66.36	28.914	67.53	19.365	70.10	19.863	49.45
10.5	30.30	70.18	29.043	66.94	19.451	73.43	20.018	49.22
20.5	30.17	73.88	29.120	66.51	19.478	76.63	20.101	49.12
30.4	29.92	77.37	29.146	66.22	19.446	79.80	20.130	49.16
Feb. 9.4	29.55	80.57	29.120	66.06	19.360	82.26	20.106	49.30
19.4	29.09	83.40	29.047	66.01	19.234	84.83	20.033	49.53
Mar. 1.4	28.54	85.80	28.933	66.04	19.046	86.57	19.917	49.79
11.3	27.93	87.72	28.789	66.13	18.834	88.06	19.769	50.06
21.3	27.27	89.12	28.621	66.25	18.600	89.16	19.597	50.32
31.3	26.59	90.01	28.443	66.39	18.354	89.78	19.413	50.58
Apr. 10.3	25.90	90.36	28.265	66.53	18.107	89.94	19.229	50.89
20.2	25.22	90.17	28.096	66.66	17.868	89.66	19.054	50.79
30.2	24.58	89.47	27.945	66.80	17.648	88.93	18.896	50.84
May 10.2	23.98	88.26	27.821	66.93	17.453	87.79	18.769	50.88
20.1	23.45	86.58	27.728	67.05	17.289	86.36	18.671	50.77
30.1	22.98	84.47	27.670	67.19	17.163	84.39	18.610	50.67
June 9.1	22.61	81.98	27.650	67.33	17.077	82.22	18.568	50.55
19.1	22.34	79.19	27.669	67.48	17.032	79.81	18.605	50.41
29.0	22.16	76.16	27.725	67.64	17.032	77.20	18.662	50.26
July 9.0	22.09	72.99	27.816	67.80	17.075	74.49	18.756	50.19
19.0	22.13	69.76	27.943	67.95	17.161	71.75	18.886	49.91
29.0	22.28	66.56	28.101	68.07	17.288	69.07	19.048	49.71
Aug. 7.9	22.55	63.52	28.286	68.14	17.454	66.54	19.239	49.47
17.9	22.90	60.71	28.498	68.14	17.656	64.24	19.457	49.18
27.9	23.35	58.25	28.732	68.04	17.890	62.26	19.696	48.84
Sept. 6.8	23.88	56.22	28.987	67.83	18.155	60.68	19.961	48.43
16.8	24.47	54.72	29.259	67.50	18.444	59.58	20.241	47.98
26.8	25.12	53.82	29.545	67.03	18.755	59.00	20.537	47.34
Oct. 6.8	25.80	53.54	29.842	66.43	19.080	58.99	20.845	46.65
16.7	26.50	53.94	30.150	65.68	19.413	59.56	21.161	45.91
26.7	27.18	54.99	30.460	64.83	19.749	60.71	21.482	45.11
Nov. 5.7	27.83	56.68	30.769	63.89	20.079	62.41	21.803	44.28
15.7	28.43	58.96	31.071	62.91	20.394	64.61	22.117	43.45
25.6	28.96	61.76	31.360	61.91	20.686	67.23	22.415	42.67
Dec. 5.6	29.40	64.98	31.626	60.95	20.946	70.19	22.693	41.97
15.6	29.71	68.52	31.863	60.06	21.165	73.38	22.940	41.37
25.5	29.92	72.25	32.062	59.29	21.337	76.70	23.148	40.99
35.5	30.00	76.05	32.218	58.63	21.456	80.05	23.312	40.53
Mean Place	26.276	63.50	28.372	75.10	16.918	65.73	17.268	57.49
Sec δ , Tan δ	2.977	-2.804	1.044	+0.300	1.251	-0.752	1.080	+0.499
$D\phi_a$, $D\omega_a$	-0.01	-0.06	+0.07	+0.01	+0.04	-0.02	+0.07	+0.01
$D\phi_\delta$, $D\omega_\delta$	-0.1	+1.0	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9

APPARENT PLACES OF STARS, 1919.

379

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	δ Volantis. Mag. 4.0		ι Geminorum. Mag. 3.9		η Canis Majoris. Mag. 2.4		Groombridge 1308. Mag. 5.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 7 16	° ' / -67 48	h m 7 20	° ' / +27 57	h m 7 20	° ' / -29 8	h m 7 22	° ' / +68 37
	s	"	s	"	s	"	s	"
Jan. 0.5	56.64	35.09	44.625	28.27	55.888	44.20	33.63	48.85
10.5	56.68 ⁴	38.92 ³⁸³	44.774 ¹⁴⁹	28.37 ¹⁰	55.988 ¹⁰⁰	47.26 ³⁰⁶	33.89 ²⁸	51.22 ²³⁷
20.5	56.59 ⁹	42.67 ³⁷⁵	44.865 ⁹¹	28.63 ²⁶	56.034 ⁴⁶	50.20 ²⁹¹	34.03 ¹⁴	53.71 ²⁴⁹
30.4	56.39 ²⁰	46.22 ³⁵⁵	44.900 ³⁵	29.01 ³⁸	56.026 ⁸	52.93 ²⁷³	34.04 ¹	56.21 ²⁵⁰
Feb. 9.4	56.09 ³⁰	49.49 ³²⁷	44.880 ²⁰	29.48 ⁴⁷	55.966 ⁶⁰	55.38 ²⁴⁵	33.92 ¹²	58.64 ²⁴³
19.4	55.70 ³⁹	52.39 ²⁹⁰	44.808 ⁷²	30.00 ⁵²	55.858 ¹⁰⁸	57.50 ²¹²	33.69 ²³	60.87 ²²³
Mar. 1.4	55.24 ⁴⁶	54.87 ²⁴⁸	44.691 ¹¹⁷	30.52 ⁵²	55.709 ¹⁴⁹	59.26 ¹⁷⁶	33.35 ³⁴	62.83 ¹⁹⁶
11.3	54.70 ⁵⁴	56.89 ²⁰²	44.537 ¹⁵⁴	31.01 ⁴⁹	55.529 ¹⁸⁰	60.65 ¹³⁹	32.94 ⁴¹	64.42 ¹⁵⁹
21.3	54.13 ⁵⁷	58.40 ¹⁵¹	44.360 ¹⁷⁷	31.42 ⁴¹	55.326 ²⁰³	61.63 ⁹⁸	32.46 ⁴⁸	65.60 ¹¹⁸
31.3	53.54 ⁵⁹	59.39 ⁹⁹	44.168 ¹⁹²	31.74 ³²	55.109 ²¹⁷	62.20 ⁵⁷	31.94 ⁵²	66.30 ⁷⁰
	60	44	194	20	217	16	53	22
Apr. 10.3	52.94	59.83	43.974	31.94	54.892	62.36	31.41	66.52
20.2	52.34 ⁶⁰	59.74 ⁹	43.788 ¹⁸⁶	32.02 ⁸	54.682 ²¹⁰	62.11 ²⁵	30.90 ⁵¹	66.24 ²⁸
30.2	51.77 ⁵⁷	59.12 ⁶²	43.622 ¹⁶⁶	31.99 ³	54.487 ¹⁹⁵	61.47 ⁶⁴	30.42 ⁴⁸	65.49 ⁷⁵
May 10.2	51.26 ⁵¹	58.00 ¹¹²	43.482 ¹⁴⁰	31.84 ¹⁵	54.317 ¹⁷⁰	60.46 ¹⁰¹	30.00 ⁴²	64.29 ¹²⁰
20.1	50.78 ⁴⁸	56.40 ¹⁶⁰	43.375 ¹⁰⁷	31.58 ²⁶	54.174 ¹⁴³	59.12 ¹³⁴	29.65 ³⁵	62.70 ¹⁵⁹
	40	204	68	34	107	167	26	192
30.1	50.38 ³⁴	54.36 ²⁴³	43.307 ²⁹	31.24 ⁴⁰	54.067 ⁷⁰	57.45 ¹⁹⁴	29.39 ¹⁶	60.78 ²²¹
June 9.1	50.04 ²⁴	51.93 ²⁷⁴	43.278 ¹²	30.84 ⁴⁵	53.997 ³²	55.51 ²¹⁷	29.23 ⁸	58.57 ²⁴²
19.1	49.80 ¹⁶	49.19 ²⁹⁹	43.290 ⁵³	30.39 ⁴⁹	53.965 ⁸	53.34 ²³²	29.15 ³	56.15 ²⁵⁶
29.0	49.64 ⁶	46.20 ³¹⁴	43.343 ⁹¹	29.90 ⁵²	53.973 ⁴⁸	51.02 ²⁴³	29.18 ¹³	53.59 ²⁶⁴
July 9.0	49.58 ³	43.06 ³²³	43.434 ¹³⁰	29.38 ⁵⁴	54.021 ⁸⁶	48.59 ²⁴⁵	29.31 ²³	50.95 ²⁶⁶
19.0	49.61 ¹³	39.83 ³²⁰	43.564 ¹⁶⁴	28.84 ⁵⁶	54.107 ¹²³	46.14 ²⁴¹	29.54 ³¹	48.29 ²⁶¹
29.0	49.74 ²²	36.63 ³⁰⁶	43.728 ¹⁹⁴	28.28 ⁵⁹	54.230 ¹⁵⁷	43.73 ²²⁸	29.85 ³⁹	45.68 ²⁵²
Aug. 7.9	49.96 ³¹	33.57 ²⁸⁴	43.922 ²²⁴	27.69 ⁶¹	54.387 ¹⁸⁹	41.45 ²⁰⁶	30.24 ⁴⁸	43.16 ²³⁷
17.9	50.27 ⁴⁰	30.73 ²⁵⁰	44.146 ²⁴⁹	27.08 ⁶³	54.576 ²¹⁹	39.39 ¹⁷⁶	30.72 ⁵⁴	40.79 ²¹⁸
27.9	50.67 ⁴⁷	28.23 ²⁰⁷	44.395 ²⁷⁰	26.45 ⁶⁸	54.795 ²⁴⁶	37.63 ¹⁴¹	31.26 ⁶⁰	38.61 ¹⁹⁶
Sept. 6.8	51.14 ⁵²	26.16 ¹⁵⁷	44.665 ²⁹⁰	25.77 ⁷²	55.041 ²⁶⁸	36.22 ⁹⁷	31.86 ⁶⁵	36.65 ¹⁶⁸
16.8	51.66 ⁵⁸	24.59 ⁹⁷	44.955 ³⁰⁸	25.05 ⁷⁴	55.309 ²⁸⁸	35.25 ⁴⁹	32.51 ⁷³	34.97 ¹³⁹
26.8	52.24 ⁶²	23.62 ³⁵	45.263 ³²⁰	24.31 ⁷⁸	55.597 ³⁰⁴	34.76 ⁵	33.21 ⁷⁴	33.58 ¹⁰⁵
Oct. 6.8	52.86 ⁶²	23.27 ³²	45.583 ³³⁶	23.53 ⁷⁹	55.901 ³¹³	34.81 ⁵⁸	33.94 ⁷⁵	32.53 ⁶⁸
16.7	53.48 ⁶²	23.59 ⁹⁹	45.913 ³³⁶	22.74 ⁷⁸	56.214 ³¹⁶	35.39 ¹¹⁰	34.68 ⁷⁵	31.85 ³⁰
26.7	54.10 ⁶⁰	24.58 ¹⁶²	46.249 ³³⁶	21.96 ⁷⁵	56.530 ³¹³	36.49 ¹⁶¹	35.43 ⁷⁴	31.55 ¹⁰
Nov. 5.7	54.70 ⁵⁶	26.20 ²²³	46.585 ³³⁰	21.21 ⁶⁷	56.843 ³⁰²	38.10 ²⁰⁷	36.17 ⁷²	31.65 ⁵¹
15.7	55.26 ⁴⁹	28.43 ²⁷⁵	46.915 ³¹⁶	20.54 ⁵⁹	57.145 ²⁸⁴	40.17 ²⁴⁶	36.89 ⁶⁷	32.16 ⁹²
25.6	55.75 ⁴¹	31.18 ³¹⁷	47.231 ²⁹⁴	19.95 ⁴⁷	57.429 ²⁵⁷	42.63 ²⁷⁵	37.56 ⁶²	33.08 ¹³³
Dec. 5.6	56.16 ³²	34.35 ³⁵²	47.525 ²⁶²	19.48 ³¹	57.686 ²²¹	45.38 ²⁹⁷	38.18 ⁵⁵	34.41 ¹⁷⁰
15.6	56.48 ²²	37.87 ³⁷²	47.787 ²²³	19.17 ¹⁶	57.907 ¹⁷⁹	48.35 ³⁰⁹	38.73 ⁴⁴	36.11 ²⁰²
25.5	56.70 ¹⁰	41.59 ³⁸²	48.010 ¹⁷⁶	19.02 ³	58.086 ¹³⁰	51.44 ³⁰⁶	39.17 ³⁴	38.13 ²²⁶
35.5	56.80	45.41	48.186	19.05	58.216	54.52	39.51	40.39
Mean Place	52.918	32.55	41.898	36.81	53.518	39.45	28.056	58.70
Sec δ, Tan δ	2.648	-2.452	1.132	+0.531	1.145	-0.558	2.744	+2.556
D _α , D _δ	0.00	-0.05	+0.07	+0.01	+0.05	-0.01	+0.13	+0.06
D _{γδ} , D _{δδ}	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Canis Minoris. Mag. 3.1		ρ Geminorum. Mag. 4.2		σ Argus. Mag. 3.3		α^2 Geminorum. (Castor.) Mag. 2.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 7 22	s + 8 26	h m 7 23	s +31 56	h m 7 26	s -43 8	h m 7 29	s +32 8
Jan. 0.5	47.991 ¹³¹	65.18 ¹¹¹	57.055 ¹⁵⁶	40.01 ³⁵	42.143 ⁹⁶	16.07 ³⁵²	28.871 ¹⁶²	54.33 ⁷¹
10.5	48.122 ⁸²	64.07 ⁹⁷	57.211 ¹⁰⁰	40.36 ⁵⁰	42.239 ³²	19.59 ³⁴³	29.033 ¹⁰⁵	54.06 ⁷¹
20.5	48.204 ³⁰	63.10 ⁸⁰	57.311 ³⁹	40.86 ⁶³	42.271 ³⁰	23.02 ³²³	29.138 ⁴⁵	55.15 ⁶²
30.5	48.234 ¹⁹	62.30 ⁶²	57.350 ¹⁸	41.49 ⁷¹	42.241 ⁹²	26.25 ²⁹⁵	29.183 ¹¹	55.77 ⁷¹
Feb. 9.4	48.215 ⁶⁶	61.68 ⁴⁷	57.332 ⁷²	42.20 ⁷³	42.149 ¹⁴⁶	29.20 ²⁶⁰	29.170 ⁶⁸	56.49 ⁷¹
19.4	48.149 ¹⁰⁵	61.21 ³¹	57.260 ¹²⁰	42.93 ⁶⁹	42.003 ¹⁹²	31.80 ²²⁰	29.102 ¹¹⁵	57.23 ⁷³
Mar. 1.4	48.044 ¹³⁶	60.90 ¹⁸	57.140 ¹⁵⁸	43.62 ⁶⁵	41.811 ²²⁹	34.00 ¹⁷⁷	28.987 ¹⁵⁵	57.96 ⁷³
11.3	47.908 ¹⁶⁰	60.72 ⁷	56.982 ¹⁸³	44.27 ⁵³	41.582 ²⁵⁷	35.77 ¹³¹	28.832 ¹⁸²	58.62 ⁷⁴
21.3	47.748 ¹⁷¹	60.65 ⁴	56.799 ¹⁹⁹	44.80 ⁴⁰	41.325 ²⁷²	37.08 ⁸³	28.650 ¹⁹⁸	59.18 ⁷⁵
31.3	45.577 ¹⁷³	60.69 ¹²	56.600 ²⁰²	45.20 ²⁴	41.053 ²⁷⁶	37.91 ³⁵	28.452 ²⁰⁵	59.61 ⁷⁵
Apr. 10.3	47.404 ¹⁶⁵	60.81 ²¹	56.398 ¹⁹⁴	45.44 ⁸	40.777 ²⁷⁰	38.26 ¹³	28.247 ¹⁹³	59.88 ⁷⁶
20.2	47.239 ¹⁴⁹	61.02 ²⁸	56.204 ¹⁷⁵	45.52 ⁷	40.507 ²⁵³	38.13 ⁶¹	28.054 ¹⁷⁸	59.99 ⁷⁶
30.2	47.090 ¹²⁵	61.30 ³⁴	56.029 ¹⁴⁸	45.45 ²⁵	40.254 ²³¹	37.52 ¹⁰⁵	27.876 ¹⁶²	59.94 ⁷⁷
May 10.2	46.965 ⁹⁸	61.64 ⁴¹	55.881 ¹¹⁴	45.20 ³⁶	40.023 ¹⁹⁷	36.47 ¹⁴⁷	27.724 ¹¹⁸	59.72 ⁷⁷
20.2	46.867 ⁶³	62.05 ⁴⁷	55.767 ⁷⁵	44.84 ⁴⁹	39.826 ¹⁶⁰	35.00 ¹⁸⁵	27.606 ⁸¹	59.36 ⁷⁸
30.1	46.804 ²⁸	62.52 ⁵³	55.692 ³⁴	44.35 ⁵⁸	39.666 ¹¹⁹	33.15 ²²⁰	27.525 ⁴⁰	58.89 ⁷⁸
June 9.1	46.776 ⁷	63.05 ⁵⁶	55.658 ⁸	43.77 ⁶⁶	39.547 ⁷⁵	30.95 ²⁴⁸	27.485 ¹	58.31 ⁷⁹
19.1	46.783 ⁴³	63.61 ⁶¹	55.666 ⁵¹	43.11 ⁷²	39.472 ²⁸	28.47 ²⁶⁹	27.486 ⁴⁵	57.64 ⁷⁹
29.0	46.826 ⁷⁸	64.22 ⁶¹	55.717 ⁹¹	42.39 ⁷⁵	39.444 ¹⁹	25.78 ²⁸³	27.531 ⁸⁵	56.91 ⁷⁹
July 9.0	46.904 ¹¹¹	64.83 ⁶⁰	55.808 ¹³¹	41.64 ⁷⁷	39.463 ⁶⁵	22.95 ²⁸⁸	27.616 ¹²⁴	56.13 ⁸⁰
19.0	47.015 ¹⁴¹	65.43 ⁵⁶	55.939 ¹⁶⁷	40.87 ⁸⁰	39.528 ¹¹¹	20.07 ²⁸⁶	27.740 ¹⁶¹	55.33 ⁸⁰
29.0	47.156 ¹⁷⁰	65.99 ⁴⁹	56.106 ²⁰⁰	40.07 ⁸¹	39.639 ¹⁵⁵	17.21 ²⁷³	27.901 ¹⁹²	54.50 ⁸⁰
Aug. 7.9	47.326 ¹⁹⁴	66.48 ³⁸	56.306 ²²⁸	39.26 ⁸²	39.794 ¹⁹⁷	14.48 ²⁵¹	28.093 ²²³	53.64 ⁸⁰
17.9	47.520 ²¹⁹	66.86 ²⁴	56.534 ²⁵⁶	38.44 ⁸³	39.991 ²³⁵	11.97 ²¹⁹	28.316 ²⁵¹	52.78 ⁸⁰
27.9	47.739 ²³⁸	67.10 ⁷	56.790 ²⁷⁹	37.61 ⁸⁴	40.226 ²⁷¹	9.78 ¹⁸⁰	28.567 ²⁷⁵	51.90 ⁸⁰
Sept. 6.9	47.977 ²⁵⁸	67.17 ¹³	57.069 ³⁰¹	36.77 ⁸⁴	40.497 ³⁰¹	7.98 ¹³²	28.842 ²⁹⁷	51.01 ⁸¹
16.8	48.235 ²⁷²	67.04 ³³	57.370 ³¹⁷	35.93 ⁸⁵	40.798 ³²⁶	6.66 ⁷⁹	29.139 ³¹⁴	50.10 ⁸¹
26.8	48.507 ²⁸⁵	66.71 ⁵⁵	57.687 ³³²	35.08 ⁸³	41.124 ³⁴⁶	5.87 ²⁰	29.453 ³³⁰	49.20 ⁸¹
Oct. 6.8	48.792 ²⁹⁵	66.16 ⁷⁸	58.019 ³⁴³	34.25 ⁸¹	41.470 ³⁵⁷	5.67 ⁴²	29.783 ³⁴²	48.31 ⁸¹
16.7	49.087 ³⁰¹	65.38 ⁹⁶	58.362 ³⁵⁰	33.44 ⁷⁷	41.827 ³⁶²	6.09 ¹⁰²	30.125 ³⁴⁹	47.43 ⁸¹
26.7	49.388 ³⁰⁰	64.42 ¹¹⁵	58.712 ³⁵⁰	32.67 ⁶⁷	42.189 ³⁵⁷	7.11 ¹⁶¹	30.474 ³⁵⁰	46.62 ⁷³
Nov. 5.7	49.688 ²⁹⁶	63.27 ¹²⁷	59.062 ³⁴⁴	32.00 ⁵⁹	42.546 ³⁴²	8.72 ²¹⁶	30.824 ³⁴⁶	45.89 ⁶⁴
15.7	49.984 ²⁸³	62.00 ¹³⁶	59.406 ³³⁰	31.41 ⁴⁵	42.888 ³¹⁸	10.88 ²⁶³	31.170 ³³³	45.25 ⁸⁰
25.6	50.267 ²⁶²	60.64 ¹⁴⁰	59.736 ³⁰⁶	30.96 ²⁸	43.206 ²⁸⁵	13.51 ³⁰¹	31.503 ³¹⁰	44.75 ³⁴
Dec. 5.6	50.529 ²³⁶	59.24 ¹³⁶	60.042 ²⁷⁵	30.68 ¹¹	43.491 ²⁴¹	16.52 ³²⁹	31.813 ²⁸⁰	44.41 ¹⁴
15.6	50.765 ¹⁹⁸	57.88 ¹³⁰	60.317 ²³⁶	30.57 ⁷	43.732 ¹⁸⁸	19.81 ³⁴⁸	32.093 ²⁴⁰	44.27 ⁴
25.6	50.963 ¹⁵⁷	56.58 ¹¹⁸	60.553 ¹⁸⁵	30.64 ²⁷	43.920 ¹³³	23.29 ³⁵³	32.333 ¹⁹¹	44.31 ²⁵
35.5	51.120	55.40	60.738	30.91	44.053	26.82	32.524	44.56
Mean Place	45.560	72.68	54.241	48.96	39.604	12.52	26.068	63.66
Sec δ , Tan δ	1.011	+0.149	1.178	+0.624	1.370	-0.937	1.180	+0.626
$D\alpha$, $D_{\alpha\alpha}$	+0.07	0.00	+0.08	+0.01	+0.05	-0.02	+0.08	+0.02
$\alpha\delta$, $D_{\alpha\delta}$	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9	-0.2	+0.9

APPARENT PLACES OF STARS, 1919.

381

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	25 Monocerotis. Mag. 5.2		α Canis Minoris. (Procyon.) Mag. 0.5		24 Lyncis. Mag. 5.0		κ Geminorum. Mag. 3.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 7 33	° ' - 3 55	h m 7 35	° ' + 5 25	h m 7 36	° ' +58 53	h m 7 39	° ' +24 35
	s	"	s	"	s	"	s	"
Jan. 0.5	17.360 132	51.54 183	6.094 135	52.71 136	13.869 237	54.01 184	36.245 163	26.24 16
10.5	17.492 82	53.42 173	6.229 87	51.35 119	14.106 146	55.85 201	36.408 110	26.08 0
20.5	17.574 33	55.15 153	6.316 36	50.16 102	14.252 54	57.86 209	36.518 55	26.08 16
30.5	17.607 17	56.68 134	6.352 14	49.14 82	14.306 40	59.95 209	36.573 2	26.24 30
Feb. 9.4	17.590 62	58.02 109	6.338 60	48.32 63	14.266 126	62.04 198	36.571 53	26.54 38
19.4	17.528 102	59.11 87	6.278 101	47.69 47	14.140 204	64.02 179	36.518 98	26.92 43
Mar. 1.4	17.426 134	59.98 63	6.177 133	47.22 29	13.936 267	65.81 152	36.420 136	27.35 44
11.4	17.292 157	60.61 42	6.044 155	46.93 15	13.669 315	67.33 118	36.284 164	27.79 42
21.3	17.135 170	61.03 18	5.889 170	46.78 2	13.354 344	68.51 81	36.120 180	28.21 37
31.3	16.965 176	61.21 1	5.719 173	46.76 10	13.010 356	69.32 39	35.940 185	28.58 29
Apr. 10.3	16.789 167	61.20 22	5.546 165	46.86 21	12.654 348	69.71 1	35.755 180	28.87 19
20.2	16.622 154	60.98 40	5.381 152	47.07 31	12.306 327	69.70 43	35.575 165	29.06 11
30.2	16.468 133	60.58 58	5.229 129	47.38 39	11.979 288	69.27 83	35.410 143	29.17 1
May 10.2	16.335 106	60.00 76	5.100 103	47.77 48	11.691 239	68.44 118	35.267 113	29.18 7
20.2	16.229 75	59.24 90	4.997 70	48.25 56	11.452 180	67.26 148	35.154 79	29.11 14
30.1	16.154 44	58.34 104	4.927 36	48.81 62	11.272 117	65.78 176	35.075 44	28.97 22
June 9.1	16.110 8	57.30 115	4.891 2	49.43 68	11.155 48	64.02 196	35.031 4	28.75 27
19.1	16.102 27	56.15 122	4.889 33	50.11 72	11.107 19	62.06 212	35.027 34	28.48 31
29.1	16.129 60	54.93 126	4.922 68	50.83 72	11.126 89	59.94 221	35.061 71	28.17 35
July 9.0	16.189 91	53.67 127	4.990 100	51.55 70	11.215 154	57.73 227	35.132 107	27.82 39
19.0	16.280 124	52.40 122	5.090 130	52.25 66	11.369 217	55.46 227	35.239 140	27.43 44
29.0	16.404 152	51.18 111	5.220 159	52.91 58	11.586 275	53.19 222	35.379 172	26.99 48
Aug. 7.9	16.556 178	50.07 99	5.379 184	53.49 46	11.861 329	50.97 214	35.551 200	26.51 53
17.9	16.734 203	49.08 77	5.563 209	53.95 30	12.190 377	48.83 203	35.751 225	25.98 58
27.9	16.937 224	48.31 55	5.772 229	54.25 12	12.567 419	46.80 186	35.976 250	25.40 66
Sept. 6.9	17.161 245	47.76 25	6.001 248	54.37 10	12.986 458	44.94 168	36.226 270	24.74 76
16.8	17.406 263	47.51 4	6.249 266	54.27 35	13.444 490	43.26 146	36.496 290	23.98 81
26.8	17.669 276	47.55 39	6.515 280	53.92 59	13.934 515	41.80 121	36.786 306	23.17 87
Oct. 6.8	17.945 287	47.94 73	6.795 290	53.33 83	14.449 535	40.59 93	37.092 319	22.30 93
16.8	18.232 294	48.67 105	7.085 297	52.50 106	14.984 544	39.66 62	37.411 327	21.37 96
26.7	18.526 297	49.72 134	7.382 299	51.44 127	15.528 545	39.04 29	37.738 331	20.41 96
Nov. 5.7	18.823 292	51.06 160	7.681 294	50.17 142	16.073 534	38.75 6	38.069 329	19.45 93
15.7	19.115 280	52.66 179	7.975 283	48.75 154	16.607 513	38.81 42	38.398 318	18.52 86
25.6	19.395 260	54.45 193	8.258 264	47.21 159	17.120 475	39.23 79	38.716 298	17.66 76
Dec. 5.6	19.655 234	56.38 200	8.522 238	45.62 159	17.595 424	40.02 115	39.014 271	16.91 61
15.6	19.889 198	58.38 199	8.760 202	44.03 153	18.019 362	41.17 145	39.285 235	16.30 45
25.6	20.087 157	60.37 193	8.962 161	42.50 142	18.381 285	42.62 173	39.520 191	15.85 26
35.5	20.244	62.30	9.123	41.08	18.666	44.35	39.711	15.59
Mean Place	15.027	44.77	3.760	60.15	9.762	65.06	33.628	35.71
Sec δ , Tan δ	1.002	-0.069	1.004	+0.095	1.936	+1.657	1.100	+0.458
$D_{\psi\alpha}$, $D_{\omega\alpha}$	+0.06	0.00	+0.06	0.00	+0.10	+0.04	+0.07	+0.01
$D_{\psi\delta}$, $D_{\omega\delta}$	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Geminorum. (Pollux.) Mag. 1.2		ϵ Puppis. Mag. 5.1		ξ Argus. Mag. 3.5		ϕ Geminorum. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 7 40	° ' " +28 13	h m 7 42	° ' " -14 21	h m 7 45	° ' " -24 39	h m 7 48	° ' " +26 58
Jan. 0.5	24.405 ¹⁶⁸	12.75	15.391 ¹³³	63.70	55.581 ¹³²	25.13	35.222 ¹⁷⁶	25.66
10.5	24.573 ¹¹²	12.79	15.524 ⁸⁴	66.16	55.713 ⁷⁹	28.07	35.398 ¹²²	25.59
20.5	24.685 ⁵⁶	13.03	15.608 ³³	68.48	55.792 ²⁶	30.89	35.520 ⁶⁵	25.72
30.5	24.741 ³	13.41	15.641 ¹⁷	70.61	55.818 ²⁷	33.53	35.585 ⁹	26.03
Feb. 9.4	24.738 ⁵⁵	13.91	15.624 ⁶⁴	72.51	55.791 ⁷⁵	35.93	35.594 ⁴⁵	26.45
19.4	24.683	14.48	15.560	74.14	55.716	38.03	35.549	26.97
Mar. 1.4	24.581 ¹⁰²	15.08	15.455 ¹⁰⁵	75.49	55.598 ¹¹⁸	39.81	35.456 ⁹³	27.54
11.4	24.440 ¹⁴¹	15.66	15.317 ¹³⁸	76.53	55.445 ¹³³	41.24	35.323 ¹³³	28.11
21.3	24.270 ¹⁷⁰	16.19	15.154 ¹⁶³	77.27	55.267 ¹⁷⁸	42.29	35.160 ¹⁶³	28.64
31.3	24.083 ¹⁸⁷	16.63	14.977 ¹⁷⁷	77.71	55.073 ¹⁹⁴	42.97	34.980 ¹⁸⁰	29.10
Apr. 10.3	23.889	16.95	14.795	77.85	54.873	43.27	34.792	29.46
20.2	23.701 ¹⁶⁸	17.14	14.617 ¹⁷⁸	77.69	54.676 ¹⁹⁷	43.21	34.607 ¹⁸⁵	29.70
30.2	23.529 ¹⁷²	17.20	14.452 ¹⁶⁵	77.26	54.491 ¹⁸⁵	42.79	34.437 ¹⁷⁰	29.83
May 10.2	23.379 ¹⁵⁰	17.14	14.305 ¹⁴⁷	76.56	54.325 ¹⁶⁶	42.01	34.287 ¹⁸⁰	29.83
20.2	23.259 ¹²⁰	16.95	14.185 ¹²⁰	75.61	54.184 ¹⁴¹	40.91	34.166 ¹²¹	29.73
30.1	23.175 ⁸⁴	16.67	14.093 ⁹²	74.43	54.073 ¹¹¹	39.52	34.078 ⁸⁸	29.51
June 9.1	23.127 ⁴⁸	16.29	14.034 ⁵⁰	73.05	53.995 ⁷⁸	37.85	34.026 ⁵²	29.20
19.1	23.120 ⁷	15.84	14.009 ²⁵	71.51	53.951 ⁴⁴	35.97	34.013 ¹³	28.82
29.1	23.152 ³²	15.33	14.018 ⁹	69.84	53.944 ²⁹	33.91	34.038 ²⁰⁶	28.38
July 9.0	23.223 ⁷¹	14.77	14.061 ⁴³	68.09	53.973 ¹⁷⁵	31.74	34.102 ²¹⁷	27.89
19.0	23.330	14.16	14.138	66.32	54.038	29.53	34.200	27.33
29.0	23.472 ¹⁴²	13.51	14.248 ¹¹⁰	64.59	54.136 ⁹⁸	27.34	34.334 ²¹⁹	26.73
Aug. 7.9	23.647 ¹⁷⁵	12.81	14.387 ¹³⁹	62.97	54.269 ¹³³	25.25	34.500 ¹⁶⁶	26.08
17.9	23.851 ²⁰⁴	12.08	14.555 ¹⁶⁸	61.49	54.434 ¹⁶⁵	23.33	34.694 ¹⁹⁴	25.37
27.9	24.081 ²³⁰	11.31	14.749 ¹⁹⁴	60.26	54.628 ¹⁹⁴	21.67	34.917 ¹⁶⁶	24.61
Sept. 6.9	24.337	10.50	14.969	59.30	54.851	20.33	35.165	23.80
16.8	24.614 ²⁷⁷	9.63	15.210 ²⁴¹	58.69	55.099 ²⁴⁸	19.37	35.434 ⁹⁶	22.92
26.8	24.911 ²⁹⁷	8.73	15.471 ²⁶¹	58.47	55.368 ²⁶⁹	18.87	35.724 ⁵⁰	21.99
Oct. 6.8	25.224 ³¹³	7.79	15.748 ²⁷⁷	58.66	55.655 ²⁸⁷	18.85	36.032 ²	21.01
16.8	25.551 ³²⁷	6.84	16.038 ²⁹⁰	59.28	55.958 ³⁰³	19.32	36.354 ⁴⁷	20.01
26.7	25.887 ³³⁶	5.90	16.336 ²⁹⁸	60.31	56.268 ³¹⁰	20.31	36.687 ⁹⁹	18.99
Nov. 5.7	26.227 ³⁴⁰	4.99	16.637 ³⁰¹	61.73	56.581 ³¹³	21.78	37.025 ¹⁴⁷	17.99
15.7	26.563 ³³⁶	4.15	16.934 ²⁹⁷	63.52	56.888 ³⁰⁷	23.67	37.361 ¹⁸⁹	17.06
25.6	26.889 ³²⁶	3.43	17.219 ²⁸⁵	65.60	57.183 ²⁹⁵	25.95	37.689 ²²⁸	16.22
Dec. 5.6	27.197 ³⁰⁸	2.83	17.484 ²⁶⁵	67.90	57.457 ²⁷⁴	28.54	37.999 ²⁵⁹	15.51
15.6	27.475 ²⁷⁸	2.40	17.723 ²³⁰	70.34	57.700 ²⁴³	31.33	38.283 ²⁷⁹	14.96
25.6	27.715 ²⁴⁰	2.17	17.925 ²⁰²	72.85	57.904 ²⁰⁴	34.25	38.530 ²⁹²	14.60
35.5	27.911 ¹⁹⁶	2.12	18.085 ¹⁶⁰	75.33	58.064 ¹⁶⁰	37.19	38.733 ²⁰⁴	14.45
Mean Place	21.720	22.53	13.000	57.88	53.258	20.43	32.587	35.82
Sec δ , Tan δ	1.135	+0.537	1.032	-0.256	1.100	-0.459	1.122	+0.509
$D_{\gamma a}$, $D_{\omega a}$	+0.07	+0.02	+0.05	-0.01	+0.05	-0.01	+0.07	+0.02
$D_{\gamma \delta}$, $D_{\omega \delta}$	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9

APPARENT PLACES OF STARS, 1919.

383

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	26 Lyncis. Mag. 5.7		Groombridge 1374. Mag. 5.6		χ Argus. Mag. 3.6		ω Cancri. Mag. 5.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 7 48	° ' " +47 46	h m 7 50	° ' " +74 7	h m 7 54	° ' " -52 45	h m 7 56	° ' " +25 36
	s 216	" 120	s 42	" 246	s 132	" 377	s 181	" 17
Jan. 0.6	52.577	21.35	38.55	58.11	45.971	54.68	4.529	45.54
10.5	52.793	22.55	38.97	60.57	46.103	58.45	4.710	45.37
20.5	52.940	23.93	39.22	63.23	46.160	62.18	4.839	45.39
30.5	53.013	25.45	39.30	65.96	46.144	65.77	4.912	45.60
Feb. 9.4	53.013	27.03	39.22	68.67	46.054	69.15	4.928	45.95
19.4	52.944	28.59	38.98	71.23	45.899	72.21	4.891	46.41
Mar. 1.4	52.812	30.07	38.58	73.55	45.685	74.90	4.806	46.93
11.4	52.628	31.38	38.06	75.53	45.423	77.17	4.680	47.47
21.3	52.404	32.46	37.45	77.09	45.125	78.98	4.524	48.00
31.3	52.154	33.27	36.78	78.17	44.802	80.30	4.349	48.47
Apr. 10.3	51.894	33.79	36.07	78.73	44.466	81.12	4.166	48.86
20.3	51.637	33.98	35.36	78.76	44.131	81.44	3.984	49.15
30.2	51.395	33.85	34.67	78.26	43.805	81.23	3.815	49.32
May 10.2	51.180	33.41	34.05	77.27	43.501	80.53	3.665	49.39
20.2	51.003	32.67	33.50	75.82	43.224	79.34	3.542	49.35
30.1	50.868	31.68	33.06	73.96	42.985	77.72	3.450	49.21
June 9.1	50.781	30.46	32.72	71.75	42.788	75.68	3.395	48.98
19.1	50.745	29.05	32.50	69.25	42.639	73.31	3.376	48.68
29.1	50.760	27.50	32.41	66.54	42.541	70.64	3.394	48.31
July 9.0	50.827	25.83	32.46	63.69	42.498	67.78	3.449	47.86
19.0	50.944	24.10	32.63	60.76	42.508	64.78	3.539	47.37
29.0	51.107	22.33	32.92	57.81	42.575	61.75	3.664	46.83
Aug. 8.0	51.314	20.56	33.33	54.92	42.698	58.78	3.819	46.23
17.9	51.563	18.80	33.86	52.14	42.876	55.98	4.005	45.55
27.9	51.847	17.10	34.48	49.52	43.106	53.44	4.218	44.82
Sept. 6.9	52.166	15.47	35.19	47.12	43.384	51.27	4.456	44.02
16.8	52.515	13.93	35.98	44.98	43.707	49.55	4.718	43.14
26.8	52.890	12.50	36.83	43.15	44.068	48.36	5.000	42.19
Oct. 6.8	53.289	11.23	37.76	41.67	44.460	47.75	5.301	41.18
16.8	53.705	10.14	38.71	40.57	44.873	47.78	5.618	40.12
26.7	54.133	9.24	39.68	39.90	45.297	48.45	5.946	39.05
Nov. 5.7	54.566	8.58	40.66	39.67	45.722	49.77	6.281	37.98
15.7	54.996	8.18	41.62	39.91	46.134	51.69	6.617	36.95
25.7	55.413	8.07	42.52	40.61	46.521	54.15	6.944	36.01
Dec. 5.6	55.805	8.27	43.37	41.78	46.872	57.08	7.255	35.19
15.6	56.161	8.76	44.13	43.39	47.174	60.37	7.542	34.54
25.6	56.471	9.55	44.78	45.39	47.416	63.94	7.793	34.07
35.5	56.724	10.63	45.28	47.69	47.591	67.64	8.002	33.80
Mean Place	49.294	33.06	31.767	70.85	43.195	53.15	1.942	56.00
Sec δ, Tan δ	1.488	+1.102	3.658	+3.518	1.653	-1.316	1.109	+0.479
D _ψ α, D _ω α	+0.09	+0.03	+0.14	+0.11	+0.03	-0.04	+0.07	+0.02
D _ψ δ, D _ω δ	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9

384 APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	χ Geminorum. Mag. 5.0		γ Lynceis. Mag. 4.9		ρ Argus. Mag. 2.9		δ H. Ursae Majoris. Mag. 5.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 7 58	° ' " +28 0	h m 8 2	° ' " +51 44	h m 8 4	° ' " -24 4	h m 8 4	° ' " +68 42
	s	"	s	"	s	"	s	"
Jan. 0.6	35.445 ¹⁸⁶	69.84 ³	25.878 ²⁴⁸	16.34 ¹³⁴	7.942 ¹⁵¹	16.22 ²⁹³	51.45 ³⁷	37.09 ²¹¹
10.5	35.631 ¹³⁴	69.81 ¹⁸	26.126 ¹⁷³	17.68 ¹⁵⁷	8.093 ⁹⁹	19.15 ²⁸⁵	51.82 ²⁴	39.25 ²³⁸
20.5	35.765 ⁷⁶	69.99 ³⁴	26.299 ⁹⁴	19.25 ¹⁷²	8.192 ⁴⁵	22.00 ²⁶⁸	52.06 ¹³	41.63 ³³²
30.5	35.841 ¹⁹	70.33 ⁴⁹	26.393 ¹⁵	20.97 ¹⁸⁰	8.237 ⁶	24.68 ²⁴⁴	52.19 ¹	44.15 ²⁵⁵
Feb. 9.5	35.860 ³⁶	70.82 ⁵⁹	26.408 ⁶¹	22.77 ¹⁸⁰	8.231 ⁵⁷	27.12 ²¹⁷	52.18 ¹⁴	46.70 ²⁶⁷
19.4	35.824 ⁸⁶	71.41 ⁶⁴	26.347 ¹³¹	24.57 ¹⁷⁰	8.174 ¹⁰⁰	29.29 ¹⁸⁶	52.04 ²⁶	49.17 ²³⁹
Mar. 1.4	35.738 ¹²⁷	72.05 ⁶⁵	26.216 ¹⁸⁹	26.27 ¹⁵³	8.074 ¹³⁷	31.15 ¹⁵¹	51.78 ³⁴	51.46 ³⁰¹
11.4	35.611 ¹⁵⁸	72.70 ⁶¹	26.027 ²³⁴	27.80 ¹²⁹	7.937 ¹⁸⁴	32.66 ¹¹⁶	51.44 ⁴³	53.47 ¹⁶⁵
21.3	35.453 ¹⁷⁸	73.31 ⁴³	25.793 ²⁸³	29.09 ⁶⁷	7.771 ¹⁹³	33.82 ⁴³	51.01 ⁵²	55.12 ⁷⁵
31.3	35.275 ¹⁸⁷	73.84 ³⁰	25.526 ²⁸³	30.10 ³⁰	7.587 ¹⁸²	34.62 ⁵	50.53 ⁵¹	56.34 ¹⁵⁷
Apr. 10.3	35.088 ¹⁸⁶	74.27 ¹⁶	25.243 ²⁷¹	30.77 ⁴	7.394 ¹⁸⁴	35.05 ³⁰	50.01 ⁵¹	57.09 ²⁸
20.3	34.902 ¹⁷⁵	74.57 ⁴	24.960 ²⁴⁴	31.07 ⁴⁰	7.202 ¹⁶⁷	35.10 ⁹⁶	49.50 ⁴¹	57.35 ¹⁵⁷
30.2	34.727 ¹⁵⁴	74.73 ²³	24.689 ¹⁶⁶	31.03 ¹⁰⁵	7.018 ¹¹⁸	34.80 ¹²⁷	48.99 ³⁵	57.12 ¹⁵⁷
May 10.2	34.573 ¹²⁷	74.77 ⁶⁰	24.445 ¹¹⁰	30.63 ¹³⁰	6.851 ⁵⁶	34.16 ¹⁷⁶	48.52 ¹⁶	56.41 ²³⁸
20.2	34.446 ⁹⁶	74.68 ⁵⁰	24.236 ⁹	29.89 ¹⁷²	6.704 ²¹	33.20 ¹⁹⁴	48.11 ⁸	55.24 ²⁶⁵
30.2	34.350 ⁶⁰	74.45 ⁵⁷	24.070 ⁴⁶	28.84 ⁹⁹	6.586 ⁴⁷	31.93 ²¹⁴	47.76 ¹¹	53.67 ²⁷¹
June 9.1	34.290 ²²	74.13 ⁶³	23.954 ¹¹⁶	27.54 ¹³⁰	6.496 ⁹⁰	30.38 ¹⁵⁵	47.50 ²⁶	51.75 ¹³⁰
19.1	34.268 ¹⁵	73.72 ⁴¹	23.891 ⁶³	26.01 ¹⁵³	6.440 ⁵⁶	28.62 ¹⁷⁶	47.34 ¹⁶	49.52 ²³⁸
29.1	34.283 ⁵³	73.22 ⁸⁶	23.882 ⁹	24.29 ¹⁷²	6.419 ²¹	26.68 ¹⁹⁴	47.26 ⁸	47.07 ²⁶⁵
July 9.0	34.336 ⁸⁹	72.65 ⁶³	23.928 ⁴⁶	22.44 ¹⁸⁵	6.431 ¹²	24.60 ²⁰⁸	47.27 ¹	44.44 ²⁸⁸
19.0	34.425 ¹²⁴	72.02 ⁷⁰	24.027 ¹⁵²	20.48 ²⁰¹	6.478 ⁸²	22.46 ²¹²	47.38 ²¹	41.70 ²³
29.0	34.549 ¹⁵⁶	71.32 ⁷⁵	24.179 ¹⁹⁹	18.47 ²⁰⁴	6.560 ¹¹⁵	20.34 ²⁰⁶	47.59 ²⁹	38.91 ²⁷³
Aug. 8.0	34.705 ¹⁸⁶	70.57 ⁸¹	24.378 ²⁴⁴	16.43 ²⁰²	6.675 ¹⁴⁷	18.28 ¹⁹⁰	47.88 ³⁷	36.13 ²³⁷
17.9	34.891 ²¹⁵	69.76 ⁹³	24.622 ²⁸⁷	14.41 ¹⁹⁸	6.822 ²⁰⁷	16.38 ¹⁶⁶	48.25 ⁴⁴	33.41 ²³⁹
27.9	35.106 ²⁴⁰	68.90 ¹⁰⁹	24.909 ³²⁵	12.43 ¹⁹⁰	7.000 ²⁰⁷	14.72 ¹³⁷	48.69 ⁵²	30.82 ²⁴¹
Sept. 6.9	35.346 ²⁶⁶	67.97 ⁹⁸	25.234 ³⁶¹	10.53 ¹⁸⁰	7.207 ²³⁴	13.35 ⁹⁹	49.21 ⁵⁸	28.38 ²²¹
16.8	35.612 ²⁸⁷	66.99 ¹⁰⁵	25.595 ³⁹²	8.73 ¹⁶⁵	7.441 ²⁶⁰	12.36 ⁵⁷	49.79 ⁶³	26.17 ¹³⁷
26.8	35.899 ³⁰⁷	65.94 ¹⁰⁷	25.987 ⁴¹⁹	7.08 ¹⁴⁸	7.701 ²⁹⁰	11.79 ¹⁰	50.42 ⁶⁸	24.20 ¹⁶
Oct. 6.8	36.206 ³²²	64.87 ¹¹⁰	26.406 ⁴⁵⁸	5.60 ¹⁰⁴	7.981 ³¹⁰	11.69 ⁹⁰	51.10 ⁷⁴	22.55 ¹²
16.8	36.528 ³³⁵	63.77 ¹⁰⁹	26.848 ⁴⁵⁸	4.32 ¹⁰⁴	8.279 ³¹⁰	12.08 ⁹⁰	51.82 ⁷⁴	21.23 ⁹
26.7	36.863 ³⁴²	62.68 ¹⁰⁷	27.306 ⁴⁶⁶	3.28 ⁷⁶	8.589 ³¹⁶	12.98 ¹³⁷	52.56 ⁷⁶	20.27 ⁸
Nov. 5.7	37.205 ³⁴²	61.61 ⁹⁹	27.772 ⁴⁶⁵	2.52 ⁴⁷	8.905 ³¹⁴	14.35 ¹⁸²	53.32 ⁷⁵	19.74 ⁹
15.7	37.547 ³³⁵	60.62 ⁸⁸	28.237 ⁴⁵³	2.05 ¹⁴	9.219 ³⁰³	16.17 ²²⁰	54.07 ⁷²	19.04 ⁹
25.7	37.882 ³¹⁰	59.74 ⁷³	28.690 ³⁹⁵	1.91 ²¹	9.522 ²⁸⁶	18.37 ²⁵¹	54.79 ⁶¹	19.99 ¹²¹
Dec. 5.6	38.201 ²⁹³	59.01 ⁵⁶	29.122 ³⁴⁶	2.12 ⁵⁶	9.808 ²⁵⁸	20.88 ²⁷⁴	55.47 ⁵³	20.79 ¹²¹
15.6	38.494 ²⁵⁸	58.45 ³⁶	29.517 ²⁸⁵	2.68 ⁸⁷	10.066 ²²¹	23.62 ²⁹⁹	56.08 ⁴⁴	22.03 ¹⁶¹
25.6	38.752 ²¹⁵	58.09 ¹⁴	29.863 ²⁸⁵	3.55 ¹²⁰	10.287 ¹⁷⁹	26.51 ²⁹²	56.61 ⁴⁴	23.67 ¹⁶¹
35.5	38.967 ²¹⁵	57.95 ¹⁴	30.148 ²⁸⁵	4.75 ¹²⁰	10.466 ¹⁷⁹	29.43 ²⁹²	57.05 ⁴⁴	25.67 ¹⁶¹
Mean Place	32.819	80.69	22.454	29.40	5.646	11.74	46.259	51.13
Sec δ, Tan δ	1.133	+0.532	1.615	+1.268	1.095	-0.447	2.754	+2.566
Dψα, Dωα	+0.07	+0.02	+0.09	+0.04	+0.05	-0.02	+0.12	+0.09
Dψδ, Dωδ	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9

APPARENT PLACES OF STARS, 1919.

385

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Argus. Mag. 2.2		ζ Cancri (mean). Mag. 4.7		Bradley 1147. Mag. 5.7		20 Puppis. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 8 7	° ' —47 5	h m 8 7	° ' +17 53	h m 8 9	° ' +75 59	h m 8 9	° ' —15 32
	s	"	s	"	s	"	s	"
Jan. 0.6	4.840 ¹⁵²	52.44 ³⁶⁷	36.565 ¹⁸⁴	25.16 ⁶⁹	31.55 ⁵²	67.10 ²⁴²	38.846 ¹⁶¹	41.66 ²⁵⁵
10.5	4.992 ⁸⁵	56.11 ³⁶⁴	36.749 ¹³³	24.47 ⁵⁰	32.07 ³⁵	69.52 ²⁶⁷	39.007 ¹¹¹	44.21 ²⁴⁶
20.5	5.077 ¹⁷	59.75 ³⁵¹	36.882 ⁸⁰	23.97 ³⁰	32.42 ¹⁵	72.19 ²⁷⁸	39.118 ⁶⁰	46.67 ²²⁸
30.5	5.094 ⁴⁹	63.26 ³³¹	36.962 ²⁷	23.67 ¹³	32.57 ⁸	74.97 ²⁸¹	39.178 ⁸	48.95 ²⁰⁵
Feb. 9.5	5.045 ¹¹⁰	66.57 ³⁰²	36.989 ²⁵	23.54 ³	32.54 ²²	77.78 ²⁷¹	39.186 ⁴⁰	51.00 ¹⁸⁰
19.4	4.935 ¹⁶⁵	69.59 ²⁶⁶	36.964 ⁷¹	23.57 ¹⁵	32.32 ³⁹	80.49 ²⁵⁰	39.146 ⁸³	52.80 ¹⁵¹
Mar. 1.4	4.770 ²¹¹	72.25 ²²⁷	36.893 ¹¹⁰	23.72 ²⁶	31.93 ⁵⁴	82.99 ²¹⁹	39.063 ¹²⁰	54.31 ¹²¹
11.4	4.559 ²⁴⁷	74.52 ¹⁸³	36.783 ¹⁴⁰	23.98 ³⁰	31.39 ⁶⁵	85.18 ¹⁷⁸	38.943 ¹⁴⁷	55.52 ⁹¹
21.3	4.312 ²⁷⁰	76.35 ¹³⁶	36.643 ¹⁶¹	24.28 ³³	30.74 ⁷⁴	86.96 ¹³¹	38.796 ¹⁶⁷	56.43 ⁵⁹
31.3	4.042 ²⁸³	77.71 ⁸⁸	36.482 ¹⁷⁰	24.61 ³³	30.00 ⁸⁰	88.27 ⁸²	38.629 ¹⁷⁵	57.02 ²⁹
Apr. 10.3	3.759 ²⁸⁶	78.59 ³⁸	36.312 ¹⁰⁰	24.94 ³¹	29.20 ⁸¹	89.09 ²⁷	38.454 ¹⁷⁶	57.31 ⁰
20.3	3.473 ²⁷⁹	78.97 ¹⁰	36.143 ¹⁶⁰	25.25 ²⁸	28.39 ⁷⁹	89.36 ²⁷	38.278 ¹⁶⁷	57.31 ³⁰
30.2	3.194 ²⁶¹	78.87 ⁵⁹	35.983 ¹⁴⁴	25.53 ²²	27.60 ⁷⁴	89.09 ⁸⁰	38.111 ¹⁵³	57.01 ⁵⁷
May 10.2	2.933 ²³⁸	78.28 ¹⁰⁵	35.839 ¹¹⁹	25.75 ²⁰	26.86 ⁶⁷	88.29 ¹²⁹	37.958 ¹³²	56.44 ⁸⁴
20.2	2.695 ²⁰⁶	77.23 ¹⁴⁸	35.720 ⁹²	25.95 ¹⁶	26.19 ⁵⁷	87.00 ¹⁷³	37.826 ¹⁰⁶	55.60 ¹⁰⁸
30.2	2.489 ¹⁷⁰	75.75 ¹⁸⁶	35.628 ⁶⁰	26.11 ¹³	25.62 ⁴⁵	85.27 ²¹³	37.720 ⁷⁷	54.52 ¹²⁸
June 9.1	2.319 ¹²⁹	73.89 ²²²	35.568 ²⁶	26.24 ⁷	25.17 ³²	83.14 ²⁴⁵	37.643 ⁴⁷	53.24 ¹⁴⁶
19.1	2.190 ⁸⁵	71.67 ²⁵⁰	35.542 ⁸	26.31 ⁴	24.85 ¹⁸	80.69 ²⁷⁰	37.596 ¹⁴	51.78 ¹⁶²
29.1	2.105 ³⁷	69.17 ²⁸⁴	35.550 ⁴¹	26.35 ¹	24.67 ¹¹	77.99 ²⁸⁸	37.582 ¹⁸	50.16 ¹⁷⁰
July 9.0	2.068 ⁹	66.46 ²⁷¹	35.591 ⁷⁵	26.34 ⁶	24.63 ¹¹	75.11 ³⁰³	37.600 ⁵⁰	48.46 ¹⁷⁵
19.0	2.077 ⁵⁸	63.62 ²⁰⁰	35.666 ¹⁰⁷	26.28 ¹²	24.74 ³⁴	72.08 ³⁰⁶	37.650 ⁸³	46.71 ¹⁷³
29.0	2.135 ¹⁰⁶	60.72 ²⁸⁴	35.773 ¹³⁶	26.16 ²⁰	24.98 ²⁷	69.02 ³⁰⁵	37.733 ¹¹³	44.98 ¹⁶⁴
Aug. 8.0	2.241 ¹⁵³	57.88 ²⁷⁰	35.909 ¹⁶⁵	25.96 ²⁸	25.35 ⁵¹	65.97 ²⁹⁸	37.846 ¹⁴²	43.34 ¹⁵¹
17.9	2.394 ²⁰⁰	55.18 ²⁴⁵	36.074 ¹⁹¹	25.68 ⁴⁰	25.86 ⁶³	62.99 ²⁸³	37.988 ¹⁷²	41.83 ¹²⁹
27.9	2.594 ²⁴⁴	52.73 ²¹²	36.265 ²¹⁷	25.28 ⁵¹	26.49 ⁷⁴	60.16 ²⁶⁴	38.160 ¹⁹⁹	40.54 ¹⁰⁸
Sept. 6.9	2.838 ²⁸²	50.61 ¹⁷⁰	36.482 ²³⁹	24.77 ⁶⁵	27.23 ⁸³	57.52 ²⁴¹	38.359 ²²⁴	39.51 ⁷⁰
16.9	3.120 ³²⁰	48.91 ¹¹⁷	36.721 ²⁶²	24.12 ⁷⁹	28.06 ⁹²	55.11 ²¹⁰	38.583 ²⁴⁹	38.81 ³²
26.8	3.440 ³⁵⁰	47.74 ⁶²	36.983 ²⁸¹	23.33 ⁹²	28.98 ¹⁰⁰	53.01 ¹⁷⁶	38.832 ²⁶⁸	38.49 ⁹
Oct. 6.8	3.790 ³⁷¹	47.12 ¹	37.264 ²⁰⁹	22.41 ¹⁰⁵	29.98 ¹⁰⁴	51.25 ¹³⁸	39.100 ²⁸⁶	38.58 ⁵³
16.8	4.161 ³⁸⁶	47.11 ⁶¹	37.563 ³¹¹	21.36 ¹¹⁷	31.02 ¹⁰⁸	49.87 ⁹⁵	39.386 ²⁹⁶	39.11 ⁹⁴
26.7	4.547 ³⁹¹	47.72 ¹²³	37.874 ³¹⁹	20.19 ¹²³	32.10 ¹⁰⁰	48.92 ⁴⁹	39.684 ³⁰⁷	40.05 ¹³⁶
Nov. 5.7	4.938 ³⁸⁵	48.95 ¹⁸²	38.193 ³²²	18.96 ¹²⁷	33.19 ¹⁰⁸	48.43 ¹	39.991 ³⁰⁷	41.41 ¹⁷⁴
15.7	5.323 ³⁶⁷	50.77 ²³⁷	38.515 ³¹⁶	17.69 ¹²⁷	34.27 ¹⁰⁵	48.42 ⁴⁹	40.298 ²⁹⁹	43.15 ²⁰⁶
25.7	5.690 ³³⁸	53.14 ²⁹⁰	38.831 ³⁰²	16.42 ¹²⁰	35.32 ⁹⁸	48.91 ⁹⁸	40.597 ²⁸⁴	45.21 ²³⁰
Dec. 5.6	6.028 ²⁹⁸	55.94 ³¹⁹	39.133 ²⁸¹	15.22 ¹¹¹	36.30 ⁸⁹	49.89 ¹⁴⁵	40.881 ²⁵⁹	47.51 ²⁴⁸
15.6	6.326 ²⁴⁷	59.13 ³⁴⁵	39.414 ²⁴⁸	14.11 ⁹⁶	37.19 ⁷⁷	51.34 ¹⁸⁷	41.140 ²²⁶	49.99 ²⁶⁸
25.6	6.573 ¹⁸⁹	62.58 ³⁶¹	39.662 ²⁰⁹	13.15 ⁸⁰	37.96 ⁶²	53.21 ²²⁴	41.366 ¹⁸⁷	52.57 ²⁶⁸
35.6	6.762	66.19	39.871	12.35	38.58	55.45	41.553	55.13
Mean Place	2.246	50.89	34.130	35.32	24.306	81.71	36.588	36.06
Sec δ, Tan δ	1.469	-1.076	1.051	+0.323	4.135	+4.012	1.038	-0.278
Dψa, Dωa	+0.04	-0.04	+0.07	+0.01	+0.15	+0.14	+0.05	-0.01
Dψδ, Dωδ	-0.2	+0.9	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8

5934°—1919—25

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Cancri. Mag. 3.8		31 Lyncis. Mag. 4.4		δ^1 Cancri. Mag. 5.9		ϵ Argus. Mag. 1.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 8 12 s	° ' " + 9 25 "	h m 8 17 s	° ' " +43 26 "	h m 8 18 s	° ' " +18 35 "	h m 8 20 s	° ' " -59 14 "
Jan. 0.6	9.763 ¹⁷⁹	60.77 ¹²¹	20.856 ²³⁸	43.32 ⁸⁰	46.103 ¹⁹⁴	24.72 ⁶⁹	54.204 ¹⁸⁵	54.24 ³⁸²
10.5	9.942 ¹³⁰	59.56 ¹⁰⁴	21.094 ¹⁷⁷	44.12 ¹⁰⁴	46.297 ¹⁴⁵	24.03 ⁴⁹	54.389 ⁹⁸	58.06 ³⁸⁴
20.5	10.072 ⁸⁰	58.52 ⁸⁵	21.271 ¹⁰⁹	45.16 ¹²⁵	46.442 ⁹¹	23.54 ²⁸	54.487 ¹¹	61.92 ³⁸⁴
30.5	10.152 ²⁷	57.67 ⁶³	21.380 ³⁸	46.41 ¹⁸⁷	46.533 ³⁸	23.26 ⁹	54.498 ⁷²	65.72 ³⁸⁴
Feb. 9.5	10.179 ²²	57.04 ⁴⁶	21.418 ²⁷	47.78 ¹⁴⁴	46.571 ¹⁵	23.17 ⁷	54.426 ¹⁵³	69.35 ³⁸⁵
19.4	10.157 ⁶⁷	56.58 ²⁶	21.391 ⁸⁸	49.22 ¹⁴²	46.556 ⁶²	23.24 ²³	54.273 ²²²	72.73 ³⁸⁵
Mar. 1.4	10.090 ¹⁰⁴	56.32 ¹³	21.303 ¹⁴¹	50.64 ¹³⁵	46.494 ¹⁰²	23.46 ³⁰	54.051 ²⁸⁴	75.79 ³⁸⁵
11.4	9.986 ¹³⁴	56.19 ⁰	21.162 ¹⁸⁴	51.99 ¹¹⁹	46.392 ¹³³	23.76 ³⁶	53.767 ³³¹	78.45 ³⁸⁵
21.4	9.852 ¹⁵²	56.19 ¹¹	20.978 ²¹³	53.18 ⁹⁹	46.259 ¹⁵⁵	24.12 ³⁸	53.436 ³⁸⁸	80.69 ³⁸⁵
31.3	9.700 ¹⁶³	56.30 ¹⁹	20.765 ²²⁹	54.17 ⁷³	46.104 ¹⁶⁹	24.50 ³⁹	53.068 ³⁸⁸	82.44 ³⁸⁵
Apr. 10.3	9.537 ¹⁶³	56.49 ²⁷	20.536 ²³³	54.90 ⁴⁷	45.935 ¹⁶⁹	24.89 ³⁶	52.680 ³⁹⁶	83.70 ³⁸⁵
20.3	9.374 ¹⁵⁵	56.76 ³²	20.303 ²²⁴	55.37 ¹⁸	45.766 ¹⁶¹	25.25 ³²	52.282 ³⁹⁵	84.44 ³⁸⁵
30.2	9.219 ¹³⁹	57.08 ³⁶	20.079 ²⁰⁵	55.55 ¹²	45.605 ¹⁴⁷	25.57 ²⁷	51.887 ³⁸¹	84.65 ³⁸⁵
May 10.2	9.080 ¹¹⁷	57.44 ⁴⁰	19.874 ¹⁷⁷	55.43 ⁶⁶	45.458 ¹²⁴	25.84 ¹⁶	51.506 ³²¹	84.34 ³⁸⁵
20.2	8.963 ⁹²	57.84 ⁴²	19.697 ¹⁴³	55.05 ⁶⁶	45.334 ⁹⁸	26.04 ¹⁶	51.152 ³²¹	83.52 ³⁸⁵
30.2	8.871 ⁶¹	58.26 ⁴⁵	19.554 ¹⁰²	54.39 ⁹⁰	45.236 ⁶⁷	26.20 ¹¹	50.831 ²⁷⁹	82.22 ³⁸⁵
June 9.1	8.810 ³⁰	58.71 ⁴⁷	19.452 ⁶⁰	53.49 ¹⁰⁹	45.169 ³⁵	26.31 ⁵	50.552 ²³⁰	80.46 ³⁸⁵
19.1	8.780 ¹	59.18 ⁴⁷	19.392 ¹⁵	52.40 ¹²⁷	45.134 ³	26.36 ⁰	50.322 ¹⁷⁵	78.30 ³⁸⁵
29.1	8.781 ³⁵	59.65 ⁴⁶	19.377 ⁴³	51.13 ¹⁴²	45.131 ⁶⁴	26.36 ¹¹	50.147 ¹¹⁵	75.79 ³⁸⁵
July 9.1	8.816 ⁶⁶	60.11 ⁴³	19.408 ⁷⁴	49.71 ¹⁵³	45.163 ⁵⁰	26.31 ¹¹	50.032 ⁵⁰	73.03 ³⁸⁵
19.0	8.882 ⁹⁵	60.54 ³⁷	19.482 ¹¹⁶	48.18 ¹⁶²	45.227 ⁹⁵	26.20 ¹⁹	49.982 ¹⁴	70.07 ³⁸⁵
29.0	8.977 ¹²⁵	60.91 ²⁹	19.598 ¹⁵⁸	46.56 ¹⁶⁸	45.322 ¹²⁶	26.01 ²⁷	49.996 ⁸¹	66.99 ³⁸⁵
Aug. 8.0	9.102 ¹⁵²	61.20 ¹⁷	19.756 ¹⁹⁶	44.88 ¹⁷¹	45.448 ¹⁵⁵	25.74 ³⁶	50.077 ²¹⁵	63.93 ³⁸⁵
17.9	9.254 ¹⁷⁹	61.37 ⁴	19.952 ²³²	43.17 ¹⁷²	45.603 ¹⁸¹	25.38 ⁴⁷	50.227 ²¹⁵	60.97 ³⁸⁵
27.9	9.433 ²⁰⁴	61.41 ¹³	20.184 ²⁶⁸	41.45 ¹⁷²	45.784 ²⁰⁸	24.91 ⁵⁹	50.442 ²⁷⁹	58.20 ³⁸⁵
Sept. 6.9	9.637 ²²⁶	61.28 ³³	20.452 ²⁹⁸	39.73 ¹⁶⁸	45.992 ²³²	24.32 ⁷⁴	50.721 ³³⁷	55.74 ³⁸⁵
16.9	9.863 ²⁵⁰	60.95 ⁵²	20.750 ³²⁷	38.05 ¹⁶⁰	46.224 ²⁵⁶	23.58 ⁸⁶	51.058 ³⁹⁰	53.69 ³⁸⁵
26.8	10.113 ²⁶⁹	60.43 ⁷⁵	21.077 ³⁵⁴	36.45 ¹⁵⁴	46.480 ²⁷⁶	22.72 ⁹⁹	51.448 ⁴³³	52.14 ³⁸⁵
Oct. 6.8	10.382 ²⁸⁶	59.68 ⁹⁴	21.431 ³⁷⁶	34.91 ¹²⁵	46.756 ³¹¹	21.73 ¹²²	51.881 ⁴⁸⁹	51.16 ³⁸⁵
16.8	10.668 ²⁹⁹	58.74 ¹¹⁵	21.807 ³⁹⁴	33.50 ¹⁰⁷	47.051 ³²⁰	20.60 ¹³²	52.348 ⁴⁹⁹	50.79 ³⁸⁵
26.8	10.967 ³⁰⁹	57.59 ¹³¹	22.201 ⁴⁰⁵	32.25 ⁸⁴	47.362 ³²⁴	19.38 ¹³²	52.837 ⁴⁸⁶	51.06 ³⁸⁵
Nov. 5.7	11.276 ³¹¹	56.28 ¹⁴³	22.606 ⁴⁰⁹	31.18 ⁵⁷	47.682 ³²¹	18.09 ¹³¹	53.333 ⁴⁶⁶	52.04 ³⁸⁵
15.7	11.587 ³⁰⁶	54.85 ¹⁵²	23.015 ³⁴⁷	30.34 ²⁸	48.006 ²⁸⁸	16.77 ¹¹³	53.821 ³⁷⁴	53.62 ³⁸⁵
25.7	11.893 ²⁹⁴	53.33 ¹⁵¹	23.417 ³⁵⁰	29.77 ³⁴	48.327 ²¹⁹	15.46 ⁸⁰	54.287 ³¹⁰	55.79 ³⁸⁵
Dec. 5.6	12.187 ²⁷²	51.79 ¹⁴²	23.804 ²⁷¹	29.49 ⁶⁵	48.637 ²⁵⁸	14.22 ¹¹³	54.714 ²³³	58.52 ³⁸⁵
15.6	12.459 ²⁴¹	50.28 ¹³⁰	24.163 ³²¹	29.51 ³⁴	48.925 ²⁵⁸	13.09 ⁹⁸	55.088 ³¹⁰	61.67 ³⁸⁵
25.6	12.700 ²⁰²	48.86 ¹³⁰	24.484 ²⁷¹	29.85 ⁶⁵	49.183 ²¹⁹	12.11 ⁸⁰	55.398 ²³³	65.16 ³⁸⁵
35.6	12.902 ²⁰²	47.56 ¹³⁰	24.755 ²⁷¹	30.50 ⁶⁵	49.402 ²¹⁹	11.31 ⁸⁰	55.631 ²³³	68.57 ³⁸⁵
Mean Place	7.426	69.98	17.895	56.90	43.693	35.44	51.181	54.66
Sec δ , Tan δ	1.014	+0.166	1.377	+0.947	1.055	+0.336	1.956	-1.681
$D\psi_a$, $D\omega_a$	+0.06	+0.01	+0.08	+0.04	+0.07	+0.01	+0.02	-0.06
$D\psi_\delta$, $D\omega_\delta$	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8

APPARENT PLACES OF STARS, 1919.

387

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	30 Monocerotis. Mag. 4.0		θ Chamæleonis. Mag. 4.3		ο Ursæ Majoris. Mag. 3.5		Groombridge 1450. Mag. 6.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 8 21	° ' " - 3 38	h m 8 22	° ' " -77 13	h m 8 23	° ' " +60 58	h m 8 27	° ' " +38 17
	s	"	s	"	s	"	s	"
Jan. 0.6	39.108 ¹⁷⁷	36.12 ¹⁹⁸	71.12 ²⁷	23.62 ³⁷⁷	36.91 ³³	69.66 ¹⁶⁸	42.096 ²³⁶	29.04 ⁴²
10.5	39.285 ¹³¹	38.10 ¹⁸⁴	71.39 ⁹	27.39 ³⁸⁷	37.24 ²³	71.34 ¹⁹⁵	42.332 ¹⁷⁹	29.46 ⁷¹
20.5	39.416 ⁸¹	39.94 ¹⁶⁵	71.48 ¹⁰	31.26 ³⁸⁶	37.47 ¹⁵	73.29 ²¹⁶	42.511 ¹¹⁷	30.17 ⁹¹
30.5	39.497 ²⁰	41.59 ¹⁴⁴	71.88 ²⁰	35.12 ³⁷⁵	37.62 ⁴	75.45 ²²⁶	42.628 ⁵¹	31.08 ¹⁰⁸
Feb. 9.5	39.526 ¹⁹	43.03 ¹²⁰	71.09 ⁴⁴	38.87 ³⁵⁴	37.66 ⁵	77.71 ²²⁵	42.679 ¹⁰	32.16 ¹²⁰
19.4	39.507	44.23	70.65	42.41	37.61	79.96	42.669	33.36
Mar. 1.4	39.444 ⁶⁸	45.20 ⁹⁷	70.03 ⁶²	45.66 ³²⁵	37.46 ¹⁵	82.11 ²¹⁵	42.600 ⁶⁹	34.58 ¹²²
11.4	39.345 ⁹⁹	45.93 ⁷⁸	69.30 ⁷⁸	48.56 ²⁹⁰	37.24 ²²	84.08 ¹⁹⁷	42.481 ¹¹⁹	35.76 ¹¹⁸
21.4	39.215 ¹³⁰	46.43 ⁸⁰	68.46 ⁸⁴	51.04 ²⁴⁸	36.95 ²⁹	85.77 ¹⁶⁹	42.322 ¹⁵⁹	36.86 ¹¹⁰
31.3	39.066 ¹⁴⁹	46.71 ²⁸	67.54 ⁹²	53.07 ²⁰³	36.62 ³³	87.11 ¹³⁴	42.134 ¹⁸⁸	37.82 ⁹⁶
Apr. 10.3	38.906	46.79	66.56	54.62 ¹⁰²	36.25	88.07 ⁸²	41.929	38.57 ⁵⁴
20.3	38.744 ¹⁶²	46.68 ¹¹	65.56 ¹⁰⁰	55.64 ⁴⁹	35.88	88.59 ⁸	41.719 ²¹⁰	39.11 ³⁰
30.2	38.588 ¹⁵⁶	46.37 ⁸¹	64.55 ¹⁰¹	56.13 [—]	35.52 ³⁶	88.67 [—]	41.514 ²⁰⁵	39.41 ⁵
May 10.2	38.445 ¹⁴³	45.91 ⁴⁶	63.55 ¹⁰⁰	56.08 ⁵	35.17 ³⁵	88.32 ³⁵	41.326 ¹⁸⁸	39.46 [—]
20.2	38.323 ¹²²	45.29 ⁶²	62.60 ⁹⁵	55.51 ⁵⁷	34.86 ³¹	87.54 ⁷⁸	41.162 ¹⁶⁴	39.27 ¹⁹
30.2	38.224 ⁹⁹	44.51 ⁷⁸	61.72 ⁸⁸	54.42 ¹⁰⁹	34.60 ²⁶	86.37 ¹¹⁷	41.029 ¹³³	38.85 ⁴²
June 9.1	38.153 ⁷¹	43.62 ⁸⁹	60.92 ⁸⁰	52.86 ¹⁵⁶	34.40 ²⁰	84.86 ¹⁵¹	40.930 ⁹⁹	38.21 ⁶⁴
19.1	38.109 ⁴⁴	42.63 ⁹⁹	60.24 ⁶⁸	50.85 ²⁰¹	34.28 ¹²	83.05 ¹⁵¹	40.870 ⁶⁰	37.39 ⁸²
29.1	38.097 ¹²	41.56 ¹⁰⁷	59.67 ⁵⁷	48.47 ²³⁸	34.21 ⁷	80.98 ²⁰⁷	40.849 ²¹	36.41 ⁹⁸
July 9.1	38.116 ¹⁹	40.44 ¹¹²	59.24 ⁴³	45.76 ²⁷¹	34.20 ¹	78.72 ²²⁶	40.869 ²⁰	35.27 ¹¹⁴
19.0	38.165 ⁴⁹	39.32 ¹¹²	58.98 ²⁶	42.82 ²⁹⁴	34.26 ⁶	76.31 ²⁴¹	40.929 ⁶⁰	34.01 ¹²⁶
29.0	38.244 ⁷⁹	38.23 ¹⁰⁹	58.86 ¹²	39.72 ³¹⁰	34.39 ¹³	73.80 ²⁵¹	41.027 ⁹⁸	32.66 ¹³⁵
Aug. 8.0	38.352 ¹⁰⁸	37.22 ¹⁰¹	58.91 ⁵	36.58 ³¹⁴	34.58 ¹⁹	71.25 ²⁵⁵	41.163 ¹³⁶	31.23 ¹⁴³
17.9	38.467 ¹³⁵	36.34 ⁸⁸	59.14 ²³	33.50 ³⁰⁸	34.84 ²⁶	68.71 ²⁵⁴	41.335 ¹⁷²	29.73 ¹⁵⁰
27.9	38.650 ¹⁶³	35.64 ⁷⁰	59.53 ³⁹	30.57 ²⁹³	35.15 ³¹	66.21 ²⁵⁰	41.541 ²⁰⁶	28.19 ¹⁵⁴
37.9	38.839 ¹⁸⁹	35.15 ⁴⁹	60.07 ⁵⁴	27.92 ²⁶⁵	35.52 ³⁷	63.80 ²⁴¹	41.778 ²³⁷	26.62 ¹⁵⁷
Sept. 6.9	38.839	35.15	60.07	27.92	35.52	63.80	41.778	26.62
16.9	39.054 ²¹⁵	34.94 ²¹	60.77 ⁷⁰	25.65 ²²⁷	35.94 ⁴²	61.54 ²²⁶	42.046 ²⁶⁸	25.04 ¹⁵⁸
26.8	39.291 ²³⁷	35.02 ⁸	61.68 ⁸¹	23.84 ¹⁸¹	36.40 ⁴⁶	59.46 ²⁰⁸	42.343 ²⁹⁷	23.47 ¹⁵⁷
Oct. 6.8	39.550 ²⁵⁹	35.42 ⁴⁰	62.50 ⁹²	22.57 ¹²⁷	36.90 ⁵⁰	57.60 ¹⁸⁶	42.665 ³²²	21.93 ¹⁵⁴
16.8	39.827 ²⁷⁷	36.15 ⁷⁸	63.49 ⁹⁹	21.92 ⁶⁵	37.43 ⁵³	56.01 ¹⁵⁹	43.011 ³⁴⁶	20.46 ¹⁴⁷
26.8	40.119 ²⁹²	37.21 ¹⁰⁶	64.53 ¹⁰⁴	21.93 ¹	37.99 ⁵⁶	54.74 ¹²⁷	43.375 ³⁶⁴	19.09 ¹³⁷
Nov. 5.7	40.422 ³⁰⁸	38.56 ¹³⁵	65.57 ¹⁰⁴	22.59 ⁶⁶	38.56 ⁵⁷	53.80 ⁹⁴	43.752 ³⁷⁷	17.86 ¹²³
15.7	40.728 ³⁰⁶	40.18 ¹⁶²	66.59 ¹⁰²	23.92 ¹³³	39.14 ⁵⁸	53.26 ⁵⁴	44.136 ³⁸⁴	16.81 ¹⁰⁵
25.7	41.029 ³⁰¹	42.01 ¹⁸³	67.54 ⁹⁵	25.87 ¹⁹⁵	39.71 ⁵⁷	53.13 ¹³	44.516 ³⁸⁰	15.97 ⁸⁴
Dec. 5.6	41.319 ²⁹⁰	43.99 ¹⁹⁸	68.39 ⁸⁵	28.37 ²⁵⁰	40.26 ⁵⁵	53.42 ²⁹	44.885 ³⁶⁹	15.39 ⁵⁸
15.6	41.587 ²⁶⁸	46.06 ²⁰⁷	69.10 ⁷¹	31.35 ²⁹⁸	40.76 ⁵⁰	54.14 ⁷²	45.229 ³⁴⁴	15.09 ³⁰
25.6	41.827 ²⁴⁰	48.14 ²⁰⁸	69.67 ⁵⁷	34.71 ³³⁶	41.21 ⁴⁵	55.27 ¹¹³	45.539 ³¹⁰	15.07 ²
35.6	42.028 ²⁰¹	50.16 ²⁰²	70.06 ³⁹	38.35 ³⁶⁴	41.59 ³⁸	56.77 ¹⁵⁰	45.804 ²⁶⁵	15.36 ²⁹
Mean Place	36.867	28.68	65.617	25.62	32.950	85.06	39.352	42.76
Sec δ, Tan δ	1.002	-0.064	4.523	-4.411	2.062	+1.803	1.274	+0.790
D _α , D _{αα}	+0.06	0.00	-0.03	-0.17	+0.10	+0.07	+0.08	+0.03
D _γ δ, D _α δ	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8	-0.2	+0.3

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	η Cancri. Mag. 5.5		Groombridge 1446. Mag. 6.3		δ Hydræ. Mag. 4.2		σ Hydræ. Mag. 4.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 8 28	° ' " +20 42	h m 8 30	° ' " +73 54	h m 8 33	° ' " + 5 58	h m 8 34	° ' " + 3 37
	s "	"	s "	"	s "	"	s "	"
Jan. 0.6	4.061 ²⁰⁶	50.47 ⁶⁰	50.26 ⁵⁴	35.23 ²¹⁷	24.426 ¹⁹⁵	64.20 ¹⁴⁹	33.752 ¹⁹⁵	27.30 ¹⁶¹
10.6	4.267 ¹⁵⁶	49.87 ³⁹	50.80 ³⁸	37.40 ²⁴⁹	24.621 ¹⁴⁸	62.71 ¹³¹	33.947 ¹⁴⁸	25.69 ¹⁶⁵
20.5	4.423 ¹⁰³	49.48 ¹⁶	51.18 ²¹	39.89 ²⁶⁷	24.769 ⁹⁹	61.40 ¹⁰⁹	34.095 ⁹⁸	24.24 ¹²⁸
30.5	4.526 ⁴⁶	49.32 ³	51.39 ⁵	42.56 ²⁷⁵	24.868 ⁴⁷	60.31 ⁸⁹	34.193 ⁴⁷	22.99 ¹⁰³
Feb. 9.5	4.572 ⁵	49.35 ¹⁹	51.44 ¹¹	45.31 ²⁷³	24.915 ⁴	59.42 ⁶⁷	34.240 ³	21.96 ⁸²
19.4	4.567 ⁵⁴	49.54 ³⁴	51.33 ²⁷	48.04 ²⁵⁸	24.911 ⁴⁸	58.75 ²⁷	34.237 ⁴⁷	21.14 ³⁹
Mar. 1.4	4.513 ⁹⁵	49.88 ⁴¹	51.06 ⁴¹	50.62 ²³³	24.863 ⁸⁸	58.27 ¹²	34.190 ⁸⁷	20.55 ⁴¹
11.4	4.418 ¹³⁰	50.29 ⁴⁷	50.65 ⁵²	52.95 ¹⁹⁸	24.775 ¹¹⁹	58.00 ²	34.103 ¹¹⁹	20.14 ²¹
21.4	4.288 ¹⁵²	50.76 ⁴⁸	50.13 ⁶¹	54.93 ¹⁵⁵	24.656 ¹⁴¹	57.88 ¹⁴	33.984 ¹⁴⁰	19.93 ¹
31.3	4.136 ¹⁶⁸	51.24 ⁴⁶	49.52 ⁶⁷	56.48 ¹⁰⁸	24.515 ¹⁵⁴	57.90 ¹⁴	33.844 ¹⁵⁴	19.87 ¹
Apr. 10.3	3.968 ¹⁷⁰	51.70 ⁴¹	48.85 ⁶⁹	57.56 ⁵⁷	24.361 ¹⁵⁸	58.04 ²⁶	33.690 ¹⁵⁷	19.96 ²²
20.3	3.798 ¹⁶³	52.11 ³⁵	48.16 ⁶⁸	58.13 ⁴	24.203 ¹⁸⁴	58.30 ³³	33.533 ¹⁶³	20.18 ²³
30.3	3.635 ¹⁵⁰	52.46 ²⁸	47.48 ⁶⁶	58.17 ⁵⁰	24.049 ¹⁴²	58.63 ⁴⁰	33.380 ¹⁴²	20.50 ⁶
May 10.2	3.485 ¹³⁰	52.74 ¹²	46.82 ⁵³	57.67 ¹⁴⁷	23.907 ¹⁰¹	59.03 ⁵³	33.238 ¹⁰¹	20.92 ⁵
20.2	3.355 ⁷⁴	52.93 ⁵	46.22 ⁴⁴	56.68 ¹⁸⁷	23.785 ⁷⁴	59.50 ⁵⁶	33.115 ⁷⁴	21.42 ⁶⁴
30.2	3.252 ⁴⁴	53.05 ³	45.69 ³³	55.21 ²²⁴	23.684 ⁴⁶	60.03 ⁵⁹	33.014 ⁴⁸	21.99 ⁷³
June 9.1	3.178 ¹⁰	53.10 ¹⁰	45.25 ²²	53.34 ²⁵⁴	23.610 ¹⁵	60.59 ⁶¹	32.940 ¹⁷	22.63 ⁷²
19.1	3.134 ²³	53.07 ¹⁷	44.92 ⁹	51.10 ²⁷⁶	23.564 ¹⁴	61.18 ⁵⁸	32.892 ⁴²	23.33 ⁶
29.1	3.124 ⁵⁶	52.97 ²⁶	44.70 ³	48.56 ²⁹³	23.549 ⁴⁴	61.79 ⁵²	32.875 ⁷²	24.05 ⁶
July 9.1	3.147 ⁸⁷	52.80 ³³	44.61 ¹⁴	45.80 ³⁰⁵	23.563 ⁷⁴	62.40 ⁴⁴	32.888 ⁷²	24.77 ⁶
19.0	3.203 ¹¹⁸	52.54 ⁴¹	44.64 ²⁷	42.87 ³⁰⁷	23.607 ¹⁰²	62.98 ³²	32.930 ⁹⁹	25.46 ⁶
29.0	3.290 ¹⁴⁶	52.21 ⁵²	44.78 ⁴⁸	39.82 ²⁹⁶	23.681 ¹⁸³	63.50 ¹	33.002 ¹⁸¹	26.12 ¹⁰
Aug. 8.0	3.408 ²⁰³	51.80 ⁸⁶	45.05 ⁶⁷	36.75 ²⁶¹	23.783 ²¹⁰	63.94 ²²	33.101 ²⁰⁷	26.69 ¹²
18.0	3.554 ²²⁷	51.28 ⁹⁹	45.43 ⁷⁷	33.72 ²³⁷	23.914 ²³²	64.26 ⁴⁵	33.229 ²³¹	27.14 ⁵
27.9	3.730 ²⁵⁴	50.66 ¹¹⁰	45.91 ⁸²	30.76 ²⁰⁵	24.072 ²⁵⁶	64.42 ⁷¹	33.384 ²⁵⁵	27.44 ⁶
Sept. 6.9	3.933 ²⁷⁵	49.92 ¹²²	46.49 ⁹³	27.95 ¹³⁰	24.255 ²⁹³	64.41 ¹¹⁸	33.565 ²⁹¹	27.54 ¹⁰
16.9	4.160 ³¹²	49.06 ¹²⁹	47.16 ⁸⁶	25.34 ²⁶¹	24.465 ²¹⁰	64.19 ²²	33.772 ²⁰⁷	27.42 ¹²
26.8	4.414 ²⁵⁴	48.07 ⁹⁹	47.93 ⁷⁷	22.97 ²³⁷	24.697 ²³²	63.74 ⁴⁵	34.003 ²³¹	27.07 ⁵
Oct. 6.8	4.689 ²⁷⁵	46.97 ¹¹⁰	48.75 ⁸²	20.92 ²⁰⁵	24.953 ²⁵⁶	63.03 ⁷¹	34.258 ²⁵⁵	26.43 ⁶⁴
16.8	4.984 ²⁹⁵	45.75 ¹²²	49.63 ⁸⁸	19.22 ¹⁷⁰	25.228 ²⁷⁵	62.09 ⁹⁴	34.532 ²⁷⁴	25.54 ⁹
26.8	5.296 ³¹²	44.46 ¹²⁹	50.56 ⁹³	17.92 ¹³⁰	25.521 ²⁹³	60.91 ¹¹⁸	34.823 ²⁹¹	24.39 ¹¹⁵
Nov. 5.7	5.620 ³²⁴	43.12 ¹³⁴	51.51 ⁹⁵	17.06 ⁸⁶	25.826 ³⁰⁵	59.53 ¹³⁸	35.127 ³⁰⁴	23.02 ¹⁵⁷
15.7	5.950 ³³⁰	41.77 ¹³⁵	52.47 ⁹⁶	16.68 ³⁸	26.137 ³¹¹	57.99 ¹⁵⁴	35.437 ³¹⁰	21.44 ¹⁵⁸
25.7	6.278 ³²⁸	40.46 ¹³¹	53.41 ⁹⁴	16.79 ¹¹	26.447 ³¹⁰	56.32 ¹⁶⁷	35.745 ³⁰⁸	19.72 ¹⁷²
Dec. 5.7	6.596 ³¹⁸	39.25 ¹²¹	54.31 ⁹⁰	17.40 ⁶¹	26.747 ³⁰⁰	54.59 ¹⁷³	36.043 ²⁸²	17.93 ¹⁷⁹
15.6	6.893 ²⁹⁷	38.16 ¹⁰⁹	55.13 ⁸²	18.51 ¹¹¹	27.029 ²⁸²	52.86 ¹⁷³	36.325 ²⁸²	16.11 ¹⁸²
25.6	7.161 ²⁰⁸	37.24 ⁹²	55.86 ⁷³	20.08 ¹⁵⁷	27.283 ²⁵⁴	51.20 ¹⁶⁶	36.578 ²⁵³	14.32 ¹⁷⁹
35.6	7.392 ²³¹	36.53 ⁷¹	56.47 ⁶¹	22.07 ¹⁹⁹	27.501 ²¹⁸	49.65 ¹⁵⁵	36.795 ²¹⁷	12.65 ¹⁶⁷
Mean Place	1.657	61.89	44.168	51.78	22.176	73.42	31.520	36.15
Sec δ , Tan δ	1.069	+0.378	3.608	+3.467	1.005	+0.105	1.002	+0.063
$D\psi_a$, $D\omega_a$	+0.07	+0.02	+0.13	+0.14	+0.06	0.00	+0.06	0.00
$D\psi_\delta$, $D\omega_\delta$	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8

APPARENT PLACES OF STARS, 1919.

389

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Cancr. Mag. 4.7		δ Cancr. Mag. 4.2		α Pyxid. Mag. 3.7		ϵ Cancr. Mag. 4.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 8 38	° ' " +21 45	h m 8 40	° ' " +18 26	h m 8 40	° ' " -32 53	h m 8 41	° ' " +29 2
	s	"	s	"	s	"	s	"
Jan. 0.6	38.483	26.49 50	7.414	58.67 79	22.500	39.81 327	50.483	72.19 18
10.6	38.700 217	25.90 36	7.628 214	57.88 57	22.691 191	43.08 327	50.714 231	72.01 18
20.5	38.867 167	25.54 12	7.793 165	57.31 35	22.827 136	46.33 325	50.894 180	72.09 8
30.5	38.981 114	25.42 7	7.907 114	56.96 13	22.908 81	49.48 315	51.018 124	72.42 33
Feb. 9.5	39.041 60	25.49 27	7.966 59	56.83 5	22.932 24	52.44 296	51.084 66	72.94 52
19.4	39.047 6	25.76 40	7.973 7	56.88 22	22.902 30	55.17 273	51.092 8	73.64 70
Mar. 1.4	39.002 45	26.16 48	7.931 42	57.10 32	22.822 80	57.58 241	51.047 45	74.43 79
11.4	38.914 88	26.64 54	7.846 85	57.42 41	22.699 123	59.65 207	50.956 91	75.27 84
21.4	38.791 123	27.18 56	7.726 120	57.83 44	22.541 158	61.35 170	50.826 130	76.12 85
31.3	38.643 148	27.74 52	7.583 143	58.27 45	22.359 182	62.65 130	50.669 157	76.91 79
Apr. 10.3	38.479 164	28.26 48	7.425 164	58.72 43	22.160 199	63.56 91	50.495 174	77.60 69
20.3	38.310 109	28.74 40	7.261 161	59.15 39	21.955 205	64.05 49	50.314 181	78.17 57
30.3	38.146 164	29.14 31	7.100 161	59.54 34	21.752 203	64.12 7	50.136 178	78.60 43
May 10.2	37.992 154	29.45 22	6.951 149	59.88 28	21.558 194	63.79 33	49.972 164	78.86 26
20.2	37.858 109	29.67 12	6.820 107	60.16 20	21.380 178	63.06 109	49.825 120	78.96 6
30.2	37.749 82	29.79 3	6.713 79	60.36 15	21.225 128	61.97 143	49.705 92	78.90 23
June 9.1	37.667 52	29.82 6	6.634 51	60.51 8	21.097 101	60.54 174	49.613 59	78.67 36
19.1	37.615 19	29.76 14	6.583 20	60.59 1	20.996 68	58.80 199	49.554 26	78.31 49
29.1	37.596 45	29.62 32	6.563 43	60.60 14	20.928 34	56.81 212	49.528 9	77.82 62
July 9.1	37.610 77	29.38 41	6.575 74	60.55 23	20.894 7	54.62 238	49.537 43	77.20 75
19.0	37.655 108	29.06 51	6.618 104	60.41 32	20.894 37	52.30 238	49.580 77	76.45 84
29.0	37.732 137	28.65 60	6.692 132	60.18 42	20.931 74	49.92 226	49.657 110	75.61 94
Aug. 8.0	37.840 166	28.14 73	6.796 161	59.86 55	21.005 110	47.55 206	49.767 141	74.67 104
18.0	37.977 193	27.54 84	6.928 188	59.44 69	21.115 147	45.29 179	49.908 173	73.63 113
27.9	38.143 221	26.81 95	7.089 216	58.89 82	21.262 183	43.23 145	50.081 203	72.50 122
Sept. 6.9	38.336 247	25.97 107	7.277 241	58.20 96	21.445 218	41.44 102	50.284 230	71.28 130
16.9	38.557 270	25.02 120	7.493 265	57.38 111	21.663 250	39.99 53	50.514 258	69.98 136
26.8	38.804 292	23.95 129	7.734 286	56.42 124	21.913 279	38.97 1	50.772 284	68.62 142
Oct. 6.8	39.074 311	22.75 136	7.999 306	55.31 134	22.192 324	38.44 54	51.056 308	67.20 145
16.8	39.366 325	21.46 140	8.285 318	54.07 142	22.497 337	38.45 108	51.364 326	65.75 145
26.8	39.677 332	20.10 140	8.591 327	52.73 145	22.821 342	38.99 162	51.690 352	64.30 133
Nov. 5.7	40.002 332	18.70 136	8.909 327	51.31 144	23.158 323	40.07 250	52.032 344	62.89 104
15.7	40.334 325	17.30 125	9.236 318	49.86 126	23.500 297	41.69 282	52.384 324	61.56 82
25.7	40.666 305	15.94 111	9.563 301	48.42 110	23.837 263	43.78 307	52.734 295	60.37 58
Dec. 5.7	40.991 278	14.69 93	9.881 273	47.04 110	24.160 218	46.28 321	53.078 257	59.33 32
15.6	41.296 241	13.58 70	10.182 238	45.78 91	24.457 218	49.10 307	53.402 295	58.51 58
25.6	41.574 218	12.65 70	10.455 238	44.68 91	24.720 218	52.17 321	53.697 257	57.93 32
35.6	41.815 218	11.95 70	10.693 238	43.77 91	24.938 218	55.38 321	53.954 257	57.61 32
Mean Place	36.107	38.51	5.083	70.21	20.206	37.47	48.010	85.49
Sec δ , Tan δ	1.077	+0.399	1.054	+0.334	1.191	-0.647	1.144	+0.556
$D\gamma\alpha$, $D\omega\alpha$	+0.07	+0.02	+0.07	+0.01	+0.05	-0.03	+0.07	+0.02
$D\gamma\delta$, $D\omega\delta$	-0.3	+0.8	-0.3	+0.8	-0.3	+0.8	-0.3	+0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	δ Argus. Mag. 2.0		ϵ Hydre. Mag. 3.5		σ^2 Canceri (mean). Mag. 5.5		ζ Hydre. Mag. 3.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 8 42	° ' " -54 24	h m 8 42	° ' " + 6 42	h m 8 49	° ' " +30 52	h m 8 51	° ' " + 6 14
Jan. 0.6	30.559 ²¹⁶	39.81 ³⁷³	31.523 ²⁰⁴	51.21 ¹⁴⁸	20.893 ²⁴⁴	59.52 ¹²	9.043 ²¹¹	66.95 ¹²
10.6	30.775 ¹⁴⁰	43.54 ³⁸⁰	31.727 ¹⁵⁷	49.73 ¹²⁹	21.137 ¹⁸⁸	59.40 ¹⁷	9.254 ¹⁶⁵	65.43 ¹²
20.5	30.915 ⁶⁴	47.34 ³⁷⁸	31.884 ¹⁰⁸	48.44 ¹⁰⁷	21.325 ¹³⁴	59.57 ⁴¹	9.419 ¹¹⁶	64.09 ¹¹²
30.5	30.979 ¹⁴	51.12 ³⁶⁴	31.992 ⁵⁶	47.37 ⁸⁶	21.459 ⁷⁶	59.98 ⁶³	9.535 ⁶⁴	62.97 ⁵⁸
Feb. 9.5	30.965 ⁸⁶	54.76 ³⁴²	32.048 ⁶	46.51 ⁶⁴	21.535 ¹⁷	60.61 ⁷⁹	9.599 ¹⁴	62.07 ⁶⁸
19.5	30.879 ¹⁵¹	58.18 ³¹³	32.054 ⁴⁰	45.87 ⁴⁵	21.552 ³⁸	61.40 ⁹¹	9.613 ³³	61.39 ⁶⁷
Mar. 1.4	30.728 ²⁰⁸	61.31 ²⁷⁸	32.014 ⁸¹	45.42 ²⁴	21.514 ⁸⁷	62.31 ⁹⁵	9.581 ⁷³	60.92 ⁵⁷
11.4	30.520 ²⁵⁶	64.09 ²³⁶	31.933 ¹¹²	45.18 ⁹	21.427 ¹²⁵	63.26 ⁹⁶	9.508 ¹⁰⁷	60.65 ¹¹
21.4	30.264 ²⁹⁰	66.45 ¹⁹²	31.821 ¹³⁶	45.09 ⁵	21.302 ¹⁵⁶	64.21 ⁸⁹	9.401 ¹³⁰	60.54 ⁴
31.3	29.974 ³¹⁷	68.37 ¹⁴³	31.685 ¹⁵¹	45.14 ¹⁷	21.146 ¹⁷⁴	65.10 ⁷⁸	9.271 ¹⁴⁷	60.58 ¹⁸
Apr. 10.3	29.657 ³²⁷	69.80 ⁹⁴	31.534 ¹⁵⁶	45.31 ²⁷	20.972 ¹⁸²	65.88 ⁶⁴	9.124 ¹⁵³	60.74 ⁵⁷
20.3	29.330 ³³⁰	70.74 ⁴²	31.378 ¹⁵³	45.58 ³⁴	20.790 ¹⁸²	66.52 ⁴⁸	8.971 ¹⁶¹	61.01 ⁵⁵
30.3	29.000 ³²¹	71.16 ⁸	31.225 ¹⁴²	45.92 ⁴¹	20.608 ¹⁷⁰	67.00 ²⁹	8.820 ¹⁴³	61.36 ⁶³
May 10.2	28.679 ³⁰²	71.08 ⁵⁹	31.083 ¹²⁵	46.33 ⁴⁶	20.438 ¹⁵²	67.29 ¹¹	8.678 ¹²⁷	61.78 ⁴⁷
20.2	28.377 ²⁷⁸	70.49 ¹⁰⁷	30.958 ¹⁰⁴	46.79 ⁵¹	20.286 ¹²⁹	67.40 ⁷	8.551 ¹⁰⁶	62.25 ⁵¹
30.2	28.099 ²⁴⁵	69.42 ¹⁵²	30.854 ⁷⁹	47.30 ⁵³	20.157 ⁹⁸	67.33 ²⁶	8.445 ⁸²	62.77 ⁵⁵
June 9.2	27.854 ²⁰⁶	67.90 ¹⁹²	30.775 ⁵⁰	47.83 ⁵⁶	20.059 ⁶⁷	67.07 ⁴¹	8.363 ⁵⁷	63.32 ⁵⁷
19.1	27.648 ¹⁶¹	65.98 ²²⁹	30.725 ²³	48.39 ⁵⁶	19.992 ³³	66.66 ⁵⁷	8.306 ²⁸	63.89 ⁵⁸
29.1	27.487 ¹¹²	63.69 ²⁵⁸	30.702 ⁶	48.95 ⁵²	19.959 ¹	66.09 ⁷¹	8.278 ¹	64.47 ⁵⁷
July 9.1	27.375 ⁶⁰	61.11 ²⁷⁹	30.708 ³⁷	49.51 ⁵²	19.960 ³⁶	65.38 ⁸⁴	8.277 ²⁹	65.04 ⁵⁴
19.0	27.315 ⁶	58.32 ²⁹³	30.745 ⁶⁶	50.03 ⁴⁶	19.906 ⁷⁰	64.54 ⁹⁵	8.306 ⁵⁷	65.58 ⁶⁷
29.0	27.309 ⁵²	55.39 ²⁹⁷	30.811 ⁹⁴	50.49 ³⁸	20.066 ¹⁰³	63.59 ¹⁰⁷	8.363 ⁸⁵	66.05 ⁵⁸
Aug. 8.0	27.361 ¹¹⁰	52.42 ²⁹⁰	30.905 ¹²²	50.87 ²⁴	20.169 ¹³⁶	62.52 ¹¹⁷	8.448 ¹¹⁴	66.44 ⁵⁸
18.0	27.471 ¹⁶⁸	49.52 ²⁷⁴	31.027 ¹⁴⁸	51.11 ¹¹	20.305 ¹⁶⁶	61.35 ¹²⁶	8.562 ¹⁴⁰	66.70 ¹¹
27.9	27.639 ²²⁴	46.78 ²⁴⁷	31.175 ¹⁷⁷	51.22 ⁶	20.471 ¹⁹⁸	60.09 ¹³⁴	8.702 ¹⁶⁰	66.81 ⁶
Sept. 6.9	27.863 ²⁷⁹	44.31 ²¹⁰	31.352 ²⁰²	51.16 ²⁹	20.669 ²²⁷	58.75 ¹⁴¹	8.871 ¹⁹⁴	66.75 ²⁸
16.9	28.142 ³²⁹	42.21 ¹⁶⁴	31.554 ²²⁷	50.87 ⁵⁰	20.896 ²⁵⁷	57.34 ¹⁴⁸	9.065 ²²²	66.47 ⁵⁹
26.9	28.471 ³⁷²	40.57 ¹¹¹	31.781 ²⁵²	50.37 ⁷⁵	21.153 ²⁸³	55.86 ¹⁵³	9.287 ²⁴⁶	65.97 ⁷⁵
Oct. 6.8	28.843 ⁴⁰⁸	39.46 ⁵¹	32.033 ²⁷²	49.62 ⁹⁸	21.436 ³⁰⁹	54.33 ¹⁵³	9.533 ²⁶⁹	65.21 ⁹⁵
16.8	29.251 ⁴³⁴	38.95 ¹²	32.305 ²⁹⁰	48.64 ¹²¹	21.745 ³²⁸	52.80 ¹⁵²	9.802 ²⁸⁸	64.23 ¹²³
26.8	29.685 ⁴⁴⁹	39.07 ⁷⁷	32.595 ³⁰⁵	47.43 ¹⁴²	22.073 ³⁴⁷	51.28 ¹⁴⁷	10.090 ³⁰⁴	63.00 ¹⁶³
Nov. 5.7	30.134 ⁴⁵¹	39.84 ¹⁴¹	32.900 ³¹²	46.01 ¹⁵⁵	22.420 ³⁵⁵	49.81 ¹³⁷	10.394 ³¹³	61.58 ¹⁶⁶
15.7	30.585 ⁴³⁸	41.25 ²⁰⁰	33.212 ³¹³	44.46 ¹⁶⁹	22.775 ³⁵⁸	48.44 ¹²²	10.707 ³¹⁴	59.98 ¹⁷⁰
25.7	31.023 ⁴¹¹	43.25 ²⁵⁵	33.525 ³⁰³	42.77 ¹⁷³	23.133 ³⁵¹	47.22 ¹⁰³	11.021 ³⁰⁷	58.28 ¹⁷⁷
Dec. 5.7	31.434 ³⁷¹	45.80 ³⁰⁹	33.828 ²⁸³	41.04 ¹⁷³	23.484 ³³³	46.19 ⁸⁰	11.328 ²⁹²	56.51 ¹⁷⁷
15.6	31.805 ³²⁰	48.80 ³³⁵	34.116 ²⁶¹	39.31 ¹⁶⁶	23.817 ³⁰⁵	45.39 ⁵⁵	11.620 ²⁶⁶	54.74 ¹⁷¹
25.6	32.125 ²⁵⁶	52.15 ³⁶¹	34.377 ²²⁶	37.65 ¹⁵⁴	24.122 ²⁶⁷	44.84 ²⁵	11.886 ²³⁴	53.03 ¹⁶⁰
35.6	32.381	55.76	34.603	36.11	24.389	44.59	12.120	51.43
Mean Place	27.805	40.77	29.300	60.76	18.425	73.47	6.851	76.60
Sec δ , Tan δ	1.718	-1.398	1.007	+0.118	1.165	+0.598	1.006	+0.110
$D\psi a$, $D\omega a$	+0.03	-0.06	+0.06	+0.01	+0.07	+0.03	+0.06	0.00
$D\psi \delta$, $D\omega \delta$	-0.3	+0.8	-0.3	+0.8	-0.3	+0.7	-0.3	+0.7

APPARENT PLACES OF STARS, 1919.

391

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ι Ursæ Majoris. Mag. 3.1		α Cancri. Mag. 4.3		δ ¹ Carinæ. Mag. 5.1		κ Ursæ Majoris. Mag. 3.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 8 53	° ' " +48 21	h m 8 54	° ' " +12 9	h m 8 54	° ' " -58 54	h m 8 58	° ' " +47 28
	s	"	s	"	s	"	s	"
Jan. 0.6	43.120	21.58	5.781	68.39	62.356	57.25	9.068	23.28
10.6	43.418	22.41	6.000	67.19	62.606	60.98	9.368	24.04
20.5	43.651	23.57	6.173	66.19	62.774	64.83	9.606	25.12
30.5	43.815	24.99	6.296	65.43	62.857	68.68	9.775	26.48
Feb. 9.5	43.903	26.61	6.367	64.88	62.856	72.46	9.870	28.06
19.5	43.919	28.35	6.386	64.55	62.774	76.03	9.893	29.77
Mar. 1.4	43.863	30.13	6.357	64.42	62.617	79.36	9.845	31.52
11.4	43.745	31.86	6.287	64.45	62.394	82.33	9.737	33.24
21.4	43.575	33.44	6.181	64.61	62.118	84.92	9.576	34.83
31.4	43.365	34.84	6.051	64.88	61.799	87.07	9.375	36.25
Apr. 10.3	43.129	35.97	5.904	65.22	61.449	88.74	9.148	37.41
20.3	42.878	36.79	5.750	65.59	61.081	89.92	8.905	38.29
30.3	42.627	37.29	5.597	65.99	60.707	90.58	8.661	38.83
May 10.2	42.387	37.44	5.452	66.41	60.336	90.72	8.427	39.04
20.2	42.169	37.25	5.323	66.82	59.982	90.35	8.213	38.91
30.2	41.979	36.73	5.215	67.22	59.650	89.46	8.026	38.45
June 9.2	41.826	35.89	5.130	67.60	59.353	88.10	7.874	37.68
19.1	41.713	34.76	5.073	67.94	59.094	86.31	7.761	36.62
29.1	41.644	33.39	5.044	68.26	58.883	84.13	7.691	35.32
July 9.1	41.620	31.79	5.042	68.53	58.723	81.60	7.664	33.79
19.1	41.642	30.01	5.071	68.72	58.621	78.84	7.681	32.06
29.0	41.709	28.09	5.129	68.85	58.582	75.90	7.743	30.19
Aug. 8.0	41.821	26.05	5.214	68.88	58.606	72.88	7.848	28.19
18.0	41.976	23.92	5.328	68.80	58.697	69.89	7.996	26.10
27.9	42.174	21.76	5.470	68.56	58.854	67.03	8.185	23.96
Sept. 6.9	42.411	19.58	5.641	68.17	59.079	64.40	8.415	21.79
16.9	42.689	17.43	5.837	67.60	59.368	62.11	8.684	19.64
26.9	43.003	15.34	6.061	66.82	59.715	60.26	8.990	17.54
Oct. 6.8	43.352	13.34	6.310	65.87	60.115	58.93	9.331	15.52
16.8	43.732	11.47	6.582	64.71	60.558	58.19	9.702	13.63
26.8	44.139	9.80	6.874	63.39	61.034	58.09	10.102	11.92
Nov. 5.8	44.566	8.34	7.183	61.92	61.530	58.63	10.522	10.41
15.7	45.005	7.17	7.501	60.35	62.031	59.84	10.955	9.17
25.7	45.447	6.32	7.822	58.73	62.519	61.67	11.392	8.24
Dec. 5.7	45.880	5.80	8.137	57.10	62.983	64.05	11.822	7.66
15.6	46.290	5.66	8.436	55.53	63.403	66.94	12.231	7.45
25.6	46.668	5.91	8.712	54.07	63.766	70.21	12.608	7.62
35.6	46.997	6.54	8.952	52.77	64.062	73.78	12.938	8.17
Mean Place	40.201	38.19	3.562	79.25	59.435	59.42	6.216	40.07
Sec δ, Tan δ	1.505	+1.124	1.023	+0.216	1.937	-1.659	1.480	+1.090
Dψα, Dωα	+0.08	+0.05	+0.07	+0.01	+0.03	-0.08	+0.08	+0.05
Dψδ, Dωδ	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	σ^3 Ursa Majoris. Mag. 4.9		κ Cancri. Mag. 5.1		λ Argus. Mag. 2.2		θ Hydre. Mag. 3.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 9 3	° ' " +67 27	h m 9 3	° ' " +10 59	h m 9 5	° ' " -43 6	h m 9 10	° ' " + 2
	s	"	s	"	s	"	s	"
Jan. 0.6	21.52	33.66	23.903	30.84	3.343	18.52	11.214	75.16
10.6	22.00 48	35.32 166	24.128 225	29.53 131	3.571 228	22.02 380	11.438 224	73.38
20.6	22.37 37	37.36 204	24.308 180	28.44 109	3.742 171	25.57 355	11.619 181	71.79
30.5	22.63 26	39.67 231	24.440 132	27.57 87	3.850 108	29.09 323	11.752 133	70.39
Feb. 9.5	22.76 13	42.18 251	24.520 80	26.95 62	3.894 44	32.50 341	11.834 82	69.22
	1	260	28	41	16	321	32	
19.5	22.77	44.78	24.548	26.54	3.878	35.71	11.866	68.28
Mar. 1.4	22.66 11	47.32 254	24.528 20	26.34 20	3.804 74	38.65 304	11.851 15	67.58
11.4	22.45 21	49.73 241	24.466 62	26.31 3	3.681 123	41.25 260	11.794 57	67.09
21.4	22.14 31	51.91 218	24.369 97	26.43 12	3.516 165	43.48 223	11.703 91	66.81
31.4	21.76 38	53.76 185	24.244 125	26.67 24	3.319 197	45.31 183	11.585 118	66.70
	44	145	142	32	219	140	136	
Apr. 10.3	21.32	55.21	24.102	26.99	3.100	46.71	11.449	66.75
20.3	20.85 47	56.20 90	23.952 150	27.37 38	2.867 233	47.65 94	11.304 145	66.95
30.3	20.37 48	56.72 52	23.801 151	27.78 41	2.629 238	48.14 49	11.158 146	67.25
May 10.3	19.90 47	56.74 2	23.657 144	28.21 43	2.396 233	48.17 3	11.017 141	67.66
20.2	19.47 43	56.27 47	23.527 130	28.65 44	2.175 221	47.74 43	10.889 128	68.15
	40	93	111	44	203	88	111	
30.2	19.07	55.34	23.416 89	29.09 42	1.972 180	46.86 128	10.778 91	68.72
June 9.2	18.73 34	53.97 137	23.327 63	29.51 40	1.792 152	45.58 166	10.687 67	69.35
19.1	18.46 27	52.21 176	23.264 37	29.91 36	1.640 120	43.92 199	10.620 43	70.05
29.1	18.25 21	50.11 210	23.227 8	30.27 32	1.520 85	41.93 227	10.577 16	70.75
July 9.1	18.13 12	47.72 239	23.219 20	30.59 25	1.435 47	39.66 247	10.561 12	71.45
	4	263						
19.1	18.09	45.09	23.239	30.84	1.388	37.19	10.573	72.10
29.0	18.14 5	42.30 279	23.287 48	31.02 18	1.382 6	34.58 261	10.610 37	72.75
Aug. 8.0	18.26 12	39.38 292	23.363 76	31.11 9	1.419 37	31.93 265	10.677 67	73.28
18.0	18.46 20	36.41 297	23.468 105	31.07 4	1.499 80	29.33 260	10.770 93	73.77
28.0	18.74 28	33.44 297	23.600 132	30.88 19	1.624 125	26.85 248	10.892 122	73.98
	36	292	161	35	169	223	149	
Sept. 6.9	19.10	30.52	23.761	30.53	1.793	24.62	11.041	74.05
16.9	19.54 44	27.71 261	23.948 187	30.00 53	2.006 213	22.71 191	11.219 178	73.95
26.9	20.03 49	25.09 262	24.164 216	29.25 75	2.262 256	21.22 149	11.425 206	73.55
Oct. 6.8	20.58 55	22.67 242	24.405 241	28.31 94	2.554 292	20.21 101	11.658 233	72.88
16.8	21.19 61	20.53 214	24.672 267	27.16 115	2.882 328	19.76 45	11.917 259	71.95
	66	180	287	133	354	12	280	
26.8	21.85	18.73	24.959	25.83	3.236	19.88	12.197	70.70
Nov. 5.8	22.53 68	17.30 143	25.265 306	24.34 149	3.610 374	20.60 72	12.496 299	69.35
15.7	23.24 71	16.31 99	25.581 316	22.72 162	3.993 383	21.91 131	12.807 311	67.65
25.7	23.95 71	15.79 52	25.901 320	21.04 168	4.374 381	23.79 188	13.123 316	65.85
Dec. 5.7	24.64 69	15.75 4	26.218 317	19.34 170	4.742 368	26.16 237	13.435 312	63.95
	66	48	302	164	343	279	299	
15.6	25.30	16.23	26.520	17.70	5.085	28.95	13.734	62.05
25.6	25.90 60	17.19 96	26.800 280	16.15 155	5.391 306	32.09 314	14.011 277	60.15
35.6	26.43 53	18.62 143	27.047 247	14.75 140	5.650 259	35.46 337	14.256 245	58.25
Mean Place	17.278	52.65	21.729	41.70	0.963	18.77	9.107	84.3
Sec δ , Tan δ	2.609	+2.410	1.019	+0.194	1.370	-0.936	1.001	+0.0
$D\mu\alpha$, $D\omega\alpha$	+0.11	+0.12	+0.06	+0.01	+0.04	-0.04	+0.06	0.0
$D\mu\delta$, $D\omega\delta$	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7

APPARENT PLACES OF STARS, 1919.

393

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Argus. Mag. 1.8		δ Cancr. Mag. 6.6		ϵ Argus. Mag. 2.2		γ Lynce. Mag. 3.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 9 12	° ' " -69 22	h m 9 14	° ' " +18 2	h m 9 14	° ' " -58 56	h m 9 16	° ' " +34 43
	s	"	s	"	s	"	s	"
Jan. 0.6	22.69	56.18	30.019	45.36	58.049	2.52	9.920	53.26
10.6	23.04	59.83	30.261	44.40	58.336	6.16	10.195	53.20
20.6	23.28	63.67	30.458	43.69	58.544	9.97	10.420	53.47
30.5	23.41	67.60	30.606	43.22	58.668	13.83	10.588	54.03
Feb. 9.5	23.41	71.52	30.699	43.01	58.708	17.63	10.695	54.85
19.5	23.31	75.31	30.740	43.02	58.667	21.30	10.741	55.87
Mar. 1.4	23.09	78.90	30.731	43.23	58.550	24.73	10.729	57.03
11.4	22.78	82.21	30.677	43.59	58.363	27.86	10.664	58.26
21.4	22.38	85.16	30.586	44.05	58.120	30.64	10.555	59.48
31.4	21.93	87.70	30.464	44.58	57.830	33.00	10.411	60.63
Apr. 10.3	21.42	89.80	30.323	45.14	57.505	34.91	10.241	61.68
20.3	20.87	91.40	30.171	45.70	57.156	36.32	10.058	62.56
30.3	20.30	92.48	30.017	46.22	56.795	37.24	9.870	63.24
May 10.3	19.73	93.03	29.868	46.69	56.434	37.64	9.687	63.71
20.2	19.17	93.03	29.731	47.09	56.082	37.52	9.521	63.93
30.2	18.63	92.50	29.612	47.42	55.747	36.89	9.372	63.93
June 9.2	18.13	91.46	29.515	47.65	55.440	35.77	9.250	63.69
19.1	17.68	89.93	29.443	47.81	55.168	34.20	9.155	63.24
29.1	17.29	87.96	29.396	47.88	54.936	32.21	9.093	62.58
July 9.1	16.98	85.61	29.379	47.85	54.752	29.86	9.064	61.73
19.1	16.74	82.92	29.390	47.72	54.622	27.22	9.068	60.71
29.0	16.58	80.01	29.429	47.47	54.550	24.38	9.107	59.52
Aug. 8.0	16.53	76.94	29.497	47.12	54.541	21.41	9.180	58.19
18.0	16.58	73.84	29.594	46.64	54.598	18.43	9.287	56.74
28.0	16.73	70.80	29.720	46.00	54.721	15.52	9.427	55.17
Sept. 6.9	16.98	67.93	29.876	45.23	54.913	12.83	9.601	53.50
16.9	17.34	65.35	30.060	44.30	55.171	10.42	9.809	51.77
26.9	17.79	63.15	30.273	43.21	55.492	8.41	10.049	49.97
Oct. 6.8	18.32	61.44	30.514	41.96	55.871	6.89	10.321	48.14
16.8	18.92	60.29	30.781	40.57	56.299	5.94	10.623	46.31
26.8	19.57	59.77	31.072	39.05	56.766	5.59	10.950	44.53
Nov. 5.8	20.26	59.90	31.384	37.45	57.260	5.90	11.300	42.82
15.7	20.96	60.70	31.708	35.80	57.765	6.86	11.666	41.26
25.7	21.65	62.17	32.039	34.18	58.268	8.46	12.039	39.88
Dec. 5.7	22.30	64.23	32.368	32.60	58.750	10.64	12.410	38.74
15.7	22.90	66.86	32.686	31.14	59.194	13.34	12.767	37.86
25.6	23.41	69.95	32.980	29.84	59.589	16.49	13.102	37.29
35.6	23.83	73.39	33.244	28.75	59.917	19.99	13.400	37.05
Mean Place	19.002	60.47	27.838	57.98	55.198	5.68	7.530	69.16
Sec δ , Tan δ	2.841	-2.659	1.052	+0.326	1.938	-1.661	1.217	+0.693
$D_{\alpha\alpha}$, $D_{\omega\alpha}$	+0.01	-0.13	+0.07	+0.02	+0.03	-0.08	+0.07	+0.03
$D_{\delta\delta}$, $D_{\omega\delta}$	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Pyxid. Mag. 4.9		α Hydre. Mag. 2.2		λ Urse Majoris. Mag. 3.8		δ Urse Majoris. Mag. 4.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 9 17	° ' -25 37	h m 9 23	° ' - 8 18	h m 9 25	° ' +63 24	h m 9 27	° ' +70
	s	"	s	"	s	"	s	"
Jan. 0.6	56.311	16.77	38.491	31.23	13.22	40.85	25.15	53.79
10.6	56.538	19.76	38.721	33.54	13.66	42.16	25.73	55.35
20.6	56.718	22.73	38.910	35.74	14.03	43.87	26.19	57.33
30.5	56.847	25.63	39.048	37.77	14.30	45.92	26.53	59.65
Feb. 9.5	56.922	28.37	39.138	39.62	14.48	48.21	26.74	62.22
19.5	56.945	30.88	39.178	41.22	14.55	50.66	26.81	64.91
Mar. 1.5	56.917	33.15	39.171	42.57	14.50	53.15	26.73	67.63
11.4	56.847	35.10	39.123	43.66	14.36	55.57	26.55	70.24
21.4	56.739	36.74	39.038	44.50	14.14	57.82	26.25	72.66
31.4	56.604	38.03	38.926	45.08	13.85	59.81	25.85	74.78
Apr. 10.3	56.448	38.98	38.795	45.41	13.51	61.46	25.39	76.51
20.3	56.279	39.56	38.653	45.53	13.14	62.71	24.87	77.90
30.3	56.108	39.79	38.507	45.42	12.74	63.52	24.32	78.60
May 10.3	55.939	39.67	38.364	45.11	12.36	63.86	23.79	78.90
20.2	55.781	39.22	38.231	44.61	11.98	63.74	23.27	78.69
30.2	55.637	38.45	38.112	43.92	11.63	63.15	22.78	77.97
June 9.2	55.513	37.37	38.011	43.10	11.33	62.13	22.34	76.78
19.2	55.409	36.02	37.931	42.14	11.07	60.71	21.97	75.16
29.1	55.332	34.44	37.874	41.07	10.88	58.92	21.68	73.13
July 9.1	55.281	32.68	37.841	39.91	10.74	56.80	21.46	70.71
19.1	55.260	30.78	37.834	38.72	10.68	54.42	21.33	68.14
29.0	55.269	28.80	37.854	37.54	10.68	51.82	21.31	65.21
Aug. 8.0	55.309	26.81	37.901	36.41	10.74	49.06	21.37	62.21
18.0	55.383	24.89	37.977	35.37	10.88	46.19	21.51	59.11
28.0	55.490	23.12	38.082	34.48	11.07	43.26	21.75	55.97
Sept. 6.9	55.630	21.57	38.216	33.81	11.34	40.33	22.09	52.81
16.9	55.806	20.31	38.381	33.37	11.68	37.45	22.50	49.71
26.9	56.015	19.40	38.574	33.25	12.07	34.69	22.99	46.81
Oct. 6.9	56.255	18.92	38.798	33.45	12.51	32.09	23.55	44.11
16.8	56.526	18.90	39.050	34.01	13.01	29.71	24.19	41.71
26.8	56.824	19.38	39.325	34.92	13.55	27.63	24.88	39.51
Nov. 5.8	57.140	20.34	39.621	36.18	14.13	25.87	25.62	37.81
15.7	57.469	21.77	39.932	37.77	14.74	24.51	26.40	36.51
25.7	57.803	23.63	40.248	39.62	15.35	23.59	27.18	35.71
Dec. 5.7	58.131	25.89	40.562	41.71	15.97	23.14	27.96	35.41
15.7	58.443	28.45	40.865	43.94	16.57	23.19	28.71	35.71
25.6	58.730	31.23	41.146	46.25	17.12	23.74	29.42	36.41
35.6	58.981	34.16	41.396	48.56	17.62	24.77	30.05	37.71
Mean Place	54.186	13.95	36.448	24.48	9.712	61.11	20.888	74.61
Ser δ , Tan δ	1.109	-0.480	1.011	-0.146	2.234	+1.998	2.950	+2.71
$D\psi\alpha$, $D\omega\alpha$	+0.05	-0.02	+0.06	-0.01	+0.09	+0.10	+0.11	+0.11
$D\psi\delta$, $D\omega\delta$	-0.3	+0.7	-0.3	+0.6	-0.3	+0.8	-0.3	+0.6

APPARENT PLACES OF STARS, 1919.

395

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Ursæ Majoris. Mag. 3.3		ψ Argus. Mag. 3.6		ξ Leonis. Mag. 5.1		10 Leonis Minoris. Mag. 4.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 9 27	° ' " +52 2	h m 9 27	° ' " -40 6	h m 9 27	° ' " +11 39	h m 9 29	° ' " +36 44
	s	"	s	"	s	"	s	"
Jan. 0.6	29.761	31.33	32.656	42.43	36.994	21.65	18.365	71.92
10.6	30.114 ³⁵³	32.07 ⁷⁴	32.908 ²⁵²	45.78 ³³⁵	37.240 ²⁴⁶	20.29 ¹³⁶	18.658 ²⁹³	71.88 ⁴
20.6	30.403 ²⁸⁹	33.20 ¹¹³	33.105 ¹⁹⁷	49.22 ³⁴⁴	37.443 ²⁰³	19.16 ¹¹³	18.900 ²⁴²	72.19 ³¹
30.5	30.622 ²¹⁹	34.67 ¹⁴⁷	33.245 ¹⁴⁰	52.66 ³⁴⁴	37.598 ¹⁵⁵	18.27 ⁸⁹	19.085 ¹⁸⁵	72.83 ⁶⁴
Feb. 9.5	30.763 ¹⁴¹	36.42 ¹⁷⁵	33.323 ⁷⁸	56.01 ³³⁵	37.702 ¹⁰⁴	17.63 ⁶⁴	19.211 ¹²⁶	73.73 ⁹⁰
19.5	30.825 ⁶²	38.34 ¹⁹²	33.342 ¹⁹	59.18 ³¹⁷	37.755 ⁵³	17.23 ⁴⁰	19.274 ⁶³	74.86 ¹¹³
Mar. 1.5	30.810 ¹⁵	40.36 ²⁰²	33.306 ³⁶	62.11 ²⁹³	37.759 ⁴	17.06 ¹⁷	19.275 ¹	76.14 ¹²⁸
11.4	30.725 ⁸⁵	42.38 ²⁰²	33.220 ⁸⁶	64.73 ²⁶²	37.718 ⁴¹	17.07 ¹	19.223 ⁵²	77.50 ¹³⁶
21.4	30.576 ¹⁴⁹	44.30 ¹⁹²	33.091 ¹²⁹	67.01 ²²⁸	37.639 ⁷⁹	17.25 ¹⁸	19.125 ⁹⁸	78.86 ¹³⁶
31.4	30.378 ¹⁹⁸	46.04 ¹⁷⁴	32.928 ¹⁶³	68.92 ¹⁹¹	37.531 ¹⁰⁶	17.55 ³⁰	18.987 ¹³⁸	80.17 ¹³¹
Apr. 10.3	30.143 ²³⁵	47.54 ¹⁵⁰	32.740 ¹⁸⁸	70.42 ¹⁵⁰	37.403 ¹²⁸	17.93 ³⁸	18.820 ¹⁶⁷	81.34 ¹¹⁷
20.3	29.882 ²⁶¹	48.72 ¹¹⁸	32.536 ²⁰⁴	71.49 ¹⁰⁷	37.262 ¹⁴¹	18.37 ⁴⁴	18.638 ¹⁸²	82.36 ¹⁰²
30.3	29.612 ²⁷⁰	49.55 ⁸⁸	32.323 ²¹³	72.13 ⁶⁴	37.117 ¹⁴⁵	18.85 ⁴⁸	18.449 ¹⁸⁹	83.15 ⁷⁹
May 10.3	29.345 ²⁶⁷	50.02 ⁴⁷	32.112 ²¹¹	72.33 ²⁰	36.975 ¹⁴²	19.34 ⁴⁹	18.262 ¹⁸⁷	83.71 ⁵⁶
20.2	29.091 ²⁵⁴	50.09 ⁷	31.907 ²⁰⁶	72.09 ²⁴	36.842 ¹³³	19.82 ⁴⁸	18.086 ¹⁷⁶	84.01 ³⁰
30.2	28.858 ²³³	49.78 ³¹	31.714 ¹⁹³	71.43 ⁶⁶	36.725 ¹¹⁷	20.28 ⁴⁶	17.928 ¹⁵⁸	84.06 ⁵
June 9.2	28.657 ²⁰¹	49.09 ⁶⁹	31.541 ¹⁷³	70.37 ¹⁰⁶	36.626 ⁹⁹	20.71 ⁴³	17.793 ¹³⁵	83.84 ²²
19.2	28.492 ¹⁶⁵	48.06 ¹⁰³	31.390 ¹⁵¹	68.94 ¹⁴³	36.550 ⁷⁶	21.11 ⁴⁰	17.687 ¹⁰⁶	83.39 ⁴⁵
29.1	28.367 ¹²⁵	46.71 ¹³⁵	31.266 ¹²⁴	67.17 ¹⁷⁷	36.497 ⁵³	21.45 ³⁴	17.610 ⁷⁷	82.69 ⁷⁰
July 9.1	28.287 ⁸⁰	45.07 ¹⁶⁴	31.172 ⁹⁴	65.11 ²⁰⁶	36.470 ²⁷	21.73 ²⁸	17.565 ⁴⁵	81.79 ⁹⁰
19.1	28.252 ³⁵	43.19 ¹⁸⁸	31.112 ⁶⁰	62.84 ²²⁷	36.469 ¹	21.92 ¹⁹	17.555 ¹⁰	80.67 ¹¹²
29.0	28.264 ¹²	41.08 ²¹¹	31.087 ²⁵	60.41 ²⁴³	36.495 ²⁶	22.03 ¹¹	17.578 ²³	79.39 ¹²⁸
Aug. 8.0	28.323 ⁵⁹	38.82 ²²⁶	31.101 ¹⁴	57.92 ²⁴⁹	36.547 ⁵²	22.04 ¹	17.636 ⁵⁸	77.94 ¹⁴⁵
18.0	28.429 ¹⁰⁶	36.43 ²³⁹	31.155 ⁵⁴	55.43 ²⁴⁹	36.628 ⁸¹	21.91 ¹³	17.728 ⁹²	76.34 ¹⁶⁰
28.0	28.582 ¹⁵³	33.94 ²⁴⁹	31.250 ⁹⁵	53.04 ²³⁹	36.737 ¹⁰⁹	21.63 ²⁸	17.856 ¹²⁸	74.62 ¹⁷²
Sept. 6.9	28.782 ²⁰⁰	31.41 ²⁵³	31.389 ¹³⁹	50.87 ²¹⁷	36.874 ¹³⁷	21.19 ⁴⁴	18.019 ¹⁶³	72.80 ¹⁸²
16.9	29.027 ²⁴⁵	28.87 ²⁵⁴	31.572 ¹⁸³	48.98 ¹⁸⁹	37.041 ¹⁶⁷	20.54 ⁶⁵	18.216 ¹⁹⁷	70.90 ¹⁹⁰
26.9	29.316 ²⁸⁹	26.37 ²⁵⁰	31.796 ²²⁴	47.46 ¹⁵²	37.237 ¹⁹⁶	19.71 ⁸³	18.447 ²³¹	68.94 ¹⁹⁶
Oct. 6.9	29.648 ³³²	23.96 ²⁴¹	32.061 ²⁶⁵	46.39 ¹⁰⁷	37.462 ²²⁵	18.67 ¹⁰⁴	18.713 ²⁶⁶	66.95 ¹⁹⁹
16.8	30.019 ³⁷¹	21.68 ²²⁸	32.363 ³⁰²	45.83 ⁵⁶	37.715 ²⁵³	17.42 ¹²⁵	19.012 ²⁹⁹	64.98 ¹⁹⁷
26.8	30.427 ⁴⁰⁶	19.60 ²⁰⁸	32.694 ³³¹	45.84 ¹	37.992 ²⁷⁷	16.00 ¹⁴²	19.339 ³²⁷	63.05 ¹⁹³
Nov. 5.8	30.864 ⁴³⁷	17.75 ¹⁸⁵	33.051 ³⁵⁷	46.42 ⁵⁸	38.291 ²⁹⁹	14.41 ¹⁵⁹	19.691 ³⁵²	61.22 ¹⁸³
15.7	31.322 ⁴⁵⁸	16.20 ¹⁵⁵	33.422 ³⁷¹	47.57 ¹¹⁵	38.606 ³¹⁵	12.71 ¹⁷⁰	20.061 ³⁷⁰	59.56 ¹⁶⁶
25.7	31.792 ⁴⁷⁰	15.01 ¹¹⁹	33.797 ³⁷⁵	49.26 ¹⁶⁹	38.929 ³²³	10.94 ¹⁷⁷	20.442 ³⁸¹	58.08 ¹⁴⁸
Dec. 5.7	32.260 ⁴⁶⁸	14.20 ⁸¹	34.166 ³⁶⁹	51.46 ²²⁰	39.253 ³²⁴	9.17 ¹⁷⁷	20.824 ³⁸²	56.86 ¹²²
15.7	32.714 ⁴⁵⁴	13.82 ³⁸	34.515 ³⁴⁹	54.09 ²⁶³	39.567 ³¹⁴	7.44 ¹⁷³	21.196 ³⁷²	55.94 ⁹²
25.6	33.141 ⁴²⁷	13.87 ⁵	34.834 ³¹⁹	57.07 ²⁹⁸	39.861 ²⁹⁴	5.83 ¹⁶¹	21.544 ³⁴⁸	55.35 ⁵⁹
35.6	33.524 ³⁸³	14.36 ⁴⁹	35.112 ²⁷⁸	60.29 ³²²	40.126 ²⁶⁵	4.37 ¹⁴⁶	21.860 ³¹⁶	55.12 ²³
Mean Place	26.972	50.49	30.401	42.94	34.920	33.18	16.020	88.79
Sec δ, Tan δ	1.626	+1.282	1.308	-0.843	1.021	+0.206	1.248	+0.747
D _α , D _ω	+0.08	+0.07	+0.05	-0.04	+0.06	+0.01	+0.07	+0.04
D _δ , D _ω	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6	-0.3	+0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Leonis. Mag. 3.8		θ Antile. Mag. 5.0		ε Leonis. Mag. 3.1		ν Arg. Mag.	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	
	h m 9 36	° ' " +10 15	h m 9 40	° ' " -27 23	h m 9 41	° ' " +24 8	h m 9 45	
Jan. 0.6	51.803	30.30	37.487	54.99	17.513	37.27	7.76	
10.6	52.053 ²⁵⁰	28.84 ¹⁴⁶	37.737 ²⁵⁰	57.98 ²⁹⁹	17.785 ²⁷²	36.50 ⁷⁷	8.14 ³⁸	
20.6	52.263 ²¹⁰	27.61 ¹²³	37.941 ²⁰⁴	61.01 ³⁰³	18.015 ²⁹⁰	36.02 ⁴⁸	8.44 ³⁰	
30.5	52.426 ¹⁶³	26.61 ¹⁰⁰	38.095 ¹⁵⁴	63.99 ²⁹⁸	18.195 ¹⁸⁰	35.86 ¹⁶	8.64 ²⁰	
Feb. 9.5	52.538 ¹¹²	25.87 ⁷⁴	38.196 ¹⁰¹	66.84 ²⁸⁵	18.321 ¹²⁶	35.96 ¹⁰	8.75 ¹¹	
19.5	52.600 ⁶²	25.36 ⁵¹	38.244 ⁴⁸	69.48 ²⁶⁴	18.393 ⁷²	36.33 ³⁷	8.76 ¹	
Mar. 1.5	52.613 ¹³	25.10 ²⁶	38.240 ⁴	71.90 ²⁴²	18.411 ¹⁸	36.90 ⁵⁷	8.67 ⁹	
11.4	52.581 ³²	25.04 ⁶	38.193 ⁴⁷	74.03 ²¹³	18.381 ³⁰	37.63 ⁷³	8.51 ¹⁶	
21.4	52.511 ⁷⁰	25.14 ¹⁰	38.105 ⁸⁸	75.85 ¹⁸²	18.308 ⁷³	38.46 ⁸⁸	8.27 ²⁴	
31.4	52.411 ¹⁰⁰	25.40 ²⁶	37.986 ¹¹⁹	77.33 ¹⁴⁸	18.201 ¹⁰⁷	39.33 ⁸⁷	7.96 ³¹	
Apr. 10.4	52.288 ¹²³	25.75 ³⁵	37.844 ¹⁴²	78.46 ¹¹³	18.070 ¹⁸¹	40.20 ⁸⁷	7.61 ³⁵	
20.3	52.153 ¹³⁵	26.18 ⁴³	37.687 ¹⁵⁷	79.25 ⁷⁹	17.922 ¹⁴⁸	41.01 ⁸¹	7.22 ³⁹	
30.3	52.011 ¹⁴²	26.65 ⁴⁷	37.521 ¹⁶⁶	79.67 ⁴²	17.767 ¹⁵⁵	41.74 ⁷³	6.80 ⁴²	
May 10.3	51.872 ¹³⁹	27.15 ⁵⁰	37.355 ¹⁶⁶	79.73 ⁶	17.613 ¹⁸⁴	42.36 ⁶²	6.37 ⁴³	
20.2	51.740 ¹³²	27.66 ⁵¹	37.195 ¹⁶⁰	79.45 ²⁸	17.466 ¹⁴⁷	42.84 ⁴⁸	5.94 ⁴³	
30.2	51.622 ¹¹⁸	28.16 ⁵⁰	37.045 ¹⁵⁰	78.83 ⁶²	17.333 ¹³³	43.18 ³⁴	5.51 ⁴³	
June 9.2	51.520 ¹⁰²	28.63 ⁴⁷	36.910 ¹³⁵	77.90 ⁹³	17.219 ¹¹⁴	43.36 ¹⁸	5.11 ⁴⁰	
19.2	51.440 ⁸⁰	29.07 ⁴⁴	36.794 ¹¹⁶	76.68 ¹²²	17.126 ⁹³	43.39 ³	4.74 ³⁷	
29.1	51.382 ⁵⁸	29.47 ⁴⁰	36.700 ⁹⁴	75.20 ¹⁴⁸	17.059 ⁶⁷	43.26 ¹³	4.40 ³⁴	
July 9.1	51.348 ³⁴	29.82 ³⁵	36.630 ⁷⁰	73.50 ¹⁷⁰	17.016 ⁴³	42.97 ²⁹	4.12 ²⁸	
19.1	51.338 ¹⁰	30.09 ²⁷	36.587 ⁴³	71.65 ¹⁸⁵	17.002 ¹⁴	42.54 ⁴³	3.89 ²³	
29.1	51.356 ¹⁸	30.27 ¹⁸	36.573 ¹⁴	69.69 ¹⁹⁶	17.015 ¹³	41.96 ⁵⁸	3.72 ¹⁷	
Aug. 8.0	51.399 ⁴³	30.35 ⁸	36.590 ¹⁷	67.70 ¹⁹⁹	17.057 ⁴²	41.21 ⁷⁵	3.64 ⁸	
18.0	51.470 ⁷¹	30.29 ⁶	36.638 ⁴⁸	65.74 ¹⁹⁶	17.129 ⁷²	40.33 ⁸⁸	3.63 ¹	
28.0	51.568 ⁹⁸	30.07 ²²	36.721 ⁸³	63.88 ¹⁸⁶	17.232 ¹⁰³	39.30 ¹⁰³	3.70 ⁷	
Sept. 6.9	51.696 ¹²⁸	29.69 ³⁸	36.840 ¹¹⁹	62.23 ¹⁶⁵	17.364 ¹³²	38.10 ¹²⁰	3.85 ¹⁵	
16.9	51.854 ¹⁵⁸	29.11 ⁵⁸	36.996 ¹⁵⁶	60.83 ¹⁴⁰	17.529 ¹⁶⁵	36.77 ¹³³	4.09 ²⁴	
26.9	52.040 ¹⁸⁶	28.32 ⁷⁹	37.187 ¹⁹¹	59.78 ¹⁰⁵	17.725 ¹⁹⁶	35.29 ¹⁴⁸	4.42 ³³	
Oct. 6.9	52.258 ²¹⁸	27.32 ¹⁰⁰	37.414 ²²⁷	59.13 ⁶⁵	17.953 ²²⁸	33.69 ¹⁶⁰	4.82 ⁴⁰	
16.8	52.504 ²⁴⁶	26.09 ¹²³	37.676 ²⁶²	58.94 ¹⁹	18.212 ²⁵⁹	31.98 ¹⁷¹	5.29 ⁴⁷	
26.8	52.775 ²⁷¹	24.67 ¹⁴²	37.965 ²⁸⁹	59.22 ²⁸	18.499 ²⁸⁷	30.21 ¹⁷⁷	5.82 ⁵³	
Nov. 5.8	53.069 ²⁹⁴	23.08 ¹⁵⁹	38.281 ³¹⁶	60.00 ⁷⁸	18.811 ³¹²	28.40 ¹⁸¹	6.39 ⁵⁷	
15.8	53.382 ³¹³	21.36 ¹⁷²	38.613 ³³²	61.28 ¹²⁸	19.141 ³³⁰	26.60 ¹⁸⁰	6.98 ⁵⁹	
25.7	53.704 ³²²	19.55 ¹⁸¹	38.953 ³⁴⁰	63.00 ¹⁷²	19.484 ³⁴³	24.88 ¹⁷²	7.58 ⁶⁰	
Dec. 5.7	54.028 ³²⁴	17.72 ¹⁸³	39.293 ³⁴⁰	65.14 ²¹⁴	19.830 ³⁴⁶	23.28 ¹⁶⁰	8.17 ⁵⁹	
15.7	54.343 ³¹⁵	15.92 ¹⁸⁰	39.620 ³²⁷	67.62 ²⁴⁸	20.168 ³³⁸	21.85 ¹⁴³	8.73 ⁵⁶	
25.6	54.640 ²⁹⁷	14.21 ¹⁷¹	39.924 ³⁰⁴	70.35 ²⁷³	20.490 ³²²	20.66 ¹¹⁹	9.23 ⁵⁰	
35.6	54.911 ²⁷¹	12.67 ¹⁵⁴	40.196 ²⁷²	73.25 ²⁹⁰	20.782 ²⁹²	19.72 ⁹⁴	9.66 ⁴³	
Mean Place	49.779	41.67	35.426	53.09	15.414	52.02	4.691	
Sec δ, Tan δ	1.016	+0.181	1.126	-0.518	1.096	+0.448	2.340	
$D\psi\alpha, D\omega\alpha$	+0.06	+0.01	+0.05	-0.03	+0.07	+0.02	+0.03	
$D\psi\delta, D\omega\delta$	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6	-0.3	

APPARENT PLACES OF STARS, 1919.

397

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	υ Ursa Majoris. Mag. 3.9		6 Sextantis. Mag. 6.0		μ Leonis. Mag. 4.1		Groombridge 1586. Mag. 6.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 9 45	° ' +59 24	h m 9 47	° ' - 3 51	h m 9 48	° ' +26 22	h m 9 51	° ' +73 15
	s	"	s	"	s	"	s	"
Jan. 0.6	17.572	52.78	11.134	55.03	11.667	65.32	14.76	33.14
10.6	18.005 ⁴³³	53.69 ⁹¹	11.384 ²⁵⁰	57.16 ²¹³	11.950 ²⁸³	64.61 ⁷¹	15.47 ⁷¹	34.56 ¹⁴²
20.6	18.368 ³⁶³	55.06 ¹³⁷	11.594 ²¹⁰	59.17 ²⁰¹	12.189 ²³⁹	64.24 ³⁷	16.06 ⁵⁹	36.45 ¹⁸⁹
30.6	18.649 ²⁸¹	56.81 ¹⁷⁵	11.759 ¹⁶⁵	61.00 ¹⁸³	12.378 ¹⁸⁹	64.17 ⁷	16.52 ⁴⁶	38.74 ²²⁹
Feb. 9.5	18.840 ¹⁹¹	58.87 ²⁰⁶	11.875 ¹¹⁶	62.62 ¹⁶²	12.513 ¹³⁵	64.40 ²³	16.81 ²⁹	41.33 ²⁵⁹
19.5	18.939 ⁹⁹	61.13 ²²⁶	11.941 ⁶⁶	64.01 ¹³⁹	12.593 ⁸⁰	64.88 ⁴⁸	16.96 ¹⁵	44.10 ²⁷⁷
Mar. 1.5	18.944 ⁵	63.50 ²³⁷	11.960 ¹⁹	65.13 ¹¹²	12.618 ²⁵	65.59 ⁷¹	16.96 ⁰	46.95 ²⁸⁵
11.4	18.863 ⁸¹	65.87 ²³⁷	11.936 ²⁴	66.02 ⁸⁹	12.595 ²³	66.44 ⁸⁵	16.79 ¹⁷	49.75 ²⁸⁰
21.4	18.705 ¹⁵⁸	68.15 ²²⁸	11.874 ⁶²	66.66 ⁶⁴	12.526 ⁹⁹	67.40 ⁹⁶	16.49 ³⁰	52.38 ²⁶³
31.4	18.482 ²²³	70.21 ²⁰⁶	11.783 ⁹¹	67.08 ⁴²	12.422 ¹⁰⁴	68.39 ⁹⁹	16.08 ⁴¹	54.74 ²³⁶
Apr. 10.4	18.208 ²⁷⁴	72.00 ¹⁷⁹	11.669 ¹¹⁴	67.28 ²⁰	12.292 ¹³⁰	69.36 ⁹⁷	15.56 ⁵²	56.75 ²⁰¹
20.3	17.898 ³¹⁰	73.45 ¹⁴⁵	11.541 ¹²⁸	67.29 ¹	12.144 ¹⁴⁸	70.27 ⁹¹	14.97 ⁵⁹	58.31 ¹⁵⁶
30.3	17.568 ³³⁰	74.50 ¹⁰⁶	11.406 ¹³⁵	67.12 ¹⁷	11.986 ¹⁵⁸	71.08 ⁸¹	14.34 ⁶³	59.40 ¹⁰⁹
May 10.3	17.233 ³³⁵	75.11 ⁶¹	11.270 ¹³⁶	66.79 ³³	11.828 ¹⁶⁸	71.74 ⁶⁶	13.70 ⁶⁴	59.97 ⁵⁷
20.2	16.907 ³²⁶	75.28 ¹⁷	11.141 ¹²⁹	66.32 ⁴⁷	11.677 ¹⁵¹	72.25 ⁵¹	13.06 ⁶⁵	59.99 ²
30.2	16.602 ³⁰⁵	75.01 ²⁷	11.023 ¹¹⁸	65.73 ⁵⁹	11.539 ¹³⁸	72.60 ³⁵	12.44 ⁶¹	59.49 ⁵⁰
June 9.2	16.326 ²⁷⁶	74.30 ⁷¹	10.918 ¹⁰⁵	65.02 ⁷¹	11.419 ¹²⁰	72.75 ¹⁵	11.88 ⁵⁶	58.49 ¹⁰⁰
19.2	16.090 ²³⁶	73.18 ¹¹²	10.830 ⁸⁸	64.22 ⁸⁰	11.319 ¹⁰⁰	72.74 ¹	11.38 ⁵⁰	57.01 ¹⁴⁸
29.1	15.899 ¹⁹¹	71.69 ¹⁴⁹	10.764 ⁶⁶	63.35 ⁸⁷	11.244 ⁷⁵	72.53 ²¹	10.96 ⁴²	55.10 ¹⁹¹
July 9.1	15.759 ¹⁴⁰	69.86 ¹⁸³	10.718 ⁴⁶	62.44 ⁹¹	11.194 ⁵⁰	72.18 ³⁵	10.62 ³⁴	52.80 ²³⁰
19.1	15.671 ⁸⁸	67.72 ²¹⁴	10.696 ²²	61.51 ⁹³	11.172 ²²	71.64 ⁵⁴	10.38 ²⁴	50.17 ²⁶³
29.1	15.639 ³²	65.34 ²³⁸	10.698 ²	60.60 ⁹¹	11.177 ⁵	70.92 ⁷²	10.24 ¹⁴	47.28 ²⁹⁹
Aug. 8.0	15.664 ²⁵	62.75 ²⁵⁹	10.727 ²⁹	59.75 ⁸⁵	11.212 ³⁵	70.06 ⁸⁶	10.23 ¹	44.16 ³¹²
18.0	15.746 ⁸²	60.01 ²⁷⁴	10.781 ⁷⁴	59.01 ⁷⁴	11.278 ⁶⁶	69.04 ¹⁰²	10.30 ⁷	40.92 ³²⁴
28.0	15.887 ¹⁴¹	57.17 ²⁸⁴	10.865 ⁸⁴	58.40 ⁶¹	11.373 ⁹⁵	67.84 ¹²⁰	10.48 ¹⁸	37.59 ³³³
Sept. 6.9	16.085 ¹⁹⁸	54.28 ²⁸⁹	10.978 ¹¹⁸	57.98 ⁴²	11.500 ¹²⁷	66.51 ¹³³	10.77 ²⁹	34.24 ³³⁵
16.9	16.339 ²⁵⁴	51.39 ²⁸⁹	11.121 ¹⁴³	57.80 ¹⁸	11.659 ¹⁵⁹	65.04 ¹⁴⁷	11.17 ⁴⁰	30.94 ³³⁰
26.9	16.650 ³¹¹	48.55 ²⁸⁴	11.296 ¹⁷⁵	57.88 ⁸	11.851 ¹⁹²	63.43 ¹⁶¹	11.66 ⁴⁹	27.76 ³¹⁸
Oct. 6.9	17.015 ³⁶⁵	45.82 ²⁷³	11.502 ²⁰⁶	58.27 ³⁹	12.076 ²²⁵	61.71 ¹⁷²	12.25 ⁵⁹	24.78 ²⁹⁸
16.8	17.431 ⁴⁶¹	43.27 ²⁵⁵	11.737 ²³⁵	58.98 ⁷¹	12.333 ²⁵⁷	59.90 ¹⁸¹	12.92 ⁶⁷	22.03 ²⁷⁵
26.8	17.892 ⁴⁶¹	40.94 ²³³	12.001 ²⁶⁴	59.99 ¹⁰¹	12.619 ²⁸⁶	58.03 ¹⁸⁷	13.68 ⁷⁶	19.61 ²⁴²
Nov. 5.8	18.392 ⁵⁰⁰	38.91 ²⁰³	12.288 ²⁸⁷	61.32 ¹³³	12.932 ³¹³	56.15 ¹⁸⁸	14.50 ⁸²	17.58 ²⁰³
15.8	18.923 ⁵³¹	37.22 ¹⁶⁹	12.595 ³⁰⁷	62.93 ¹⁶¹	13.265 ³³³	54.31 ¹⁸⁴	15.36 ⁸⁶	15.99 ¹⁵⁹
25.7	19.471 ⁵⁴⁸	35.94 ¹²⁸	12.912 ³¹⁷	64.77 ¹⁸⁴	13.611 ³⁴⁶	52.55 ¹⁷⁶	16.26 ⁹⁰	14.89 ¹¹⁰
Dec. 5.7	20.023 ⁵⁵²	35.11 ⁸³	13.232 ³²⁰	66.79 ²⁰²	13.962 ³⁵¹	50.95 ¹⁶⁰	17.18 ⁹²	14.32 ⁵⁷
15.7	20.563 ⁵⁴⁰	34.77 ³⁴	13.544 ³¹²	68.93 ²¹⁴	14.307 ³⁴⁵	49.53 ¹⁴²	17.18 ⁸⁷	14.32 ¹
25.6	21.075 ⁵¹²	34.93 ¹⁶	13.839 ²⁹⁵	71.12 ²¹⁹	14.636 ³²⁹	48.38 ¹¹⁵	18.89 ⁸⁴	14.90 ⁵⁷
35.6	21.541 ⁴⁶⁶	35.57 ⁶⁴	14.107 ²⁶⁸	73.28 ²¹⁶	14.937 ³⁰¹	47.52 ⁸⁶	19.65 ⁷⁶	16.00 ¹¹⁰
Mean Place	14.613	73.85	9.185	47.18	9.588	80.77	10.444	55.72
Sec δ, Tan δ	1.965	+1.692	1.002	-0.068	1.116	+0.496	3.472	+3.325
D _{φa} , D _{ωa}	+0.09	+0.09	+0.06	0.00	+0.07	+0.03	+0.11	+0.19
D _{φδ} , D _{ωδ}	-0.3	+0.6	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5

398 APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	19 Leonis Minoris. Mag. 5.2		φ Argus. Mag. 3.7		π Leonis. Mag. 4.9		γ Leonis. Mag. 3.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 9 52	° ' " +41 25	h m 9 54	° ' " -54 10	h m 9 55	° ' " + 8 25	h m 10 2	° ' " +17
	s	"	s	"	s	"	s	"
Jan. 0.6	46.029	72.80	3.450	51.08	57.991	49.12	56.968	75.99
10.6	46.358 ³²⁹	72.81 ¹	3.778 ³²⁸	54.49 ³⁴¹	58.254 ²⁶³	47.52 ¹⁶⁰	57.246 ²⁷⁸	74.77 ¹
20.6	46.636 ²⁷⁸	73.23 ⁴²	4.041 ²⁶³	58.10 ³⁶¹	58.478 ²²⁴	46.12 ¹⁴⁰	57.484 ²³⁸	73.81
30.6	46.858 ²²²	74.01 ⁷⁸	4.235 ¹⁹⁴	61.84 ³⁷⁴	58.657 ¹⁷⁹	44.97 ¹¹⁵	57.677 ¹⁹³	73.15
Feb. 9.5	47.018 ¹⁶⁰	75.12 ¹¹¹	4.355 ¹²⁰	65.58 ³⁷⁴	58.788 ¹³¹	44.07 ⁹⁰	57.820 ¹⁴³	72.77
	93	136	46	365	80	63	90	
19.5	47.111	76.48	4.401	69.23	58.868	43.44	57.910	72.67
Mar. 1.5	47.141 ³⁰	78.02 ¹⁵⁴	4.378 ²³	72.72 ³⁴⁹	58.899 ³¹	43.04 ⁴⁰	57.950 ⁴⁰	72.82
11.4	47.110 ³¹	79.68 ¹⁶⁶	4.291 ⁵⁷	75.97 ³²⁵	58.886 ¹³	42.87 ¹⁷	57.944 ⁶	73.16
21.4	47.027 ⁸³	81.34 ¹⁶⁶	4.145 ¹⁴⁶	78.91 ²⁹⁴	58.834 ⁵²	42.89 ²	57.896 ⁴⁸	73.67
31.4	46.899 ¹²⁸	82.93 ¹⁵⁹	3.953 ¹⁹²	81.49 ²⁵⁸	58.750 ⁸⁴	43.09 ²⁰	57.814 ⁸²	74.28
	162	148	229	218	106	31	110	
Apr. 10.4	46.737	84.41	3.724	83.67	58.642	43.40	57.704	74.98
20.3	46.551 ¹⁸⁶	85.68 ¹²⁷	3.465 ²⁵⁹	85.40 ¹⁷³	58.517 ¹²⁵	43.80 ⁴⁰	57.577 ¹²⁷	75.69
30.3	46.353 ¹⁹⁸	86.72 ¹⁰⁴	3.188 ²⁷⁷	86.66 ¹²⁶	58.384 ¹³³	44.27 ⁴⁷	57.440 ¹³⁷	76.38
May 10.3	46.151 ²⁰²	87.47 ⁷⁵	2.901 ²⁸⁷	87.44 ⁷⁸	58.250 ¹²⁴	44.79 ⁵²	57.301 ¹³⁹	77.03
20.3	45.956 ¹⁹⁵	87.94 ⁴⁷	2.613 ²⁸⁸	87.72 ²⁸	58.120 ¹³⁰	45.33 ⁵⁴	57.165 ¹³⁶	77.62
	182	14	281	21	118	54	126	
30.2	45.774	88.08	2.332	87.51	58.002	45.87	57.039	78.13
June 9.2	45.613 ¹⁶¹	87.91 ¹⁷	2.065 ²⁶⁷	86.81 ⁷⁰	57.896 ¹⁰⁶	46.40 ⁵³	56.927 ¹¹²	78.54
19.2	45.476 ¹³⁷	87.45 ⁴⁶	1.820 ²⁴⁵	85.65 ¹¹⁶	57.807 ⁸⁹	46.91 ⁵¹	56.831 ⁹⁶	78.84
29.1	45.367 ¹⁰⁹	86.68 ⁷⁷	1.602 ²¹⁸	84.06 ¹⁵⁹	57.739 ⁶⁸	47.38 ⁴⁷	56.756 ⁷⁵	79.02
July 9.1	45.291 ⁷⁶	85.66 ¹⁰²	1.416 ¹⁸⁶	82.08 ¹⁹⁸	57.691 ⁴⁸	47.81 ⁴³	56.701 ⁵⁵	79.09
	43	128	146	229	24	35	30	
19.1	45.248	84.38	1.270	79.79	57.667	48.16	56.671	79.04
29.1	45.240 ⁸	82.88 ¹⁵⁰	1.169 ¹⁰¹	77.22 ²⁵⁷	57.666 ¹	48.42 ²⁶	56.664 ⁷	78.83
Aug. 8.0	45.268 ²⁸	81.18 ¹⁷⁰	1.117 ⁵²	74.49 ²⁷³	57.691 ²⁵	48.58 ¹⁶	56.685 ²¹	78.49
18.0	45.332 ⁶⁴	79.31 ¹⁸⁷	1.120 ³	71.67 ²⁸²	57.741 ⁵⁰	48.61 ³	56.731 ⁴⁶	78.00
28.0	45.433 ¹⁰¹	77.29 ²⁰²	1.178 ⁵⁸	68.87 ²⁸⁰	57.820 ⁷⁹	48.48 ¹³	56.806 ⁷⁵	77.33
	138	215	119	269	106	32	106	
Sept. 7.0	45.571	75.14	1.297	66.18	57.928	48.16	56.912	76.49
16.9	45.749 ¹⁷⁸	72.91 ²²³	1.476 ¹⁷⁹	63.72 ²⁴⁶	58.066 ¹³⁸	47.65 ⁵¹	57.047 ¹³⁵	75.48
26.9	45.966 ²¹⁷	70.63 ²²⁸	1.717 ²⁴¹	61.58 ²¹⁴	58.236 ¹⁷⁰	46.91 ⁷⁴	57.216 ¹⁶⁹	74.27
Oct. 6.9	46.221 ²⁵⁵	68.33 ²³⁰	2.014 ²⁹⁷	59.86 ¹⁷²	58.438 ²⁰²	45.95 ⁹⁶	57.417 ²⁰¹	72.88
16.8	46.514 ²⁹³	66.06 ²²⁷	2.365 ³⁵¹	58.66 ¹²⁰	58.669 ²³¹	44.75 ¹²⁰	57.650 ²³³	71.34
	326	220	397	65	261	141	264	
26.8	46.840	63.86	2.762	58.01	58.930	43.34	57.914	69.64
Nov. 5.8	47.200 ³⁶⁰	61.80 ²⁰⁶	3.194 ⁴³²	57.98 ³	59.216 ²⁸⁶	41.73 ¹⁶¹	58.204 ²⁹⁰	67.84
15.8	47.581 ³⁸¹	59.92 ¹⁸⁸	3.650 ⁴⁵⁶	58.56 ⁵⁸	59.524 ³⁰⁸	39.98 ¹⁷⁵	58.518 ³¹⁴	65.97
25.7	47.977 ³⁹⁶	58.28 ¹⁶⁴	4.118 ⁴⁶⁸	59.79 ¹²³	59.844 ³²⁰	38.11 ¹⁸⁷	58.846 ³²⁸	64.06
Dec. 5.7	48.381 ⁴⁰⁴	56.94 ¹³⁴	4.580 ⁴⁶²	61.60 ¹⁸¹	60.168 ³²⁴	36.19 ¹⁹²	59.181 ³³⁵	62.24
	398	100	442	237	321	190	332	
15.7	48.779	55.94	5.022	63.97	60.489	34.29	59.513	60.56
25.7	49.160 ³⁸¹	55.33 ⁶¹	5.431 ⁴⁰⁹	66.79 ²⁸²	60.794 ³⁰⁵	32.46 ¹⁸³	59.831 ³¹⁸	58.96
35.6	49.509 ³⁴⁹	55.12 ²¹	5.792 ³⁶¹	69.99 ³²⁰	61.075 ²⁶¹	30.77 ¹⁶⁹	60.125 ²⁹⁴	57.57
Mean Place	43.766	91.54	0.964	55.33	56.064	60.29	55.041	89.56
Sec δ, Tan δ	1.334	+0.883	1.709	-1.386	1.011	+0.148	1.046	+0.36
Dψa, Dωa	+0.07	+0.05	+0.04	-0.08	+0.06	+0.01	+0.06	+0.01
Dψδ, Dωδ	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5

APPARENT PLACES OF STARS, 1919.

399

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Leonis. (Regulus.) Mag. 1.3		λ Hydræ. Mag. 3.8		η Velorum. Mag. 4.1		β Ursæ Majoris. Mag. 5.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 10 4	° ' +12 21	h m 10 6	° ' -11 57	h m 10 11	° ' -41 43	h m 10 12	° ' +65 30
	s	"	s	"	s	"	s	"
Jan. 0.6	5.516	36.61	40.230	16.86	22.021	10.49	13.20	23.97
10.6	5.788 ²⁷²	35.16 ¹⁴⁵	40.493 ²⁶³	19.32 ²⁴⁶	22.324 ³⁰³	13.66 ³¹⁷	13.74 ⁵⁴	24.86 ⁸⁹
20.6	6.023 ²³⁵	33.95 ¹²¹	40.718 ²²⁵	21.72 ²⁴⁰	22.579 ²⁵⁵	17.00 ³³⁴	14.21 ⁴⁷	26.26 ¹⁴⁰
30.6	6.212 ¹⁸⁹	33.00 ⁹⁵	40.899 ¹⁸¹	24.00 ²²⁸	22.778 ¹⁹⁹	20.42 ³⁴²	14.59 ³⁸	28.10 ¹⁸⁴
Feb. 9.5	6.351 ¹³⁹	32.34 ⁶⁶	41.031 ¹³²	26.09 ²⁰⁹	22.918 ¹⁴⁰	23.82 ³⁴⁰	14.87 ²⁸	30.30 ²²⁰
	90	42	94	189	81	330	17	246
19.5	6.441	31.92	41.115	27.98	22.999	27.12	15.04	32.76
Mar. 1.5	6.481 ⁴⁰	31.77 ¹⁵	41.150 ³⁵	29.61 ¹⁶³	23.023 ²⁴	30.23 ³¹¹	15.09 ⁵	35.39 ²⁶³
11.5	6.475 ⁶	31.83 ⁶	41.142 ⁸	31.00 ¹³⁹	22.993 ⁸⁰	33.12 ²⁸⁹	15.04 ⁵	38.05 ²⁶⁶
21.4	6.430 ⁴⁵	32.09 ²⁶	41.096 ⁴⁶	32.11 ¹¹¹	22.916 ⁷⁷	35.70 ²⁵⁸	14.90 ¹⁴	40.63 ²⁵⁸
31.4	6.350 ⁸⁰	32.47 ³⁸	41.016 ⁸⁰	32.96 ⁸⁵	22.799 ¹¹⁷	37.95 ²²⁵	14.66 ²⁴	43.04 ²⁴¹
	104	49	102	58	148	189	32	213
Apr. 10.4	6.246	32.96	40.914	33.54	22.651	39.84	14.34	45.17
20.3	6.123 ¹²³	33.52 ⁵⁶	40.792 ¹²²	33.88 ³⁴	22.478 ¹⁷³	41.32 ¹⁴⁸	13.98 ³⁶	46.94 ¹⁷⁷
30.3	5.991 ¹³²	34.11 ⁵⁹	40.662 ¹³⁰	33.98 ¹⁰	22.289 ¹⁸⁹	42.39 ¹⁰⁷	13.58 ⁴⁰	48.31 ¹³⁷
May 10.3	5.856 ¹³⁵	34.70 ⁵⁹	40.528 ¹³⁴	33.86 ¹²	22.091 ¹⁹⁸	43.04 ⁶⁵	13.16 ⁴²	49.21 ⁹⁰
20.3	5.725 ¹³¹	35.27 ⁵⁷	40.396 ¹³²	33.51 ³⁵	21.891 ²⁰⁰	43.25 ²¹	12.74 ⁴²	49.63 ⁴²
	122	54	125	54	197	22	41	7
30.2	5.603	35.81	40.271	32.97	21.694	43.03	12.33	49.56
June 9.2	5.493 ¹¹⁰	36.30 ⁴⁹	40.157 ¹¹⁴	32.24 ⁷³	21.507 ¹⁸⁷	42.40 ⁶³	11.96 ³⁷	49.00 ⁵⁶
19.2	5.399 ⁹⁴	36.72 ⁴²	40.057 ¹⁰⁰	31.35 ⁸⁹	21.334 ¹⁷³	41.36 ¹⁰⁴	11.62 ³⁴	47.97 ¹⁰³
29.2	5.325 ⁷⁴	37.08 ³⁶	39.974 ⁸³	30.33 ¹⁰²	21.181 ¹⁵³	39.96 ¹⁷⁴	11.32 ³⁰	46.51 ¹⁴⁶
July 9.1	5.271 ⁵⁴	37.33 ²⁵	39.910 ⁶⁴	29.20 ¹¹³	21.050 ¹³¹	38.22 ¹⁴⁰	11.08 ²⁴	44.66 ¹⁸⁵
	30	17	43	121	103	201	19	223
19.1	5.241	37.50	39.867	27.99	20.947	36.21	10.89	42.43
29.1	5.233 ⁸	37.56 ⁶	39.848 ¹⁹	26.75 ¹²⁴	20.875 ⁷²	33.98 ²²³	10.77 ¹²	39.90 ²⁵³
Aug. 8.0	5.251 ¹⁸	37.49 ⁷	39.853 ⁵	25.52 ¹²³	20.837 ³⁸	31.61 ²³⁷	10.72 ⁵	37.13 ²⁷⁷
18.0	5.294 ⁴³	37.27 ²²	39.886 ³³	24.38 ¹¹⁴	20.837 ⁰	29.18 ²⁴³	10.74 ²	34.15 ²⁹⁸
28.0	5.366 ⁷²	36.90 ³⁷	39.948 ⁶²	23.34 ¹⁰⁴	20.880 ⁴³	26.76 ²⁴²	10.84 ¹⁰	31.03 ³¹²
	101	55	91	86	88	229	17	319
Sept. 7.0	5.467	36.35	40.039	22.48	20.968	24.47	11.01	27.84
16.9	5.599 ¹³²	35.59 ⁷⁶	40.164 ¹²⁵	21.86 ⁶²	21.102 ¹³⁴	22.39 ²⁰⁸	11.24 ²³	24.62 ³²²
26.9	5.763 ¹⁶⁴	34.64 ⁹⁵	40.323 ¹⁵⁹	21.52 ³⁴	21.284 ¹⁸²	20.61 ¹⁷⁸	11.55 ³¹	21.45 ³¹⁷
Oct. 6.9	5.960 ¹⁹⁷	33.47 ¹¹⁷	40.514 ¹⁹¹	21.49 ³	21.512 ²²⁸	19.21 ¹⁴⁰	11.92 ³⁷	18.39 ³⁰⁶
16.9	6.187 ²²⁷	32.11 ¹³⁶	40.740 ²²⁶	21.83 ³⁴	21.785 ²⁷³	18.29 ⁹²	12.37 ⁴⁵	15.50 ²⁸⁹
	259	156	257	71	314	42	51	266
26.8	6.446	30.55	40.997	22.54	22.099	17.87	12.88	12.84
Nov. 5.8	6.730 ²⁸⁴	28.84 ¹⁷¹	41.280 ²⁸³	23.63 ¹⁰⁹	22.447 ³⁴⁸	18.01 ¹⁴	13.44 ⁵⁶	10.49 ²³⁵
15.8	7.038 ³⁰⁸	27.02 ¹⁸²	41.586 ³⁰⁶	25.06 ¹⁴³	22.819 ³⁷²	18.72 ⁷¹	14.05 ⁶¹	8.52 ¹⁹⁷
25.7	7.360 ³²²	25.13 ¹⁸⁹	41.905 ³¹⁹	26.83 ¹⁷⁷	23.207 ³⁸⁸	20.00 ¹²⁸	14.69 ⁶⁴	6.98 ¹⁵⁴
Dec. 5.7	7.689 ³²⁹	23.23 ¹⁹⁰	42.230 ³²⁵	28.86 ²⁰³	23.598 ³⁹¹	21.80 ¹⁸⁰	15.35 ⁶⁶	5.94 ¹⁰⁴
	326	185	321	224	382	228	65	52
15.7	8.015	21.38	42.551	31.10	23.980	24.08	16.00	5.42
25.7	8.326 ³¹¹	19.64 ¹⁷⁴	42.856 ³⁰⁵	33.47 ²³⁷	24.340 ³⁶⁰	26.77 ²⁶⁹	16.62 ⁶²	5.46 ⁴
35.6	8.614 ²⁸⁸	18.09 ¹⁵⁵	43.137 ²⁸¹	35.91 ²⁴⁴	24.666 ³²⁶	29.78 ³⁰¹	17.21 ⁵⁹	6.04 ⁵⁸
Mean Place	3.617	48.93	38.353	11.34	19.913	12.88	10.218	47.09
Sec δ , Tan δ	1.024	+0.219	1.022	-0.212	1.340	-0.892	2.412	+2.195
$D_{\delta a}$, $D_{\delta \alpha}$	+0.06	+0.01	+0.06	-0.01	+0.05	-0.05	+0.09	+0.13
$D_{\delta \delta}$, $D_{\delta \delta}$	-0.3	+0.5	-0.3	+0.5	-0.4	+0.5	-0.4	+0.5

400 APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Leonis. Mag. 3.6		λ Ursa Majoris. Mag. 3.5		γ Leonis pr. Mag. 2.6		μ Ursa Majoris. Mag. 3.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 10 12	° ' " +23 48	h m 10 12	° ' " +43 18	h m 10 15	° ' " +20 14	h m 10 17	° ' " +41 53
	^s 10 12	^s " "	^s 10 12	^s " "	^s 10 15	^s " "	^s 10 17	^s " "
Jan. 0.7	13.234	61.92	15.297	50.27	32.431	51.78	32.686	66.88
10.6	13.528 ²⁹⁴	60.95 ⁹⁷	15.647 ³⁵⁰	50.22 ⁵	32.722 ²⁶¹	50.66 ¹¹²	33.035 ³⁴⁰	66.72 ¹¹
20.6	13.783 ²⁵⁵	60.32 ⁶³	15.951 ³⁰⁴	50.60 ³⁸	32.975 ²⁶³	49.81 ⁸⁵	33.339 ³⁰⁴	66.99 ⁵
30.6	13.992 ²⁰⁹	60.01 ³¹	16.199 ²⁴⁸	51.38 ⁷⁸	33.183 ²⁰⁸	49.27 ⁵⁴	33.589 ²⁵⁰	67.66 ⁵
Feb. 9.5	14.150 ¹⁵⁸	60.01 ⁰	16.385 ¹⁸⁶	52.52 ¹¹⁴	33.342 ¹⁸⁰	49.05 ²²	33.778 ¹⁸⁰	68.70 ¹³
	105	30	120	142	107	6	126	13
19.5	14.255	60.31	16.505	53.94	33.449	49.11	33.904	70.04
Mar. 1.5	14.306 ⁶¹	60.85 ⁵⁴	16.560 ⁵⁵	55.60 ¹⁶⁶	33.504 ⁵⁵	49.43 ³²	33.965 ⁶¹	71.62 ¹³
11.5	14.308 ²	61.59 ⁷⁴	16.551 ⁹	57.37 ¹⁷⁷	33.510 ⁶	49.96 ⁸³	33.984 ¹	73.34 ¹³
21.4	14.265 ⁴³	62.47 ⁸⁸	16.486 ⁶⁵	59.19 ¹⁸²	33.473 ³⁷	50.66 ⁷⁰	33.908 ⁵⁶	75.11 ¹³
31.4	14.185 ⁸⁰	63.43 ⁹⁶	16.373 ¹¹³	60.97 ¹⁷⁸	33.400 ⁷³	51.45 ⁷⁹	33.805 ¹⁰⁸	76.87 ¹³
	109	98	152	165	101	85	141	13
Apr. 10.4	14.076	64.41	16.221	62.62	33.299	52.30	33.664	78.51
20.4	13.947 ¹²⁹	65.37 ⁹⁶	16.042 ¹⁷⁹	64.09 ¹⁴⁷	33.176 ¹²³	53.15 ⁸⁵	33.493 ¹⁷¹	79.99 ¹⁶
30.3	13.806 ¹⁴¹	66.26 ⁸⁹	15.845 ¹⁹⁷	65.31 ¹²²	33.042 ¹³⁴	53.97 ⁸²	33.306 ¹⁸⁷	81.24 ¹⁵
May 10.3	13.660 ¹⁴⁶	67.04 ⁷⁸	15.641 ²⁰⁴	66.25 ⁹⁴	32.903 ¹³⁰	54.72 ⁷⁵	33.109 ¹⁹⁷	82.23 ¹⁶
20.3	13.515 ¹⁴⁵	67.69 ⁶⁵	15.438 ²⁰³	66.87 ⁶²	32.765 ¹³⁸	55.36 ⁶⁴	32.914 ¹⁹⁶	82.91 ¹⁶
	136	50	194	29	131	54	188	13
30.2	13.379	68.19	15.244	67.16	32.634	55.90	32.726	83.26
June 9.2	13.257 ¹²²	68.53 ³⁴	15.066 ¹⁷⁸	67.12 ⁴	32.517 ¹¹⁷	56.31 ⁴¹	32.552 ¹⁷⁴	83.30 ⁴
19.2	13.150 ¹⁰⁷	68.68 ¹⁵	14.911 ¹⁵⁵	66.75 ³⁷	32.414 ¹⁰³	56.56 ²⁵	32.400 ¹⁵²	83.00 ¹³
29.2	13.063 ⁸⁷	68.67 ¹	14.782 ¹²⁹	66.05 ⁷⁰	32.329 ⁸⁵	56.68 ¹²	32.271 ¹³⁹	82.39 ¹³
July 9.1	12.999 ⁶⁴	68.48 ¹⁹	14.680 ¹⁰²	65.05 ¹⁰⁰	32.266 ⁶³	56.64 ⁴	32.169 ¹⁰²	81.48 ¹³
	42	37	68	129	42	21	70	13
19.1	12.957	68.11	14.612	63.76	32.224	56.43	32.099	80.29
29.1	12.941 ¹⁶	67.58 ⁵³	14.577 ³⁵	62.22 ¹⁵⁴	32.207 ¹⁷	56.08 ³⁵	32.059 ⁴⁰	78.84 ¹⁶
Aug. 8.0	12.951 ¹⁰	66.85 ⁷³	14.576 ¹	60.45 ¹⁷⁷	32.215 ⁸	55.56 ⁵²	32.053 ⁶	77.15 ¹⁶
18.0	12.989 ³⁸	65.96 ⁸⁹	14.612 ³⁶	58.48 ¹⁹⁷	32.251 ³⁶	54.87 ⁶⁹	32.083 ³⁰	75.26 ¹⁵
28.0	13.057 ⁶⁸	64.90 ¹⁰⁶	14.687 ⁷⁵	56.33 ²¹⁵	32.315 ⁶⁴	54.01 ⁸⁶	32.150 ⁶⁷	73.17 ²⁰
	98	125	115	229	93	104	106	23
Sept. 7.0	13.155	63.65	14.802	54.04	32.408	52.97	32.256	70.95
16.9	13.287 ¹³²	62.25 ¹⁴⁰	14.956 ¹⁵⁴	51.65 ²³⁹	32.534 ¹²⁶	51.74 ¹⁴⁰	32.401 ¹⁴⁵	68.61 ²⁰
26.9	13.452 ¹⁶⁵	60.67 ¹⁵⁸	15.152 ¹⁹⁶	49.19 ²⁴⁶	32.693 ¹⁵⁹	50.34 ¹⁵⁷	32.586 ¹⁸⁵	66.18 ²⁷
Oct. 6.9	13.652 ²⁰⁰	58.96 ¹⁷¹	15.390 ²³⁸	46.70 ²⁴⁹	32.885 ¹⁹²	48.77 ¹⁶⁷	32.814 ²²⁸	63.71 ²⁷
16.9	13.885 ²³³	57.13 ¹⁸³	15.668 ²⁷⁸	44.23 ²⁴⁷	33.112 ²²⁷	47.06 ¹⁷¹	33.082 ²⁶⁸	61.24 ²⁷
	266	193	318	240	259	184	307	23
26.8	14.151	55.20	15.986	41.83	33.371	45.22	33.389	58.83
Nov. 5.8	14.447 ²⁹⁶	53.22 ¹⁹⁸	16.338 ³⁵²	39.56 ²²⁷	33.659 ²⁸⁸	43.30 ¹⁹²	33.731 ³⁴²	56.53 ²⁰
15.8	14.767 ³²⁰	51.23 ¹⁹⁹	16.719 ³⁸¹	37.49 ²⁰⁷	33.973 ³¹⁴	41.33 ¹⁹⁷	34.102 ³⁷¹	54.42 ²³
25.7	15.104 ³³⁷	49.31 ¹⁹²	17.121 ⁴⁰²	35.67 ¹⁸²	34.304 ³¹¹	39.38 ¹⁹⁵	34.496 ³⁹⁴	52.53 ¹⁹
Dec. 5.7	15.451 ³⁴⁷	47.50 ¹⁸¹	17.534 ⁴¹³	34.16 ¹⁵¹	34.644 ³⁴⁰	37.50 ¹⁸⁸	34.901 ⁴⁰⁵	50.94 ¹⁹
	345	163	411	114	340	174	405	19
15.7	15.796	45.87	17.945	33.02	34.984	35.76	35.306	49.72
25.7	16.130 ³³⁴	44.45 ¹⁴²	18.343 ³⁹⁸	32.29 ⁷³	35.313 ³²⁹	34.21 ¹⁵⁵	35.699 ³⁸³	48.59 ¹⁹
35.6	16.440 ³¹⁰	43.33 ¹¹²	18.714 ³⁷¹	31.98 ³¹	35.620 ³⁰⁷	32.91 ¹³⁰	36.066 ³⁶⁷	48.48 ⁴
Mean Place	11.322	77.39	13.157	70.15	30.561	66.41	30.616	86.65
Sec δ, Tan δ	1.093	+0.441	1.374	+0.943	1.066	+0.369	1.344	+0.897
D _α , D _ω	+0.07	+0.03	+0.07	+0.06	+0.07	+0.02	+0.07	+0.05
D _δ , D _ω	-0.4	+0.5	-0.4	+0.5	-0.4	+0.4	-0.4	+0.4

APPARENT PLACES OF STARS, 1919.

401

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	30 H. Ursæ Majoris. Mag. 4.9		μ Hydræ. Mag. 4.1		31 Leonis Minoris. Mag. 4.4		α Antilæ. Mag. 4.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 10 18	° ' " +65 57	h m 10 22	° ' " -16 25	h m 10 23	° ' " +37 6	h m 10 23	° ' " -30 39
	s "	s "	s "	s "	s "	s "	s "	s "
Jan. 0.7	21.79	72.53	12.162	24.38	14.292	62.69	28.515	19.19
10.6	22.35 ⁵⁶	73.38 ⁸⁵	12.440 ²⁷⁸	26.96 ²⁵⁸	14.626 ³³⁴	62.26 ⁴³	28.807 ²⁹²	22.12 ²⁹³
20.6	22.84 ⁴⁹	74.74 ¹³⁶	12.679 ²³⁹	29.52 ²⁵⁶	14.919 ²⁹³	62.24 ²	29.057 ²⁵⁰	25.16 ³⁰⁴
30.6	23.24 ⁴⁰	76.55 ¹⁸¹	12.874 ¹⁹⁵	32.00 ²⁴⁸	15.162 ²⁴³	62.62 ³⁸	29.260 ²⁰³	28.20 ³⁰⁴
Feb. 9.5	23.54 ³⁰	78.74 ²¹⁹	13.022 ¹⁴⁸	34.35 ²³⁵	15.348 ¹⁸⁶	63.37 ⁷⁵	29.412 ¹⁵²	31.18 ²⁹⁸
	17	246	99	213	127	106	99	286
19.5	23.71	81.20	13.121	36.48	15.475	64.43	29.511	34.04
Mar. 1.5	23.78 ⁷	83.85 ²⁶⁵	13.172 ⁵¹	38.40 ¹⁹²	15.542 ⁶⁷	65.73 ¹³⁰	29.558 ⁴⁷	36.70 ²⁶⁶
11.5	23.75 ³	86.53 ²⁶⁸	13.178 ⁶	40.06 ¹⁶⁶	15.552 ¹⁰	67.21 ¹⁴⁸	29.557 ¹	39.12 ²⁴²
21.4	23.61 ¹⁴	89.15 ²⁶²	13.144 ³⁴	41.45 ¹³⁹	15.509 ⁴³	68.78 ¹⁵⁷	29.513 ⁴⁴	41.25 ²¹³
31.4	23.37 ²⁴	91.61 ²⁴⁶	13.077 ⁶⁷	42.56 ¹¹¹	15.422 ⁸⁷	70.37 ¹⁵⁹	29.432 ⁸¹	43.08 ¹⁸³
	30	219	93	84	124	153	110	149
Apr. 10.4	23.07	93.80	12.984	43.40	15.298	71.90	29.322	44.57
20.4	22.71 ³⁶	95.65 ¹⁸⁵	12.871 ¹¹³	43.95 ⁵⁵	15.148 ¹⁵⁰	73.30 ¹⁴⁰	29.191 ¹³¹	45.71 ¹¹⁴
30.3	22.30 ⁴¹	97.08 ¹⁴³	12.745 ¹²⁶	44.24 ²⁹	14.980 ¹⁶⁸	74.51 ¹²¹	29.045 ¹⁴⁶	46.50 ⁷⁹
May 10.3	21.88 ⁴²	98.06 ⁹⁸	12.614 ¹³¹	44.28 ⁴	14.804 ¹⁷⁶	75.51 ¹⁰⁰	28.891 ¹⁵⁴	46.94 ⁴⁴
20.3	21.45 ⁴³	98.55 ⁴⁹	12.481 ¹³³	44.06 ²²	14.628 ¹⁷⁶	76.24 ⁷³	28.733 ¹⁵⁸	47.02 ⁸
	41	2	128	45	170	47	154	28
30.2	21.04	98.53	12.353	43.61	14.458	76.71	28.579	46.74
June 9.2	20.64 ⁴⁰	98.04 ⁴⁹	12.233 ¹²⁰	42.93 ⁶⁸	14.301 ¹⁵⁷	76.87 ¹⁶	28.431 ¹⁴⁸	46.12 ⁶²
19.2	20.28 ³⁶	97.06 ⁹⁸	12.124 ¹⁰⁹	42.06 ⁸⁷	14.161 ¹⁴⁰	76.74 ¹³	28.295 ¹³⁶	45.18 ⁹⁴
29.2	19.97 ³¹	95.66 ¹⁴⁰	12.030 ⁹⁴	41.01 ¹⁰⁵	14.043 ¹¹⁸	76.34 ⁴⁰	28.174 ¹²¹	43.95 ¹²³
July 9.1	19.72 ²⁵	93.83 ¹⁸³	11.953 ⁷⁷	39.80 ¹²¹	13.948 ⁹⁵	75.64 ⁷⁰	28.071 ¹⁰³	42.47 ¹⁴⁸
	20	220	58	130	67	95	82	171
19.1	19.52	91.63	11.895	38.50	13.881	74.69	27.989	40.76
29.1	19.38 ¹⁴	89.12 ²⁵¹	11.859 ³⁶	37.13 ¹³⁷	13.842 ³⁹	73.49 ¹²⁰	27.932 ⁵⁷	38.89 ¹⁸⁷
Aug. 8.1	19.31 ⁷	86.35 ²⁷⁷	11.848 ¹¹	35.74 ¹³⁹	13.834 ⁸	72.06 ¹⁴³	27.904 ²⁸	36.93 ¹⁹⁶
18.0	19.31 ⁰	83.36 ²⁹⁹	11.864 ¹⁶	34.38 ¹³⁶	13.858 ²⁴	70.42 ¹⁶⁴	27.906 ²	34.94 ¹⁹⁹
28.0	19.39 ⁸	80.23 ³¹³	11.908 ⁴⁴	33.12 ¹²⁶	13.917 ⁵⁹	68.59 ¹⁸³	27.942 ³⁶	32.99 ¹⁹⁵
	15	323	76	108	92	199	74	183
Sept. 7.0	19.54	77.00	11.984	32.04	14.009	66.60	28.016	31.16
16.9	19.77 ²³	73.74 ³²⁶	12.095 ¹¹¹	31.16 ⁸⁸	14.140 ¹³¹	64.46 ²¹⁴	28.129 ¹¹³	29.56 ¹⁶⁰
26.9	20.07 ³⁰	70.52 ³²²	12.240 ¹⁴⁵	30.56 ⁶⁰	14.310 ¹⁷⁰	62.21 ²²⁵	28.283 ¹⁵⁴	28.23 ¹³³
Oct. 6.9	20.44 ³⁷	67.39 ³¹³	12.421 ¹⁸¹	30.29 ²⁷	14.519 ²⁰⁹	59.88 ²³³	28.478 ¹⁹⁵	27.25 ⁹⁸
16.9	20.88 ⁴⁴	64.43 ²⁹⁶	12.639 ²¹⁸	30.39 ¹⁰	14.767 ²⁴⁸	57.52 ²³⁶	28.712 ²³⁴	26.71 ⁵⁴
	50	273	252	48	285	235	273	9
26.8	21.38	61.70	12.891	30.87	15.052	55.17	28.985	26.62
Nov. 5.8	21.94 ⁵⁶	59.28 ²⁴²	13.172 ²⁸¹	31.76 ⁸⁹	15.372 ³²⁰	52.88 ²²⁹	29.291 ³⁰⁶	27.02 ⁴⁰
15.8	22.55 ⁶¹	57.24 ²⁰⁴	13.478 ³⁰⁶	33.05 ¹²⁹	15.722 ³⁵⁰	50.72 ²¹⁶	29.622 ³³¹	27.93 ⁹¹
25.8	23.20 ⁶⁵	55.63 ¹⁶¹	13.800 ³²²	34.71 ¹⁶⁶	16.092 ³⁷⁰	48.75 ¹⁹⁷	29.971 ³⁴⁹	29.32 ¹³⁹
Dec. 5.7	23.86 ⁶⁶	54.51 ¹¹²	14.131 ³³¹	36.67 ¹⁹⁶	16.475 ³⁸³	47.04 ¹⁷¹	30.327 ³⁵⁶	31.16 ¹⁸⁴
	66	58	328	224	385	142	351	224
15.7	24.52	53.93	14.459	38.91	16.860	45.62	30.678	33.40
25.7	25.16 ⁶⁴	53.90 ³	14.775 ³¹⁶	41.32 ²⁴¹	17.235 ³⁷⁵	44.57 ¹⁰⁶	31.016 ³³⁸	35.96 ²⁵⁶
35.6	25.76 ⁶⁰	54.43 ⁵³	15.068 ²⁹³	43.86 ²⁵⁴	17.586 ³⁵¹	43.91 ⁶⁶	31.325 ³⁰⁹	38.75 ²⁷⁹
Mean Place	18.879	95.99	10.338	20.32	12.334	81.62	26.600	19.18
Sec δ, Tan δ	2.456	+2.243	1.043	-0.295	1.254	+0.757	1.162	-0.593
D _ψ a, D _ω a	+0.09	+0.14	+0.06	-0.02	+0.07	+0.05	+0.05	-0.04
D _ψ δ, D _ω δ	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	36 Ursæ Majoris. Mag. 4.8		9 H. Draconis. Mag. 5.0		ρ Leonis. Mag. 3.8		33 Sextantis. Mag. 6.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 10 25	° ' " +56 23	h m 10 28	° ' " +76 7	h m 10 28	° ' " + 9 42	h m 10 37	° ' " - 1 1
	s	"	s	"	s	"	s	"
Jan. 0.7	29.618	24.36	19.02	26.46	34.642	74.17	18.652	63.00
10.6	30.063 ⁴⁴⁵	24.74 ³⁸	19.93 ⁹¹	27.54 ¹⁰⁸	34.928 ²⁸⁶	72.53 ¹⁶⁴	18.937 ²⁸⁵	65.08 ²
20.6	30.453 ³⁹⁰	25.63 ⁸⁹	20.72 ⁷⁹	29.17 ¹⁶³	35.179 ²⁵¹	71.10 ¹⁴³	19.187 ²⁵⁰	67.04 ¹
30.6	30.775 ³²²	26.97 ¹³⁴	21.37 ⁶⁵	31.28 ²¹¹	35.387 ²⁰⁸	69.94 ¹¹⁶	19.397 ²¹⁰	68.81 ¹
Feb. 9.6	31.019 ²⁴⁴	28.71 ¹⁷⁴	21.85 ⁴⁸	33.77 ²⁴⁹	35.550 ¹⁶³	69.05 ⁸⁹	19.563 ¹⁶⁶	70.34 ¹
	164	205	31	276	113	61	118	
19.5	31.183	30.76	22.16	36.53	35.663	68.44	19.681	71.64
Mar. 1.5	31.261 ⁷⁸	33.02 ²²⁶	22.26 ¹⁰	39.46 ²⁹³	35.729 ⁶⁶	68.09 ³⁵	19.751 ⁷⁰	72.67
11.5	31.257 ⁴	35.39 ²³⁷	22.21 ⁵	42.43 ²⁹⁷	35.748 ¹⁹	68.00 ⁹	19.778 ²⁷	73.45
21.4	31.178 ⁷⁹	37.76 ²³⁷	21.97 ²⁴	45.31 ²⁸⁸	35.726 ²²	68.11 ¹¹	19.764 ¹⁴	74.00
31.4	31.032 ¹⁴⁶	40.04 ²²⁸	21.57 ⁴⁰	48.00 ²⁶⁹	35.671 ⁵⁵	68.40 ²⁰	19.717 ⁴⁷	74.30
	201	206	53	237	85	42	76	
Apr. 10.4	30.831	42.12	21.04	50.37	35.586	68.82	19.641	74.42
20.4	30.588 ²⁴³	43.94 ¹⁸²	20.40 ⁶⁴	52.35 ¹⁹⁸	35.482 ¹⁰⁴	69.33 ⁵¹	19.546 ⁹⁵	74.37
30.3	30.316 ²⁷²	45.41 ¹⁴⁷	19.69 ⁷¹	53.88 ¹⁵³	35.362 ¹²⁰	69.91 ⁵⁸	19.436 ¹¹⁰	74.14
May 10.3	30.028 ²⁸⁸	46.50 ¹⁰⁹	18.93 ⁷⁶	54.90 ¹⁰²	35.238 ¹²⁴	70.52 ⁶¹	19.318 ¹¹⁸	73.79
20.3	29.736 ²⁹²	47.18 ⁶⁸	18.14 ⁷⁹	55.37 ⁴⁷	35.113 ¹²⁵	71.13 ⁶¹	19.199 ¹¹⁹	73.33
	286	24	78	7	119	60	116	
30.3	29.450	47.42	17.36	55.30	34.994	71.73	19.083	72.78
June 9.2	29.181 ²⁶⁹	47.22 ²⁰	16.61 ⁷⁵	54.69 ⁶¹	34.882 ¹¹²	72.30 ⁵⁷	18.972 ¹¹¹	72.15
19.2	28.938 ²⁴³	46.59 ⁶³	15.91 ⁷⁰	53.56 ¹¹³	34.782 ¹⁰⁰	72.82 ⁵²	18.871 ¹⁰¹	71.46
29.2	28.725 ²¹³	45.55 ¹⁰⁴	15.28 ⁶³	51.94 ¹⁶²	34.698 ⁸⁴	73.28 ⁴⁶	18.783 ⁸⁸	70.74
July 9.1	28.550 ¹⁷⁵	44.13 ¹⁴²	14.74 ⁵⁴	49.87 ²⁰⁷	34.631 ⁶⁷	73.67 ³⁹	18.710 ⁷³	70.00
	135	177	42	246	49	30	56	
19.1	28.415 ⁹⁰	42.36 ²⁰⁹	14.32 ³³	47.41 ²⁷⁹	34.582 ²⁶	73.97 ¹⁸	18.654 ³⁷	69.27
29.1	28.325 ⁴⁴	40.27 ²³⁶	13.99 ²¹	44.62 ³⁰⁹	34.556 ⁵	74.15 ⁶	18.617 ¹⁵	68.58
Aug. 8.1	28.281 ⁶	37.91 ²⁵⁹	13.78 ⁸	41.53 ³²⁹	34.551 ²⁰	74.21 ⁸	18.602 ⁸	67.95
18.0	28.287 ⁵⁷	35.32 ²⁷⁶	13.70 ⁵	38.24 ³⁴⁴	34.571 ⁴⁷	74.13 ²⁵	18.610 ³⁶	67.42
28.0	28.344 ¹¹⁰	32.56 ²⁹⁰	13.75 ¹⁷	34.80 ³⁵⁴	34.618 ⁷⁶	73.88 ⁴²	18.646 ⁶⁵	67.02
Sept. 7.0	28.454	29.66	13.92	31.26	34.694	73.46	18.711	66.81
17.0	28.617 ¹⁶³	26.69 ²⁹⁷	14.21 ²⁹	27.72 ³⁵⁴	34.801 ¹⁰⁷	72.82 ⁶⁴	18.806 ⁹⁵	66.80
26.9	28.836 ²¹⁹	23.69 ³⁰⁰	14.65 ⁴⁴	24.26 ³⁴⁶	34.940 ¹³⁹	71.97 ⁸⁵	18.934 ¹²⁸	67.04
Oct. 6.9	29.110 ²⁷⁴	20.71 ²⁹⁸	15.20 ⁵³	20.92 ³³⁴	35.114 ¹⁷⁴	70.89 ¹⁰⁸	19.098 ¹⁶⁴	67.54
16.9	29.438 ³²⁸	17.84 ²⁸⁷	15.87 ⁶⁷	17.79 ³¹³	35.322 ²⁰⁸	69.59 ¹³⁰	19.297 ¹⁹⁹	68.33
	379	272	78	285	240	151	232	
26.8	29.817	15.12	16.65	14.94	35.562	68.08	19.529	69.42
Nov. 5.8	30.242 ⁴²⁵	12.62 ²⁵⁰	17.54 ⁸⁹	12.44 ²⁵⁰	35.833 ²⁷¹	66.38 ¹⁷⁰	19.794 ²⁶⁵	70.78
15.8	30.706 ⁴⁶⁴	10.43 ²¹⁹	18.49 ⁹⁵	10.37 ²⁰⁷	36.130 ²⁹⁷	64.53 ¹⁸⁵	20.084 ²⁹⁰	72.41
25.8	31.199 ⁴⁹³	8.59 ¹⁸⁴	19.51 ¹⁰²	8.79 ¹⁵⁸	36.445 ³¹⁵	62.57 ¹⁹⁶	20.395 ³¹¹	74.26
Dec. 5.7	31.709 ⁵¹⁰	7.18 ¹⁴¹	20.55 ¹⁰⁴	7.76 ¹⁰³	36.772 ³²⁷	60.57 ²⁰⁰	20.718 ³²³	76.26
	512	95	106	44	328	198	324	
15.7	32.221	6.23	21.61	7.32	37.100	58.59	21.042	78.39
25.7	32.720 ⁴⁹⁹	5.81 ⁴²	22.63 ¹⁰²	7.47 ¹⁵	37.420 ³²⁰	56.70 ¹⁸⁹	21.359 ³¹⁷	80.54
35.7	33.187 ⁴⁶⁷	5.89	23.58 ⁹⁵	8.21 ⁷⁴	37.719 ²⁹⁹	54.95 ¹⁷⁵	21.656 ²⁹⁷	82.64
Mean Place	27.290	46.95	15.102	51.11	32.882	85.99	16.940	54.52
Sec δ, Tan δ	1.807	+1.504	4.170	+4.049	1.015	+0.171	1.000	-0.02
$\overline{D}\alpha, D_{\omega\alpha}$	+0.08	+0.09	+0.10	+0.25	+0.06	+0.01	+0.06	0.06
$\overline{\gamma}\delta, D_{\omega\delta}$	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4

APPARENT PLACES OF STARS, 1919.

403

FOR THE UPPER TRANSIT AT WASHINGTON.

11 Leonis Minoris. Mag. 5.0		θ Argus. Mag. 3.0		42 Leonis Minoris. Mag. 5.4		γ Argus. Var. 1.6-6.6	
Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
h m	° ' "	h m	° ' "	h m	° ' "	h m	° ' "
10 39	+23 36	10 40	-63 58	10 41	+31 5	10 41	-59 15
s	"	s	"	s	"	s	"
2.647	30.44	6.41	5.48	23.661	75.59	57.290	23.15
309	29.32	48	8.52	328	74.76	434	26.20
2.956	28.53	41	11.91	292	74.32	370	29.57
275	28.10	33	15.55	247	74.27	300	33.17
3.231	27.99	25	19.33	196	74.60	223	36.90
232	28.22	14	23.16	140	75.27	144	40.65
3.463	28.72	6	26.96	86	76.21	66	44.35
184	29.46	2	30.64	32	77.39	9	47.90
3.647	30.37	11	34.09	17	78.70	76	51.24
133	31.39	17	37.26	59	80.10	140	54.30
	108	23	40.11	94	81.50	190	57.01
3.780	33.55	29	42.57	123	82.84	232	59.35
80	34.57	32	44.59	139	84.05	121	61.25
3.860	35.50	36	46.14	151	85.12	107	62.68
30	36.30	38	47.19	155	85.98	86	63.64
3.890	36.93	38	47.72	151	86.62	64	64.08
15	37.41	39	47.72	144	87.02	40	64.02
3.875	37.69	38	47.22	131	87.16	14	63.48
55	37.79	35	46.22	114	87.05	11	62.44
3.820	37.70	32	44.74	95	86.69	36	60.96
87	37.41	29	42.84	73	86.08	61	59.07
	49	24	40.56	52	85.24	84	56.82
3.733	36.24	19	37.97	23	84.16	108	54.29
110	35.37	11	35.18	4	82.87	129	51.56
3.623	34.29	4	32.27	36	81.37	150	48.73
128	33.03	4	29.33	68	79.67	42	45.90
3.495	31.58	13	26.48	103	77.81	186	43.16
136	29.95	21	23.85	140	75.79	202	40.65
3.359	28.16	30	21.52	178	73.63	216	38.45
140	26.23	38	19.62	217	71.39	224	36.67
3.219	24.19	46	18.23	255	69.10	229	35.38
135	22.07	51	17.39	291	66.80	230	34.66
3.084	19.95	56	17.18	321	64.56	224	34.56
128	17.88	60	17.62	345	62.44	212	35.10
3.956	15.89	60	18.70	361	60.49	195	36.26
84	14.08	59	20.39	366	58.81	168	38.01
62	12.51	57	22.64	360	57.41	140	40.31
	11.20	51	25.39	342	56.37	104	43.08
3.084	46.33	3.754	13.43	21.897	93.50	54.877	30.38
2.956	+0.437	2.279	-2.048	1.168	+0.603	1.956	-1.882
2.841	+0.03	+0.04	-0.13	+0.07	+0.04	+0.05	-0.11
2.740	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	μ Argus. Mag. 2.8		γ Leonis. Mag. 5.3		δ^2 Chamæleonis. Mag. 4.6		ν Hydræ. Mag. 3.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 10 43	° ' " -48 59	h m 10 45	° ' " +10 57	h m 10 44	° ' " -80 6	h m 10 45	° ' " -15 4
	s	"	s	"	s	"	s	"
Jan. 0.7	18.998	26.77	1.769	74.37	67.33	36.52	39.318	13.13
10.6	19.363 ³⁶⁵	29.81 ³⁰⁴	2.065 ²⁹⁶	72.72 ¹⁶⁵	68.41 ¹⁰⁸	39.29 ²⁷⁷	39.611 ²⁹³	15.64 ²
20.6	19.679 ³¹⁶	33.10 ³²⁹	2.328 ²⁶³	71.30 ¹⁴²	69.32 ⁹¹	42.50 ³²¹	39.869 ²⁵⁸	18.14 ²
30.6	19.938 ²⁵⁹	36.55 ³⁴⁵	2.551 ²²³	70.16 ¹¹⁴	70.03 ⁷¹	46.05 ³⁵⁵	40.087 ²¹⁸	20.57 ²
Feb. 9.6	20.135 ¹⁹⁷	40.10 ³⁵⁵	2.730 ¹⁷⁹	69.30 ⁸⁶	70.54 ⁵¹	49.81 ³⁷⁶	40.260 ¹⁷³	22.87 ²
	133	351	130	55	29	391	124	2
19.5	20.268	43.61	2.860	68.75	70.83	53.72	40.384	24.97
Mar. 1.5	20.338	47.03 ³⁴²	2.942 ⁸²	68.47 ²⁸	70.91 ⁸	57.66 ³⁹⁴	40.461 ⁷⁷	26.87 ¹
11.5	20.348 ¹⁰	50.27 ³²⁴	2.978 ³⁶	68.44 ³	70.79 ¹²	61.55 ³⁸⁹	40.493 ³²	28.51 ¹
21.5	20.304 ⁴⁴	53.27 ³⁰⁰	2.973 ⁵	68.64 ²⁰	70.47 ³²	65.28 ³⁷³	40.485 ⁸	29.89 ¹
31.4	20.211 ⁹³	55.98 ²⁷¹	2.931 ⁴²	69.01 ³⁷	69.97 ⁵⁰	68.82 ³⁵⁴	40.442 ⁴³	30.99 ¹
	133	238	71	50	66	323	72	
Apr. 10.4	20.078	58.36	2.860	69.51	69.31	72.05	40.370	31.85
20.4	19.911 ¹⁶⁷	60.35 ¹⁹⁹	2.767 ⁹³	70.11 ⁶⁰	68.51 ⁸⁰	74.92 ²⁸⁷	40.277 ⁹³	32.43
30.3	19.720 ¹⁹¹	61.93 ¹⁵⁸	2.657 ¹¹⁰	70.77 ⁶⁶	67.59 ⁹²	77.39 ²⁴⁷	40.167 ¹¹⁰	32.75
May 10.3	19.510 ²¹⁰	63.08 ¹¹⁵	2.538 ¹¹⁹	71.45 ⁶⁸	66.59 ¹⁰⁰	79.38 ¹⁹⁹	40.047 ¹²⁰	32.84
20.3	19.290 ²²⁰	63.78 ⁷⁰	2.416 ¹²²	72.12 ⁶⁷	65.51 ¹⁰⁸	80.87 ¹⁴⁹	39.924 ¹²³	32.68
	225	24	118	64	113	98	124	
30.3	19.065	64.02	2.298	72.76	64.38	81.85	39.800	32.31
June 9.2	18.841 ²²⁴	63.80 ²²	2.184 ¹¹⁴	73.36 ⁶⁰	63.24 ¹¹⁴	82.26 ⁴¹	39.682 ¹¹⁸	31.72
19.2	18.626 ²¹⁵	63.13 ⁶⁷	2.080 ¹⁰⁴	73.89 ⁵³	62.12 ¹¹²	82.11 ¹⁵	39.571 ¹¹¹	30.94
29.2	18.422 ²⁰⁴	62.03 ¹¹⁰	1.987 ⁹³	74.34 ⁴⁵	61.03 ¹⁰⁹	81.44 ⁶⁷	39.470 ¹⁰¹	30.00
July 9.2	18.238 ¹⁸⁴	60.54 ¹⁴⁹	1.911 ⁷⁶	74.70 ³⁶	60.01 ¹⁰²	80.24 ¹²⁰	39.382 ⁸⁸	28.91
	159	184	60	25	91	171	70	
19.1	18.079 ¹²⁹	58.70 ²¹⁴	1.851 ⁴¹	74.95 ¹³	59.10	78.53	39.312 ⁵²	27.70
29.1	17.950 ⁹⁴	56.56 ²³⁶	1.810 ¹⁹	75.08 ⁰	58.33 ⁷⁷	76.39 ²¹⁴	39.260 ²⁹	26.43
Aug. 8.1	17.856 ⁵²	54.20 ²⁵²	1.791 ⁴	75.08 ¹⁷	57.70 ⁶³	73.88 ²⁵¹	39.231 ⁶	25.13
18.0	17.804 ⁶	51.68 ²⁵²	1.795 ³¹	74.91 ³³	57.26 ⁴⁴	71.07 ²⁸¹	39.225 ²²	23.86
28.0	17.798 ⁴⁶	49.10 ²⁵⁴	1.826 ⁶⁰	74.58 ⁵¹	57.03 ²	68.06 ³¹⁰	39.247 ⁵³	22.68
Sept. 7.0	17.844	46.56	1.886	74.07	57.01	64.96	39.300	21.62
17.0	17.944 ¹⁰⁰	44.14 ²⁴²	1.975 ⁸⁹	73.34 ⁷³	57.22 ²¹	61.89 ³⁰⁷	39.387 ⁸⁷	20.76
26.9	18.101 ¹⁵⁷	41.97 ²¹⁷	2.100 ¹²⁵	72.40 ⁹⁴	57.65 ⁴³	58.96 ²⁹³	39.511 ¹²⁴	20.17
Oct. 6.9	18.316 ²¹⁵	40.11 ¹⁸⁶	2.259 ¹⁵⁹	71.23 ¹¹⁷	58.32 ⁶⁷	56.28 ²⁶⁸	39.672 ¹⁶¹	19.87
16.9	18.585 ²⁶⁹	38.68 ¹⁴³	2.454 ¹⁹⁵	69.85 ¹³⁸	59.18 ⁸⁶	53.96 ²³²	39.871 ¹⁹⁹	19.91
	322	93	228	160	105	185	234	
26.9	18.907	37.75	2.682	68.25	60.23	52.11	40.105	20.35
Nov. 5.8	19.274 ³⁶⁷	37.36 ³⁹	2.945 ²⁶³	66.48 ¹⁷⁷	61.43 ¹²⁰	50.83 ¹²⁸	40.374 ²⁶⁹	21.17
15.8	19.677 ⁴⁰³	37.55 ¹⁹	3.235 ²⁹⁰	64.57 ¹⁹¹	62.74 ¹³¹	50.14 ⁶⁹	40.671 ²⁹⁷	22.37
25.8	20.104 ⁴²⁷	38.34 ⁷⁹	3.548 ³¹³	62.56 ²⁰¹	64.12 ¹³⁸	50.12 ²	40.989 ³¹⁸	23.94
Dec. 5.7	20.541 ⁴³⁷	39.70 ¹³⁶	3.874 ³²⁶	60.51 ²⁰⁵	65.50 ¹³⁸	50.73 ⁶¹	41.320 ³³¹	25.81
	435	192	331	201	137	130	333	
15.7	20.976	41.62	4.205	58.50	66.87	52.03	41.653	27.96
25.7	21.394 ⁴¹⁸	44.01 ²³⁹	4.530 ³²⁵	56.58 ¹⁹²	68.16 ¹²⁹	53.93 ¹⁹⁰	41.978 ³²⁵	30.29
35.7	21.780 ³⁸⁶	46.80 ²⁷⁹	4.838 ³⁰⁸	54.82 ¹⁷⁶	69.31 ¹¹⁵	56.39 ²⁴⁶	42.284 ³⁰⁶	32.74
Mean Place	16.907	31.96	0.099	86.64	62.198	46.61	37.607	9.24
Sec δ , Tan δ	1.524	-1.150	1.019	+0.194	5.825	-5.739	1.039	-0.28
$D\psi\alpha, D\omega\alpha$	+0.05	-0.07	+0.06	+0.01	+0.01	-0.36	+0.06	-0.02
$\zeta, D\omega\delta$	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

APPARENT PLACES OF STARS, 1919.

405

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	46 Leonis Minoris. Mag. 3.9		54 Leonis. Mag. 4.5		Antliae. Mag. 4.7		Groombridge 1706. Mag. 6.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 10 48	° ' " +34 38	h m 10 51	° ' " +25 10	h m 10 52	° ' " -36 42	h m 10 53	° ' " +78 11
	s	"	s	"	s	"	s	"
Jan. 0.7	48.930	48.04 75	15.485	39.11 114	58.538	5.11 286	34.50	50.40 80
10.6	49.272	47.29 32	15.806	37.97 77	58.868	7.97 307	35.60	51.20 142
20.6	49.578	46.97 —	16.092	37.20 42	59.158	11.04 314	36.58	52.62 194
30.6	49.841	47.05 8	16.337	36.78 5	59.401	14.18 316	37.42	54.56 236
Feb. 9.6	50.050	47.54 84	16.534	36.73 29	59.594	17.34 308	38.06	56.92 271
19.5	50.204	48.38 113	16.680	37.02 59	59.732	20.42 295	38.52	59.63 294
Mar. 1.5	50.301	49.51 136	16.774	37.61 83	59.816	23.37 276	38.75	62.57 303
11.5	50.342	50.87 150	16.817	38.44 101	59.850	26.13 250	38.79	65.60 300
21.5	50.331	52.37 157	16.813	39.45 113	59.837	28.63 222	38.60	68.60 286
31.4	50.275	53.94 157	16.770	40.58 120	59.784	30.85 191	38.24	71.46 260
Apr. 10.4	50.182	55.51 149	16.692	41.78 118	59.697	32.76 156	37.70	74.06 224
20.4	50.058	57.00 135	16.588	42.96 113	59.581	34.32 120	37.01	76.30 181
30.3	49.914	58.35 116	16.465	44.09 102	59.445	35.52 82	36.21	78.11 131
May 10.3	49.757	59.51 93	16.331	45.11 89	59.293	36.34 45	35.34	79.42 79
20.3	49.595	60.44 67	16.193	46.00 70	59.133	36.79 6	34.42	80.21 23
30.3	49.433	61.11 40	16.055	46.70 53	58.969	36.85 31	33.48	80.44 32
June 9.2	49.279	61.51 11	15.923	47.23 31	58.808	36.54 69	32.56	80.12 87
19.2	49.137	61.62 —	15.802	47.54 12	58.651	35.85 103	31.68	79.25 139
29.2	49.011	61.45 17	15.693	47.66 10	58.503	34.82 133	30.86	77.86 187
July 9.2	48.904	60.99 74	15.601	47.56 33	58.370	33.49 162	30.13	75.99 231
19.1	48.819	60.25 99	15.528	47.23 52	58.255	31.87 185	29.51	73.68 269
29.1	48.758	59.26 125	15.475	46.71 76	58.161	30.02 201	29.00	70.99 301
Aug. 8.1	48.724	58.01 148	15.446	45.95 95	58.096	28.01 212	28.63	67.98 327
18.0	48.718	56.53 170	15.442	45.00 116	58.060	25.89 213	28.40	64.71 347
28.0	48.745	54.83 189	15.467	43.84 136	58.059	23.76 206	28.30	61.24 359
Sept. 7.0	48.805	52.94 208	15.522	42.48 157	58.098	21.70 193	28.36	57.65 365
17.0	48.900	50.86 222	15.610	40.91 173	58.180	19.77 169	28.56	54.00 363
26.9	49.035	48.64 234	15.733	39.18 190	58.309	18.08 137	28.93	50.37 352
Oct. 6.9	49.210	46.30 241	15.894	37.28 204	58.484	16.71 96	29.45	46.85 336
16.9	49.425	43.89 245	16.093	35.24 215	58.706	15.75 53	30.12	43.49 310
26.9	49.681	41.44 242	16.329	33.09 221	58.971	15.22 1	30.91	40.39 277
Nov. 5.8	49.974	39.02 234	16.601	30.88 221	59.277	15.21 50	31.84	37.62 237
15.8	50.299	36.68 219	16.904	28.67 217	59.617	15.71 101	32.87	35.25 189
25.8	50.652	34.49 198	17.232	26.50 203	59.980	16.72 182	34.00	33.36 134
Dec. 5.7	51.022	32.51 169	17.576	24.47 187	60.358	18.24 198	35.18	32.02 76
15.7	51.399	30.82 137	17.927	22.60 162	60.736	20.22 236	36.38	31.26 15
25.7	51.771	29.45 97	18.274	20.98 132	61.105	22.58 270	37.57	31.11 —
35.7	52.126	28.48 —	18.607	19.66 —	61.450	25.28 —	38.72	31.58 47
Mean Place	47.199	66.97	13.823	55.59	56.700	7.54	31.007	76.06
Sec δ , Tan δ	1.215	+0.691	1.105	+0.470	1.247	-0.746	4.890	+4.786
$D\psi\alpha$, $D\omega\alpha$	+0.07	+0.04	+0.07	+0.03	+0.06	-0.05	+0.10	+0.31
$D\psi\delta$, $D\omega\delta$	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Crateris. Mag. 4.2		δ Leonis. Mag. 5.0		β Ursæ Majoris. Mag. 2.4		α Ursæ Majoris. Mag. 2.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 10 55	° ' " -17 52	h m 10 56	° ' " + 4 2	h m 10 56	° ' " +56 48	h m 10 58	° ' " +62
	s	"	s	"	s	"	s	"
Jan. 0.7	51.251	5.63	24.284	59.39	59.813	37.16	46.64	54.41
10.7	51.550	8.16	24.580	57.46	60.286	37.22	47.18	54.64
20.6	51.816	10.72	24.847	55.71	60.713	37.82	47.67	55.44
30.6	52.042	13.23	25.075	54.19	61.079	38.93	48.09	56.76
Feb. 9.6	52.223	15.62	25.261	52.93	61.374	40.50	48.43	58.54
19.5	52.359	17.85	25.400	51.93	61.590	42.43	48.66	60.70
Mar. 1.5	52.446	19.85	25.492	51.21	61.723	44.67	48.81	63.13
11.5	52.487	21.63	25.539	50.75	61.773	47.08	48.87	65.75
21.5	52.489	23.15	25.544	50.53	61.746	49.57	48.83	68.41
31.4	52.454	24.39	25.514	50.52	61.646	52.03	48.71	71.01
Apr. 10.4	52.389	25.37	25.455	50.70	61.486	54.35	48.50	73.46
20.4	52.301	26.08	25.373	51.02	61.276	56.45	48.25	75.63
30.4	52.196	26.53	25.274	51.45	61.028	58.24	47.95	77.51
May 10.3	52.079	26.71	25.165	51.96	60.755	59.69	47.62	79.37
20.3	51.956	26.66	25.051	52.53	60.469	60.72	47.26	79.99
30.3	51.832	26.35	24.936	53.14	60.179	61.32	46.91	80.51
June 9.2	51.710	25.83	24.826	53.77	59.896	61.46	46.56	80.61
19.2	51.595	25.09	24.722	54.40	59.630	61.16	46.22	80.20
29.2	51.488	24.16	24.628	55.01	59.385	60.41	45.92	79.31
July 9.2	51.393	23.08	24.547	55.59	59.170	59.25	45.65	77.99
19.1	51.312	21.85	24.482	56.11	58.990	57.69	45.42	76.24
29.1	51.251	20.55	24.433	56.56	58.848	55.78	45.24	74.12
Aug. 8.1	51.209	19.20	24.404	56.90	58.749	53.53	45.10	71.67
18.1	51.192	17.86	24.397	57.12	58.697	51.00	45.02	68.94
28.0	51.203	16.57	24.416	57.19	58.694	48.25	45.00	65.97
Sept. 7.0	51.244	15.42	24.462	57.08	58.744	45.32	45.05	62.83
17.0	51.320	14.45	24.540	56.76	58.849	42.24	45.16	59.57
26.9	51.433	13.73	24.651	56.21	59.010	39.09	45.34	56.25
Oct. 6.9	51.584	13.30	24.798	55.41	59.230	35.92	45.58	52.93
16.9	51.774	13.22	24.980	54.35	59.510	32.81	45.89	49.70
26.9	52.003	13.52	25.199	53.05	59.846	29.82	46.27	46.62
Nov. 5.8	52.267	14.22	25.452	51.49	60.235	27.01	46.71	43.76
15.8	52.562	15.32	25.734	49.74	60.672	24.47	47.20	41.21
25.8	52.879	16.80	26.041	47.81	61.147	22.28	47.74	39.04
Dec. 5.8	53.210	18.60	26.362	45.77	61.649	20.49	48.31	37.31
15.7	53.547	20.71	26.689	43.67	62.164	19.17	48.89	36.09
25.7	53.877	23.02	27.013	41.59	62.677	18.37	49.48	35.41
35.7	54.188	25.48	27.321	39.60	63.168	18.11	50.04	35.31
Mean Place	49.578	2.57	22.678	69.49	57.873	60.82	44.585	78.89
Sec δ , Tan δ	1.051	-0.322	1.002	+0.070	1.827	+1.529	2.143	+1.895
$D\psi\alpha$, $D\omega\alpha$	+0.06	-0.02	+0.06	0.00	+0.07	+0.10	+0.07	+0.12
$D\psi\delta$, $D\omega\delta$	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

APPARENT PLACES OF STARS, 1919.

407

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Time.	χ Leonis. Mag. 4.7		ρ^4 Leonis. Mag. 5.7		ψ Ursa Majoris. Mag. 3.2		β Crateris. Mag. 4.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 11 0	° ' " + 7 45	h m 11 2	° ' " + 2 23	h m 11 5	° ' " +44 55	h m 11 7	° ' " -22 23
	s	"	s	"	s	"	s	"
L. 0.7	51.975	76.26	47.940	34.72	8.679	56.18	41.960	2.07
10.7	52.275 ³⁰⁰	74.44 ¹⁸²	48.239 ²⁹⁹	32.73 ¹⁹⁹	9.069 ³⁹⁰	55.69 ⁴⁹	42.272 ³¹²	4.67 ²⁹⁰
20.6	52.547 ²⁷²	72.85 ¹⁵⁹	48.508 ²⁹⁹	30.90 ¹⁸³	9.425 ³⁵⁶	55.72 ³	42.553 ²⁸¹	7.33 ²⁶⁶
30.6	52.780 ²³³	71.49 ¹³⁶	48.741 ²³³	29.29 ¹⁶¹	9.733 ³⁰⁸	56.23 ⁵¹	42.793 ²⁴⁰	9.98 ²⁶⁵
b. 9.6	52.970 ¹⁹⁰	70.43 ¹⁰⁶	48.930 ¹⁸⁹	27.91 ¹³⁸	9.986 ²⁵³	57.17 ⁹⁴	42.989 ¹⁹⁶	12.56 ²⁵⁸
	144	77	143	110	189	134	149	244
19.5	53.114 ⁹⁶	69.66 ⁵¹	49.073 ⁹⁷	26.81 ⁸³	10.175 ¹²⁶	58.51 ¹⁶⁶	43.138 ¹⁰¹	15.00 ²²⁷
r. 1.5	53.210 ⁵¹	69.15 ²²	49.170 ⁵³	25.98 ⁵⁶	10.301 ⁶¹	60.17 ¹⁸⁹	43.239 ⁵⁶	17.27 ²⁰³
11.5	53.261 ¹⁰	68.93 ²¹	49.223 ¹²	25.42 ³¹	10.362 ⁰	62.06 ²⁰³	43.295 ¹³	19.30 ¹⁸⁰
21.5	53.271 ²⁷	68.93 ²¹	49.235 ²⁵	25.11 ¹¹	10.362 ⁵⁴	64.09 ²⁰⁸	43.308 ²⁴	21.10 ¹⁵²
31.4	53.244 ⁵⁷	69.14 ³⁷	49.210 ⁵³	25.00 ⁸	10.308 ¹⁰¹	66.17 ²⁰³	43.284 ⁵⁴	22.62 ¹²⁴
r. 10.4	53.187 ⁸¹	69.51 ⁴⁹	49.157 ⁷⁹	25.08 ²⁶	10.207 ¹³⁹	68.20 ¹⁹⁰	43.230 ⁸¹	23.86 ⁹⁷
20.4	53.106 ⁹⁶	70.00 ⁵⁷	49.078 ⁹⁴	25.34 ³⁷	10.068 ¹⁶⁸	70.10 ¹⁷⁰	43.149 ⁹⁹	24.83 ⁶⁸
30.4	53.008 ¹⁰⁹	70.57 ⁶³	48.984 ¹⁰⁶	25.71 ⁴⁷	9.900 ¹⁸⁸	71.80 ¹⁴³	43.050 ¹¹³	25.51 ⁴⁰
y 10.3	52.899 ¹¹⁴	71.20 ⁶⁶	48.878 ¹¹²	26.18 ⁵⁴	9.712 ¹⁹⁸	73.23 ¹¹²	42.937 ¹²²	25.91 ¹¹
20.3	52.785 ¹¹⁶	71.86 ⁶⁶	48.766 ¹¹⁴	26.72 ⁶⁰	9.514 ²⁰¹	74.35 ⁷⁸	42.815 ¹²⁶	26.02 ¹⁶
30.3	52.669 ¹¹³	72.52 ⁶³	48.652 ¹¹⁰	27.32 ⁶³	9.313 ¹⁹⁸	75.13 ⁴³	42.689 ¹²⁵	25.86 ⁴¹
ne 9.2	52.556 ¹⁰⁶	73.15 ⁶⁰	48.542 ¹⁰⁵	27.95 ⁶⁴	9.115 ¹⁸⁷	75.56 ⁴	42.564 ¹²³	25.45 ⁶⁷
19.2	52.450 ⁹⁶	73.75 ⁵⁵	48.437 ⁹⁶	28.59 ⁶⁴	8.928 ¹⁷¹	75.60 ³⁴	42.441 ¹¹⁴	24.78 ⁸⁹
29.2	52.354 ⁸⁵	74.30 ⁴⁷	48.341 ⁸⁵	29.23 ⁶²	8.757 ¹⁵³	75.26 ⁷⁰	42.327 ¹⁰⁶	23.89 ¹¹⁰
ly 9.2	52.269 ⁶⁹	74.77 ³⁹	48.256 ⁷⁰	29.85 ⁵⁷	8.604 ¹²⁷	74.56 ¹⁰⁴	42.221 ⁹²	22.79 ¹²⁷
19.1	52.200 ⁵³	75.16 ²⁷	48.186 ⁵⁴	30.42 ⁵¹	8.477 ¹⁰³	73.52 ¹³⁷	42.129 ⁷⁶	21.52 ¹³⁹
29.1	52.147 ³³	75.43 ¹⁷	48.132 ³⁶	30.93 ⁴²	8.374 ⁷¹	72.15 ¹⁶⁹	42.053 ⁵⁵	20.13 ¹⁴⁷
lg. 8.1	52.114 ¹¹	75.60 ¹	48.096 ¹³	31.35 ³¹	8.303 ³⁸	70.46 ¹⁹⁵	41.998 ³⁰	18.66 ¹⁵⁰
18.1	52.103 ¹⁴	75.61 ¹⁶	48.083 ¹²	31.66 ¹⁵	8.265 ²	68.51 ²²¹	41.968 ⁴	17.16 ¹⁴⁷
28.0	52.117 ⁴¹	75.45 ³³	48.095 ³⁹	31.81 ¹	8.263 ³⁷	66.30 ²⁴¹	41.964 ²⁹	15.69 ¹³⁸
pt. 7.0	52.158 ⁷⁴	75.12 ⁵⁴	48.134 ⁷⁰	31.80 ²³	8.300 ⁷⁹	63.89 ²⁶⁰	41.993 ⁶⁵	14.31 ¹²¹
17.0	52.232 ¹⁰⁷	74.58 ⁷⁸	48.204 ¹⁰⁴	31.57 ⁴⁴	8.379 ¹²⁴	61.29 ²⁷²	42.058 ¹⁰⁴	13.10 ⁹⁸
26.9	52.339 ¹⁴¹	73.80 ¹⁰⁰	48.308 ¹³⁹	31.13 ⁷¹	8.503 ¹⁷¹	58.57 ²⁸¹	42.162 ¹⁴⁴	12.12 ⁶⁹
t. 6.9	52.480 ¹⁷⁹	72.80 ¹²⁵	48.447 ¹⁷⁷	30.42 ⁹⁷	8.674 ²¹⁸	55.76 ²⁸⁵	42.306 ¹⁸⁵	11.43 ³³
16.9	52.659 ²¹⁶	71.55 ¹⁴⁸	48.624 ²¹⁴	29.45 ¹²⁴	8.892 ²⁶⁶	52.91 ²⁸²	42.491 ²²⁶	11.10 ⁵
26.9	52.875 ²⁵¹	70.07 ¹⁶⁹	48.838 ²⁴⁸	28.21 ¹⁴⁹	9.158 ³¹⁰	50.09 ²⁷³	42.717 ²⁶⁴	11.15 ⁴⁶
iv. 5.8	53.126 ²⁸⁰	68.38 ¹⁸⁶	49.086 ²⁷⁸	26.72 ¹⁷²	9.468 ³⁵¹	47.36 ²⁵⁶	42.981 ²⁹⁷	11.61 ⁸⁹
15.8	53.406 ³⁰⁶	66.52 ²⁰⁰	49.364 ³⁰³	25.00 ¹⁹⁰	9.819 ³⁸³	44.80 ²³⁴	43.278 ³²²	12.50 ¹³⁰
25.8	53.711 ³²²	64.52 ²⁰⁷	49.667 ³¹⁹	23.10 ²⁰⁴	10.202 ⁴⁰⁸	42.46 ¹⁶⁵	43.600 ³³⁸	13.80 ¹⁶⁸
c. 5.8	54.033 ³²⁸	62.45 ²⁰⁸	49.986 ³²⁷	21.06 ²¹²	10.610 ⁴¹⁹	40.43 ¹⁶⁵	43.938 ³⁴⁵	15.48 ²⁰²
15.7	54.361 ³²⁵	60.37 ²⁰³	50.313 ³²³	18.94 ²¹⁰	11.029 ⁴²⁰	38.78 ¹²²	44.283 ³⁴⁰	17.50 ²²⁸
25.7	54.686 ³¹¹	58.34 ¹⁹⁰	50.636 ³⁰⁹	16.84 ²⁰⁵	11.449 ⁴⁰⁴	37.56 ⁷⁶	44.623 ³²⁴	19.78 ²⁴⁸
35.7	54.997	56.44	50.945	14.79	11.853	36.80	44.947	22.26
Place	50.397	87.54	46.368	44.26	7.006	77.80	40.321	0.66
i, Tan δ	1.009	+0.136	1.001	+0.042	1.412	+0.997	1.082	-0.412
$D_{\alpha\alpha}$	+0.06	+0.01	+0.06	0.00	+0.07	+0.06	+0.06	-0.03
$D_{\alpha\delta}$	-0.4	+0.3	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	δ Leonis. Mag. 2.6		θ Leonis. Mag. 3.4		ν Ursae Majoris. Mag. 3.7		δ Crateris. Mag. 3.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 11 9	° ' " +20 57	h m 11 9	° ' " +15 51	h m 11 14	° ' " +33 31	h m 11 15	° ' " -14
	s	"	s	"	s	"	s	"
Jan. 0.7	49.740	48.19	60.983	67.17	8.016	52.52	18.928	28.01
10.7	50.061 ³²¹	46.78 ¹⁴¹	61.295 ³¹²	65.59 ¹⁵⁸	8.366 ³⁵⁰	51.53 ⁹⁹	19.236 ³⁰⁸	30.41 ²
20.6	50.352 ²⁹¹	45.71 ¹⁰⁷	61.580 ²⁸⁵	64.30 ¹²⁹	8.685 ³¹⁹	50.99 ⁵⁴	19.515 ²⁷⁹	32.82 ²
30.6	50.606 ²⁵⁴	44.99 ⁷²	61.827 ²⁴⁷	63.32 ⁹⁸	8.966 ²⁸¹	50.88 ¹¹	19.758 ²⁴³	35.15 ¹
Feb. 9.6	50.815 ²⁰⁹	44.64 ³⁵	62.031 ²⁰⁴	62.69 ⁶³	9.197 ²³¹	51.19 ³¹	19.957 ¹⁹⁹	37.36 ¹
	161	2	158	31	180	70	155	
19.6	50.976	44.62	62.189	62.38	9.377	51.89	20.112	39.38
Mar. 1.5	51.088 ¹¹²	44.92 ³⁰	62.298 ¹⁰⁹	62.36 ²	9.501 ¹²⁴	52.91 ¹⁰²	20.221 ¹⁰⁹	41.20 ¹
11.5	51.151 ⁶³	45.49 ⁵⁷	62.360 ⁶²	62.63 ²⁷	9.572 ⁷¹	54.22 ¹³¹	20.285 ⁶⁴	42.77 ¹
21.5	51.169 ¹⁸	46.29 ⁸⁰	62.379 ¹⁹	63.12 ⁴⁹	9.590 ¹⁸	55.71 ¹⁴⁹	20.308 ²³	44.11 ¹
31.4	51.147 ²²	47.23 ⁹⁴	62.359 ²⁰	63.80 ⁶⁸	9.563 ²⁷	57.31 ¹⁸⁰	20.295 ¹³	45.17 ¹
	55	105	52	80	67	164	42	
Apr. 10.4	51.092	48.28	62.307	64.60	9.496	58.95	20.253	46.00
20.4	51.008 ⁸⁴	49.37 ¹⁰⁹	62.228 ⁷⁹	65.47 ⁸⁷	9.397 ⁹⁹	60.56 ¹⁶¹	20.184 ⁶⁹	46.57
30.4	50.905 ¹⁰³	50.45 ¹⁰⁸	62.131 ⁹⁷	66.37 ⁹⁰	9.272 ¹²⁵	62.06 ¹⁵⁰	20.097 ⁵⁷	46.90
May 10.3	50.787 ¹¹⁸	51.47 ¹⁰²	62.020 ¹¹¹	67.26 ⁸⁹	9.132 ¹⁴⁰	63.39 ¹³³	19.996 ¹⁰¹	47.01 ¹
20.3	50.663 ¹²⁴	52.40 ⁹³	61.901 ¹¹⁹	68.10 ⁸⁴	8.981 ¹⁵¹	64.51 ¹¹²	19.886 ¹¹⁰	46.91
	127	80	120	76	184	99	114	
30.3	50.536	53.20	61.781	68.86	8.827	65.40	19.772	46.60
June 9.3	50.411 ¹²⁵	53.84 ⁶⁴	61.663 ¹¹⁸	69.51 ⁶⁵	8.675 ¹⁵²	66.01 ⁶¹	19.657 ¹¹⁵	46.11
19.2	50.294 ¹¹⁷	54.32 ⁴⁸	61.551 ¹¹²	70.06 ⁵⁵	8.529 ¹⁴⁶	66.33 ³²	19.545 ¹¹²	45.43
29.2	50.184 ¹¹⁰	54.61 ²⁹	61.447 ¹⁰⁴	70.46 ⁴⁰	8.393 ¹²⁶	66.37 ⁴	19.439 ¹⁰⁶	44.61
July 9.2	50.088 ⁹⁶	54.72 ¹¹	61.355 ⁹²	70.71 ²⁵	8.273 ¹²⁰	66.11 ²⁶	19.341 ⁹⁸	43.66
	82	8	78	11	104	54	86	
19.1	50.006 ⁶³	54.64 ³⁰	61.277 ⁶¹	70.82 ⁶	8.169 ⁸⁴	65.57 ⁸³	19.255 ⁷⁰	42.61
29.1	49.943 ⁴⁵	54.34 ⁵⁰	61.216 ⁴²	70.76 ²⁵	8.085 ⁶⁰	64.74 ¹¹¹	19.185 ⁵⁴	41.49
Aug. 8.1	49.898 ²⁰	53.84 ⁷¹	61.174 ¹⁹	70.51 ⁴²	8.025 ³³	63.63 ¹³⁶	19.131 ³¹	40.34
18.1	49.878 ⁵	53.13 ⁹¹	61.155 ⁵	70.09 ⁶³	7.992 ⁶	62.27 ¹⁶¹	19.100 ⁵	39.21
28.0	49.883 ³⁵	52.22 ¹¹³	61.160 ³⁴	69.46 ⁸²	7.986 ²⁸	60.66 ¹⁸²	19.095 ²⁴	38.14
Sept. 7.0	49.918	51.09	61.194	68.64	8.014	58.84	19.119	37.19
17.0	49.984 ⁶⁶	49.75 ¹³⁴	61.259 ⁶⁵	67.60 ¹⁰⁴	8.078 ⁶⁴	56.80 ²⁰⁴	19.176 ⁵⁷	36.42
27.0	50.086 ¹⁰²	48.21 ¹⁵⁴	61.359 ¹⁰⁰	66.35 ¹²⁵	8.180 ¹⁰²	54.60 ²²⁰	19.268 ⁹²	35.88
Oct. 6.9	50.224 ¹³⁸	46.48 ¹⁷³	61.494 ¹³⁵	64.89 ¹⁴⁶	8.322 ¹⁴²	52.24 ²³⁶	19.400 ¹³²	35.62
16.9	50.401 ¹⁷⁷	44.57 ¹⁹¹	61.668 ¹⁷⁴	63.22 ¹⁶⁷	8.507 ¹⁸⁵	49.77 ²⁴⁷	19.573 ¹⁷³	35.67
	217	206	212	184	227	253	211	
26.9	50.618	42.51	61.880	61.38	8.734	47.24	19.784	36.08
Nov. 5.8	50.871 ²⁵³	40.35 ²¹⁶	62.128 ²⁴⁸	59.39 ¹⁹⁹	9.002 ²⁶⁸	44.70 ²⁵⁴	20.033 ²⁴⁹	36.85
15.8	51.157 ²⁶⁶	38.13 ²²²	62.408 ²⁸⁰	57.29 ²¹⁰	9.308 ³⁰⁶	42.21 ²⁴⁹	20.314 ²⁸¹	37.99
25.8	51.471 ³¹⁴	35.91 ²¹⁵	62.716 ³⁰⁸	55.14 ²¹⁵	9.643 ³³⁵	39.84 ²³⁷	20.622 ³⁰⁸	39.48
Dec. 5.8	51.804 ³³³	33.76 ²⁰²	63.041 ³²⁵	53.00 ²¹⁴	10.002 ³⁵⁹	37.67 ²¹⁷	20.948 ³²⁶	41.26
	343	202	336	205	371	191	334	
15.7	52.147	31.74	63.377	50.95	10.373	35.76	21.282	43.30
25.7	52.490 ³⁴³	29.91 ¹⁸³	63.712 ³³⁵	49.03 ¹⁹²	10.745 ³⁷²	34.16 ¹⁶⁰	21.613 ³³¹	45.52
35.7	52.820 ³³⁰	28.35 ¹⁵⁶	64.035 ³²³	47.32 ¹⁷¹	11.106 ³⁶¹	32.96 ¹²⁰	21.932 ³¹⁹	47.87
Mean Place	48.213	63.59	59.460	81.01	6.492	71.51	17.371	24.13
Sec δ , Tan δ	1.071	+0.383	1.040	+0.284	1.200	+0.663	1.032	-0.256
$D\mu\alpha$, $D\omega\alpha$	+0.06	+0.02	+0.06	+0.02	+0.06	+0.04	+0.06	-0.02
$D\mu\delta$, $D\omega\delta$	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2

APPARENT PLACES OF STARS, 1919.

409

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	σ Leonis. Mag. 4.1			π Centauri. Mag. 4.3			ι Leonis. Mag. 4.0			τ Leonis. Mag. 5.2		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h m 11 16	s 11 16	° ' " + 6 27	h m 11 17	s 11 17	° ' " -54 2	h m 11 19	s 11 19	° ' " +10 57	h m 11 23	s 11 23	° ' " + 3 17
Jan. 0.7	59.136	307	73.87	20.463	41.60	43.612	79.76	47.779	59.35	199		
10.7	59.443	307	71.97	20.894	44.31	43.923	77.99	48.087	57.36	199		
20.6	59.724	281	70.29	21.280	47.39	44.208	76.47	48.371	55.53	183		
30.6	59.968	244	68.84	21.609	50.71	44.460	75.23	48.620	53.94	159		
Feb. 9.6	60.172	204	67.67	21.876	54.20	44.669	74.29	48.828	52.59	135		
19.6	60.331	159	66.79	22.077	57.76	44.833	73.67	48.993	51.52	107		
Mar. 1.5	60.444	113	66.21	22.210	61.29	44.951	73.35	49.112	50.73	79		
11.5	60.512	68	65.89	22.278	64.73	45.023	73.30	49.187	50.21	52		
21.5	60.538	26	65.82	22.284	68.00	45.052	73.51	49.220	49.96	25		
31.4	60.527	11	65.97	22.234	71.03	45.045	73.91	49.218	49.91	5		
Apr. 10.4	60.486	41	66.29	22.135	73.78	45.004	74.47	49.183	50.07	16		
20.4	60.419	67	66.74	21.995	76.18	44.938	75.16	49.123	50.38	31		
30.4	60.333	86	67.30	21.817	78.21	44.851	75.90	49.043	50.82	44		
May 10.3	60.234	99	67.93	21.612	79.82	44.750	76.68	48.949	51.35	53		
20.3	60.127	107	68.59	21.385	81.00	44.642	77.45	48.846	51.94	59		
30.3	60.016	111	69.26	21.144	81.71	44.529	78.20	48.739	52.58	64		
June 9.3	59.906	110	69.94	20.894	81.95	44.416	78.87	48.631	53.23	65		
19.2	59.799	107	70.56	20.642	81.72	44.307	79.48	48.525	53.88	65		
29.2	59.699	100	71.15	20.395	81.02	44.205	80.00	48.427	54.52	64		
July 9.2	59.609	90	71.67	20.159	79.88	44.113	80.41	48.333	55.12	60		
19.1	59.532	77	72.11	19.944	78.34	44.032	80.70	48.251	55.66	47		
29.1	59.468	64	72.46	19.754	76.44	43.967	80.85	48.185	56.13	37		
Aug. 8.1	59.422	46	72.68	19.599	74.22	43.919	80.86	48.134	56.50	24		
18.1	59.397	25	72.76	19.485	71.78	43.893	80.70	48.104	56.74	10		
28.0	59.395	2	72.68	19.419	69.18	43.889	80.36	48.095	56.84	7		
Sept. 7.0	59.421	26	72.41	19.410	66.54	43.913	79.83	48.115	56.77	29		
17.0	59.479	58	71.94	19.462	63.93	43.968	79.08	48.164	56.48	20		
27.0	59.569	90	71.24	19.578	61.49	44.056	78.11	48.248	55.97	51		
Oct. 6.9	59.696	127	70.30	19.763	59.29	44.181	76.91	48.368	55.21	76		
16.9	59.861	165	69.11	20.013	57.43	44.345	75.49	48.527	54.20	101		
26.9	60.064	203	67.68	20.327	56.02	44.547	73.84	48.724	52.92	128		
Nov. 5.8	60.302	238	66.03	20.699	55.13	44.785	72.04	48.958	51.39	153		
15.8	60.575	273	64.19	21.119	54.79	45.057	70.04	49.226	49.65	174		
25.8	60.874	299	62.20	21.575	55.05	45.357	67.94	49.522	47.73	192		
Dec. 5.8	61.192	318	60.11	22.053	55.90	45.677	65.80	49.837	45.68	205		
15.7	61.520	327	58.00	22.537	57.34	46.008	63.70	50.164	43.55	211		
25.7	61.847	317	55.93	23.013	59.31	46.339	61.67	50.492	41.44	205		
35.7	62.164	317	53.96	23.464	61.76	46.661	59.79	50.810	39.39	205		
Mean Place	57.650		84.68	18.453		42.148	92.03	46.327	69.05			
Sec δ , Tan δ	1.006		+0.113	1.703		1.019	+0.194	1.002	+0.058			
$D\psi_a$, $D\omega_a$	+0.06		+0.01	+0.05		+0.06	+0.01	+0.06	0.00			
$D\psi_\delta$, $D\omega_\delta$	-0.4		+0.2	-0.4		-0.4	+0.2	-0.4	+0.2			

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	λ Draconis. Mag. 4.1		ξ Hydræ. Mag. 3.7		λ Centauri. Mag. 3.3		ν Leonis. Mag. 4.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 11 26	" ' +69 45	h m 11 29	" ' -31 24	h m 11 32	" ' -62 34	h m 11 32	" ' - 0
	s "	s "	s "	s "	s "	s "	s "	s "
Jan. 0.7	38.61	75.94	2.495	32.00	4.32	8.05	49.496	43.43
10.7	39.32 71	76.08 14	2.835 340	34.59 259	4.86 54	10.56 251	49.807 311	45.52
20.6	39.99 67	76.83 75	3.144 309	37.34 275	5.35 49	13.48 292	50.093 286	47.47
30.6	40.57 58	78.16 133	3.415 271	40.19 285	5.77 42	16.73 325	50.348 255	49.24
Feb. 9.6	41.06 49	80.01 185	3.641 226	43.05 286	6.12 35	20.23 350	50.562 214	50.78
	38	228	178	281	26	364	172	
19.6	41.44	82.29	3.819	45.86	6.38	23.87	50.734	52.06
Mar. 1.5	41.68 24	84.90 261	3.948 129	48.54 268	6.56 18	27.56 369	50.861 127	53.08
11.5	41.81 13	87.72 282	4.029 81	51.05 251	6.67 11	31.22 366	50.945 84	53.82
21.5	41.82 —	90.63 291	4.065 —	53.34 229	6.70 3	34.76 354	50.989 44	54.31
31.5	41.71 11	93.53 290	4.061 4	55.38 204	6.66 4	38.12 336	50.995 — 6	54.55
	23	275	40	177	11	310	26	
Apr. 10.4	41.48	96.28	4.021	57.15	6.55	41.22	50.969	54.60
20.4	41.17 31	98.78 250	3.952 69	58.62 147	6.39 16	44.03 281	50.918 51	54.47
30.4	40.78 39	100.96 218	3.860 92	59.78 116	6.16 23	46.46 243	50.846 72	54.18
May 10.3	40.34 44	102.72 176	3.748 112	60.62 84	5.91 25	48.49 203	50.759 87	53.78
20.3	39.85 49	104.02 130	3.624 124	61.14 52	5.62 29	50.07 158	50.661 98	53.28
	50	81	134	18	32	110	103	
30.3	39.35	104.83	3.490	61.32	5.30	51.17	50.558	52.71
June 9.3	38.83 52	105.11 28	3.350 140	61.18 14	4.96 34	51.78 61	50.452 106	52.08
19.2	38.32 51	104.86 25	3.210 140	60.73 45	4.62 34	51.89 11	50.347 105	51.42
29.2	37.84 48	104.10 76	3.072 138	59.96 77	4.28 34	51.49 40	50.245 102	50.74
July 9.2	37.40 44	102.84 126	2.941 131	58.91 105	3.94 34	50.60 89	50.150 95	50.07
	40	172	120	129	31	136	86	
19.2	37.00	101.12	2.821	57.62	3.63	49.24	50.064	49.42
29.1	36.66 34	98.97 215	2.716 105	56.12 150	3.35 28	47.45 179	49.991 73	48.81
Aug. 8.1	36.38 28	96.43 254	2.630 86	54.44 168	3.10 25	45.29 216	49.933 58	48.28
18.1	36.17 21	93.57 286	2.568 62	52.66 178	2.92 18	42.83 246	49.893 40	47.85
28.0	36.05 12	90.43 314	2.535 33	50.85 181	2.79 13	40.15 263	49.877 16	47.56
	5	335	1	178	6	281	11	
Sept. 7.0	36.00 4	87.08	2.536	49.07	2.73	37.34	49.888	47.43
17.0	36.04 13	83.57 351	2.576 40	47.40 167	2.75 2	34.51 283	49.928 40	47.48
27.0	36.17 4	80.00 357	2.660 84	45.91 149	2.85 10	31.76 275	50.002 74	47.78
Oct. 6.9	36.40 23	76.41 359	2.789 129	44.70 121	3.04 19	29.22 254	50.114 112	48.31
16.9	36.72 32	72.90 351	2.965 176	43.80 90	3.33 29	26.98 224	50.265 151	49.13
	41	337	222	49	36	183	190	
26.9	37.13	69.53	3.187	43.31	3.69	25.15	50.455	50.22
Nov. 5.9	37.63 50	66.40 313	3.453 266	43.26 — 5	4.12 43	23.80 135	50.683 228	51.57
15.8	38.21 58	63.56 284	3.757 304	43.67 41	4.62 50	23.01 79	50.947 264	53.19
25.8	38.86 65	61.14 242	4.091 334	44.55 88	5.17 55	22.82 19	51.238 291	55.01
Dec. 5.8	39.56 70	59.18 196	4.447 356	45.89 134	5.75 58	23.27 45	51.552 314	57.00
	74	141	366	175	59	105	326	
15.7	40.30	57.77	4.813	47.64	6.34	24.32	51.878	59.11
25.7	41.06 76	56.93 84	5.177 364	49.77 213	6.93 59	25.96 164	52.206 328	61.26
35.7	41.80 74	56.70 23	5.528 351	52.18 241	7.49 56	28.14 218	52.526 320	63.38
Mean Place	36.816	101.85	0.898	33.85	2.145	17.72	48.085	35.07
Sec δ , Tan δ	2.892	+2.714	1.172	-0.611	2.172	-1.928	1.000	-0.00
$D\mu\alpha$, $D\omega\alpha$	+0.07	+0.18	+0.06	-0.04	+0.05	-0.13	+0.06	0.00
$D\mu\delta$, $D\omega\delta$	-0.4	+0.1	-0.4	+0.1	-0.4	+0.1	-0.4	+0.1

APPARENT PLACES OF STARS, 1919.

411

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	π Chamæleonis. Mag. 5.7			β Draconis. Mag. 5.5			ζ Crateris. Mag. 4.9			χ Ursæ Majoris. Mag. 3.8		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h m	s	° ' "	h m	s	° ' "	h m	s	° ' "	h m	s	° ' "
	11	33	-75 26	11	37	+67 10	11	40	-17 54	11	41	+48 13
Jan. 0.7	57.80		41.75	59.63		69.97	40.746		3.56	48.117		20.09
10.7	58.70	90	44.05	60.29	66	69.89	41.070	324	5.95	48.542	425	19.36
20.7	59.51	81	46.82	60.90	61	70.43	41.368	298	8.39	48.938	396	19.17
30.6	60.21	70	50.01	61.44	54	71.55	41.632	264	10.81	49.294	356	19.52
Feb. 9.6	60.78	57	53.51	61.90	46	73.21	41.857	225	13.14	49.598	304	20.38
19.6	61.21	43	57.21	62.27	37	75.33	42.039	182	15.31	49.843	245	21.69
Mar. 1.5	61.50	29	61.04	62.53	26	77.81	42.176	137	17.32	50.022	179	23.40
11.5	61.66	16	64.91	62.68	15	80.53	42.269	93	19.11	50.136	114	25.41
21.5	61.66	0	68.71	62.70	2	83.39	42.320	51	20.65	50.184	48	27.62
31.5	61.55	11	72.39	62.64	6	86.28	42.333	13	21.96	50.173	11	29.94
Apr. 10.4	61.32	23	75.84	62.48	16	89.06	42.314	19	23.01	50.108	65	32.26
20.4	60.98	34	79.00	62.23	25	91.62	42.269	45	23.80	49.996	112	34.49
30.4	60.53	45	81.83	61.91	32	93.90	42.200	69	24.36	49.847	149	36.53
May 10.4	60.00	53	84.25	61.53	38	95.80	42.114	86	24.67	49.669	178	38.34
20.3	59.40	60	86.22	61.12	41	97.26	42.016	98	24.76	49.470	199	39.83
30.3	58.75	65	87.69	60.68	44	98.24	41.909	107	24.62	49.258	212	40.97
June 9.3	58.06	69	88.65	60.24	46	98.70	41.797	112	24.27	49.042	216	41.72
19.2	57.35	71	89.06	59.79	45	98.66	41.683	114	23.73	48.827	215	42.07
29.2	56.63	72	88.92	59.37	42	98.10	41.570	113	23.00	48.621	206	42.01
July 9.2	55.93	70	88.25	58.97	40	97.05	41.461	109	22.11	48.427	194	41.54
19.2	55.27	66	87.05	58.60	37	95.53	41.361	100	21.09	48.250	177	40.66
29.1	54.66	61	85.36	58.28	32	93.57	41.272	89	19.96	48.097	153	39.40
Aug. 8.1	54.14	52	83.24	58.02	26	91.21	41.199	73	18.76	47.970	127	37.77
18.1	53.71	43	80.75	57.81	21	88.50	41.144	55	17.55	47.873	97	35.82
28.1	53.42	29	77.98	57.67	14	85.49	41.114	30	16.37	47.812	61	33.57
Sept. 7.0	53.25	17	75.01	57.60	7	82.25	41.110	4	15.27	47.790	22	31.05
17.0	53.24	1	71.95	57.62	2	78.83	41.142	32	14.31	47.812	22	28.31
27.0	53.38	14	68.94	57.71	9	75.29	41.210	68	13.56	47.881	69	25.39
Oct. 6.9	53.68	30	66.08	57.89	18	71.72	41.319	109	13.06	48.001	120	22.35
16.9	54.14	46	63.48	58.15	26	68.19	41.469	150	12.87	48.174	173	19.24
26.9	54.76	62	61.25	58.49	34	64.76	41.662	193	13.02	48.401	227	16.14
Nov. 5.9	55.49	73	59.50	58.92	43	61.52	41.896	234	13.54	48.681	280	13.10
15.8	56.34	85	58.30	59.44	52	58.58	42.168	272	14.43	49.009	328	10.22
25.8	57.27	93	57.70	60.01	57	56.00	42.471	303	15.70	49.380	371	7.55
Dec. 5.8	58.26	99	57.77	60.63	62	53.86	42.796	325	17.31	49.786	406	5.17
15.8	59.26	100	58.47	61.29	66	52.24	43.134	338	19.20	50.213	427	3.19
25.7	60.24	98	59.82	61.97	68	51.19	43.475	341	21.33	50.650	437	1.66
35.7	61.18	94	61.76	62.63	66	50.75	43.807	332	23.63	51.083	433	0.62
Mean Place	54.643		53.34	58.134		95.76	39.305		1.32	46.807		42.81
Sec δ , Tan δ	3.980		-3.853	2.579		+2.377	1.051		-0.323	1.501		+1.119
$D_{\phi a}$, $D_{\omega a}$	+0.05		-0.25	+0.07		+0.16	+0.06		-0.02	+0.08		+0.07
$D_{\phi \delta}$, $D_{\omega \delta}$	-0.4		+0.1	-0.4		+0.1	-0.4		+0.1	-0.4		+0.1

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Leonis. (Denebola.) Mag. 2.2		β Virginis. Mag. 3.8		Groombridge 1830. Mag. 6.5		γ Urae Majoris. Mag. 2.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 11 44	° ' " +15 0	h m 11 46	° ' " + 2 12	h m 11 48	° ' " +38 17	h m 11 49	° ' " +54 7
	s "	"	s "	"	s "	"	s "	"
Jan. 0.7	57.075	76.22	29.885	67.49	20.183	40.11	35.918	78.53
10.7	57.399 324	74.48 174	30.203 318	65.44 205	20.570 387	38.85 126	36.390 472	77.89 34
20.7	57.700 301	73.01 147	30.498 295	63.55 189	20.933 363	38.07 78	36.834 444	77.83 6
30.6	57.969 269	71.88 113	30.763 265	61.87 168	21.262 329	37.78 29	37.235 401	78.36 31
Feb. 9.6	58.202 233	71.09 79	30.990 227	60.43 144	21.546 284	37.97 19	37.580 345	79.41 26
	188	46	187	115	232	64	279	13
19.6	58.390	70.63	31.177	59.28	21.778	38.61	37.859	80.94
Mar. 1.6	58.532 142	70.53 10	31.320 143	58.40 88	21.957 179	39.64 103	38.069 210	82.87 26
	98	19	99	59	123	134	135	85.12 25
11.5	58.630	70.72	31.419	57.81	22.080	40.98	38.204	85.12 25
	54	45	58	33	68	160	61	87.56 24
21.5	58.684	71.17	31.477	57.48	22.148	42.58	38.265	87.56 24
	14	67	21	11	17	176	8	90.11 23
31.5	58.698	71.84	31.498	57.37	22.165	44.34	38.257	90.11 23
	20	83	12	10	29	181	71	92.65 22
Apr. 10.4	58.678	72.67	31.486	57.47	22.136	46.15	38.186	92.65 22
	49	93	38	28	67	180	126	95.07 20
20.4	58.629	73.60	31.448	57.75	22.069	47.95	38.060	95.07 20
	73	98	60	41	98	168	171	97.30 18
30.4	58.556	74.58	31.388	58.16	21.971	49.63	37.889	97.30 18
May 10.4	58.467	75.57	31.309	58.67	21.847	51.15	37.681	99.25 16
	89	96	79	51	124	182	208	100.55 14
20.3	58.365	76.53	31.220	59.26	21.707	52.45	37.448	100.55 14
	110	89	96	63	151	102	251	102.06 12
30.3	58.255	77.42	31.122	59.89	21.556	53.47	37.197	102.06 12
June 9.3	58.140	78.22	31.019	60.55	21.399	54.18	36.938	102.84 10
	115	80	103	66	157	38	259	103.18 9
19.3	58.026	78.88	30.916	61.22	21.242	54.56	36.679	103.18 9
	114	66	103	67	157	5	259	103.07 11
29.2	57.914	79.42	30.813	61.87	21.090	54.61	36.427	103.07 11
	112	54	103	65	152	31	252	102.51 10
July 9.2	57.809	79.81	30.716	62.49	20.946	54.30	36.188	102.51 10
	105	39	90	57	144	66	219	101.51 14
19.2	57.712	80.02	30.626	63.06	20.815	53.64	35.969	101.51 14
	84	4	80	50	113	99	196	100.10 13
29.1	57.626	80.06	30.546	63.56	20.702	52.65	35.773	100.10 13
	70	15	66	41	95	133	165	98.29 11
Aug. 8.1	57.556	79.91	30.480	63.97	20.607	51.32	35.608	98.29 11
	52	31	49	28	69	164	128	96.13 24
18.1	57.504	79.57	30.431	64.25	20.538	49.68	35.480	96.13 24
	29	55	26	14	42	192	91	93.66 27
28.1	57.475	79.02	30.405	64.39	20.496	47.76	35.389	93.66 27
	4	77	2	2	9	219	45	90.91 27
Sept. 7.0	57.471	78.25	30.403	64.37	20.487	45.57	35.344	90.91 27
	27	98	28	23	27	242	4	87.94 23
17.0	57.498	77.27	30.431	64.14	20.514	43.15	35.348	87.94 23
	62	123	93	45	68	263	57	84.79 23
27.0	57.560	76.04	30.494	63.69	20.582	40.52	35.405	84.79 23
Oct. 7.0	57.659	74.61	30.593	62.98	20.693	37.72	35.519	81.53 23
	99	143	90	71	111	280	114	78.22 23
16.9	57.796	72.94	30.731	62.03	20.851	34.80	35.694	78.22 23
	137	167	138	95	158	292	175	74.93 19
	180	186	180	123	206	300	236	71.74 19
26.9	57.976	71.08	30.911	60.80	21.057	31.80	35.930	71.74 19
Nov. 5.9	58.195	69.05	31.129	59.33	21.310	28.80	36.225	68.73 23
	219	203	218	147	253	300	295	65.97 23
15.8	58.452	66.89	31.385	57.62	21.607	25.86	36.575	65.97 23
	257	216	256	171	297	294	400	63.57 19
25.8	58.740	64.66	31.671	55.73	21.942	23.05	36.975	63.57 19
	288	223	286	189	335	281	468	61.58 13
Dec. 5.8	59.054	62.41	31.982	53.69	22.308	20.46	37.415	61.58 13
	314	225	311	204	366	259	481	60.08 13
	329	219	325	214	387	231	480	59.13 13
15.8	59.383	60.22	32.307	51.55	22.695	18.15	37.883	59.13 13
	335	206	330	215	396	194	481	57.13 13
25.7	59.718	58.16	32.637	49.40	23.091	16.21	38.364	57.13 13
	330	157	325	209	394	153	480	55.13 13
35.7	60.048	56.29	32.962	47.31	23.485	14.68	38.844	55.13 13
Mean Place	55.777	89.68	28.561	76.59	18.943	60.49	34.690	102.43
Sec δ , Tan δ	1.035	+0.268	1.001	+0.038	1.274	+0.790	1.707	+1.383
$D_{\alpha\alpha}$, $D_{\alpha\delta}$	+0.06	+0.02	+0.06	0.00	+0.06	+0.05	+0.06	+0.09
$D_{\delta\delta}$, $D_{\delta\alpha}$	-0.4	+0.1	-0.4	+0.1	-0.4	+0.1	-0.4	0.0

APPARENT PLACES OF STARS, 1919.

413

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	π Virginis. Mag. 4.6		σ Virginis. Mag. 4.2		δ Centauri. Mag. 2.9		ϵ Corvi. Mag. 3.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 11 56	° ' + 7 3	h m 12 1	° ' + 9 10	h m 12 4	° ' -50 16	h m 12 5	° ' -22 10
	s "	"	s "	"	s "	"	s "	"
Jan. 0.7	44.575	46.92	6.233	46.59	10.796	9.36	58.699	9.99
10.7	44.897 ³²²	44.96 ¹⁹⁶	6.557 ³⁵⁴	44.66 ¹⁹³	11.238 ⁴⁴²	11.63 ²²⁷	59.037 ³³⁸	12.30 ²³¹
20.7	45.198 ³⁰¹	43.20 ¹⁷⁶	6.860 ³⁰³	42.97 ¹⁶⁹	11.650 ⁴¹²	14.27 ²⁶⁴	59.354 ³¹⁷	14.71 ²⁴¹
30.6	45.470 ²⁷²	41.71 ¹⁴⁹	7.136 ²⁷⁶	41.55 ¹⁴²	12.019 ³⁶⁹	17.18 ²⁹¹	59.642 ²⁸⁸	17.16 ²⁴⁵
Feb. 9.6	45.707 ²³⁷	40.50 ¹²¹	7.376 ²⁴⁰	40.43 ¹¹²	12.339 ³²⁰	20.31 ³¹³	59.893 ²⁵¹	19.57 ²⁴¹
	195	91	199	79	264	324	208	232
19.6	45.902	39.59	7.575	39.64	12.603	23.55	60.101	21.89
Mar. 1.6	46.054 ¹⁵²	39.00 ⁵⁹	7.731 ¹⁵⁶	39.16 ⁴⁸	12.810 ²⁰⁷	26.83 ³²⁸	60.267 ¹⁶⁶	24.06 ²¹⁷
11.5	46.162 ¹⁰⁸	38.70 ³⁰	7.844 ¹¹³	38.99 ¹⁷	12.958 ¹⁴⁸	30.07 ³²⁴	60.388 ¹²¹	26.06 ²⁰⁰
21.5	46.229 ⁶⁷	38.67 ³	7.915 ⁷¹	39.09 ¹⁰	13.048 ⁹⁰	33.21 ³¹⁴	60.468 ⁸⁰	27.85 ¹⁷⁹
31.5	46.258 ²⁹	38.88 ²¹	7.947 ³²	39.44 ³⁵	13.087 ²⁹⁶	36.17 ²⁹⁶	60.511 ⁴³	29.39 ¹⁵⁴
	4	40	0	53	11	275	7	132
Apr. 10.5	46.254	39.28	7.947	39.97	13.076	38.92	60.518	30.71
20.4	46.221 ³³	39.83 ⁵⁵	7.916 ³¹	40.65 ⁶⁸	13.022 ⁵⁴	41.39 ²⁴⁷	60.495 ²³	31.77 ¹⁰⁶
30.4	46.165 ⁸⁶	40.51 ⁶⁸	7.863 ⁵³	41.42 ⁷⁷	12.930 ⁹²	43.55 ²¹⁶	60.448 ⁴⁷	32.58 ⁸¹
May 10.4	46.090 ⁷⁵	41.24 ⁷³	7.789 ⁷⁴	42.25 ⁸³	12.804 ¹²⁶	45.37 ¹⁸²	60.379 ⁶⁹	33.15 ⁵⁷
20.3	46.002 ⁸⁸	42.01 ⁷⁷	7.701 ⁸⁸	43.10 ⁸⁵	12.649 ¹⁵⁵	46.81 ¹⁴⁴	60.294 ⁸⁵	33.46 ³¹
	98	77	97	83	177	103	99	8
30.3	45.904	42.78	7.604	43.93	12.472	47.84	60.195	33.54
June 9.3	45.800 ¹⁰⁴	43.53 ⁷⁵	7.500 ¹⁰⁴	44.73 ⁸⁰	12.277 ¹⁹⁵	48.47 ⁶³	60.087 ¹⁰⁸	33.38 ¹⁶
19.3	45.694 ¹⁰⁶	44.23 ⁷⁰	7.392 ¹⁰⁸	45.44 ⁷¹	12.068 ²⁰⁹	48.64 ¹⁷	59.970 ¹¹⁷	33.00 ³⁸
29.2	45.588 ¹⁰⁶	44.87 ⁶⁴	7.284 ¹⁰⁸	46.09 ⁶⁵	11.852 ²¹⁶	48.39 ²⁵	59.851 ¹¹⁹	32.41 ⁵⁹
July 9.2	45.485 ¹⁰³	45.43 ⁵⁶	7.178 ¹⁰⁶	46.63 ⁵⁴	11.635 ²¹⁷	47.71 ⁶⁸	59.732 ¹¹⁹	31.60 ⁸¹
	96	46	99	41	210	108	114	97
19.2	45.389	45.89	7.079	47.04	11.425	46.63	59.618	30.63
29.2	45.302 ⁸⁷	46.24 ³⁵	6.988 ⁹¹	47.32 ²⁸	11.227 ¹⁹⁸	45.18 ¹⁴⁵	59.510 ¹⁰⁸	29.51 ¹¹²
Aug. 8.1	45.228 ⁷⁴	46.44 ²⁰	6.909 ⁷⁹	47.45 ¹³	11.049 ¹⁷⁸	43.38 ¹⁸⁰	59.414 ⁹⁶	28.28 ¹²³
18.1	45.168 ⁶⁰	46.51 ⁷	6.847 ⁶²	47.42 ³	10.900 ¹⁴⁹	41.32 ²⁰⁶	59.336 ⁷⁸	27.00 ¹²⁸
28.1	45.130 ³⁸	46.40 ¹¹	6.804 ⁴³	47.20 ²²	10.788 ¹¹²	39.06 ²²⁶	59.279 ⁵⁷	25.69 ¹³¹
	12	31	17	41	68	239	29	127
Sept. 7.0	45.118	46.09	6.787	46.79	10.720	36.67	59.250	24.42
17.0	45.135 ¹⁷	45.59 ⁵⁰	6.799 ¹²	46.15 ⁶⁴	10.705 ¹⁵	34.25 ²⁴²	59.254 ⁴	23.26 ¹¹⁶
27.0	45.184 ⁴⁹	44.85 ⁷⁴	6.843 ⁴⁴	45.29 ⁸⁶	10.749 ⁴⁴	31.90 ²³⁵	59.296 ⁴²	22.25 ¹⁰¹
Oct. 7.0	45.271 ⁸⁷	43.88 ⁹⁷	6.925 ⁸²	44.19 ¹¹⁰	10.855 ¹⁰⁶	29.71 ²¹⁹	59.380 ⁸⁴	21.48 ⁷⁷
16.9	45.398 ¹²⁷	42.65 ¹²³	7.048 ¹²³	42.85 ¹³⁴	11.027 ¹⁷²	27.76 ¹⁹⁵	59.509 ¹²⁹	20.97 ⁵¹
	168	146	163	158	237	158	175	16
26.9	45.566	41.19	7.211	41.27	11.264	26.18	59.684	20.81
Nov. 5.9	45.774 ²⁰⁸	39.50 ¹⁶⁰	7.416 ²⁰⁵	39.48 ¹⁷⁹	11.562 ²⁹⁸	25.03 ¹¹⁵	59.905 ²²¹	21.01 ²⁰
15.9	46.021 ²⁴⁷	37.62 ¹⁸⁸	7.660 ²⁴⁴	37.52 ¹⁹⁶	11.917 ³⁵⁵	24.37 ⁶⁶	60.166 ²⁶¹	21.60 ⁵⁹
25.8	46.300 ²⁷⁹	35.58 ²⁰⁴	7.937 ²⁷⁷	35.41 ²¹¹	12.318 ⁴⁰¹	24.24 ¹³	60.463 ²⁹⁷	22.57 ⁹⁷
Dec. 5.8	46.606 ³⁰⁶	33.44 ²¹⁴	8.241 ³⁰⁴	33.24 ²¹⁷	12.752 ⁴³⁴	24.67 ⁴³	60.786 ³²³	23.91 ¹³⁴
	323	217	322	230	456	98	342	169
15.8	46.929	31.27	8.563	31.04	13.208	25.65	61.128	25.60
25.7	47.259 ³³⁰	29.14 ²¹³	8.893 ³³⁰	28.91 ²¹³	13.669 ⁴⁶¹	27.16 ¹⁵¹	61.477 ³⁴⁹	27.56 ¹⁹⁶
35.7	47.586 ³³⁷	27.10 ²⁰⁴	9.221 ³²⁸	26.90 ²⁰¹	14.120 ⁴⁵¹	29.14 ¹⁹⁸	61.821 ³⁴⁴	29.75 ²¹⁹
Mean Place	43.329	57.57	5.021	57.92	9.180	17.34	57.370	9.67
Sec δ , Tan δ	1.008	+0.124	1.013	+0.162	1.565	-1.203	1.080	-0.408
$D\alpha$, D_{α}	+0.06	+0.01	+0.06	+0.01	+0.06	-0.08	+0.06	-0.03
$D\delta$, D_{δ}	-0.4	0.0	-0.4	0.0	-0.4	0.0	-0.4	0.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	4 H. Draconis. Mag. 5.1		δ Crucis. Mag. 3.1		δ Ursæ Majoris. Mag. 3.4		γ Corvi. Mag. 2.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 12 8	° ' +78 3	h m 12 10	° ' -58 17	h m 12 11	° ' +57 28	h m 12 11	° ' -17 5
	s 12 8	" "	s 12 10	" "	s 12 11	" "	s 12 11	" "
Jan. 0.7	26.05	31.96	52.140	45.51	26.514	33.04	39.535	33.79
10.7	27.20 115	31.78 18	52.661 521	47.61 210	27.023 509	32.25 79	39.870 335	36.04 25
20.7	28.30 110	32.27 49	53.146 485	50.14 253	27.509 486	32.07 18	40.183 313	38.35 28
30.6	29.31 101	33.37 110	53.585 439	53.02 288	27.956 447	32.48 41	40.469 286	40.64 28
Feb. 9.6	30.20 89	35.06 169	53.967 382	56.18 316	28.351 395	33.48 100	40.718 249	42.66 22
	74	219	316	334	329	151	211	28
19.6	30.94	37.25	54.283	59.52	28.680	34.99	40.929	44.94
Mar. 1.6	31.49 55	39.86 261	54.533 250	62.96 344	28.937 257	36.95 196	41.097 168	46.66 18
11.5	31.85 36	42.75 289	54.713 180	66.42 346	29.115 178	39.25 230	41.223 126	48.57 17
21.5	32.01 16	45.83 306	54.828 115	69.82 340	29.215 100	41.81 256	41.308 85	50.06 16
31.5	31.97 4	48.94 311	54.878 50	73.09 327	29.240 25	44.50 269	41.356 48	51.31 15
	25	304	9	307	48	271	13	16
Apr. 10.5	31.72	51.98	54.869	76.16	29.192	47.21	41.369	52.33
20.4	31.32 40	54.83 265	54.805 64	78.99 283	29.082 110	49.83 362	41.353 16	53.10 7
30.4	30.76 56	57.39 256	54.692 113	81.51 252	28.917 165	52.28 245	41.313 40	53.66 3
May 10.4	30.06 70	59.56 217	54.536 156	83.68 217	28.708 209	54.46 218	41.252 61	54.00 3
20.3	29.26 80	61.29 173	54.343 193	85.46 178	28.462 246	56.30 184	41.173 79	54.12 1
	87	123	226	136	270	144	91	1
30.3	28.39	62.52	54.117	86.82	28.192	57.74	41.082	54.04
June 9.3	27.47 92	63.21 60	53.885 252	87.73 91	27.906 286	58.75 101	40.961 101	53.77 27
19.3	26.54 93	63.35 14	53.596 269	88.18 45	27.613 293	59.30 55	40.873 106	53.33 4
29.2	25.61 90	62.93 42	53.315 281	88.15 3	27.320 293	59.37 7	40.761 112	52.72 6
July 9.2	24.71 85	61.98 95	53.031 284	87.65 50	27.036 284	58.96 41	40.648 113	51.95 77
		149	280	96	269	88	110	8
19.2	23.86	60.49	52.751	86.69	26.767	58.08	40.538	51.06
29.2	23.10 76	58.53 196	52.486 265	85.31 138	26.521 246	56.76 132	40.434 104	50.07 8
Aug. 8.1	22.41 69	56.14 239	52.245 241	83.53 178	26.303 218	55.01 175	40.341 93	49.02 166
18.1	21.83 58	53.35 279	52.039 206	81.41 212	26.119 184	52.87 214	40.264 77	47.93 169
28.1	21.37 46	50.22 313	51.878 161	79.03 238	25.977 142	50.38 249	40.206 58	46.66 167
	32	339	105	257	97	279	31	164
Sept. 7.0	21.05	46.83	51.773	76.46	25.880	47.59	40.175	45.85
17.0	20.85 20	43.22 361	51.731 42	73.82 264	25.837 43	44.54 305	40.174 1	44.96 8
27.0	20.81 4	39.49 373	51.760 29	71.18 264	25.850 13	41.30 324	40.210 36	44.25 71
Oct. 7.0	20.94 13	35.70 379	51.868 108	68.67 251	25.925 75	37.91 339	40.286 76	43.75 3
16.9	21.22 28	31.94 376	52.055 187	66.38 229	26.067 142	34.45 346	40.406 130	43.54 2
	44	366	267	197	209	346	165	11
26.9	21.66	28.28	52.322	64.41	26.276	30.99	40.571	43.65
Nov. 5.9	22.27 61	24.83 345	52.665 343	62.88 153	26.552 276	27.61 338	40.780 209	44.06 4
15.9	23.02 75	21.66 317	53.073 408	61.83 105	26.892 340	24.40 321	41.029 249	44.68 8
25.8	23.90 88	18.86 280	53.538 465	61.34 49	27.291 399	21.45 295	41.314 285	46.08 113
Dec. 5.8	24.90 100	16.53 233	54.046 508	61.42 8	27.738 447	18.85 260	41.628 314	47.50 16
	110	180	532	67	485	219	333	177
15.8	26.00	14.73	54.578	62.09	28.223	16.66	41.961	49.27
25.7	27.14 114	13.53 120	55.118 540	63.34 125	28.730 507	14.98 168	42.301 340	51.26 18
35.7	28.30 116	12.97 56	55.649 531	65.11 177	29.242 512	13.85 113	42.638 337	53.43 27
Mean Place	25.338	58.69	50.417	55.45	25.585	57.47	38.269	31.84
Sec δ, Tan δ	4.834	+4.729	1.903	-1.619	1.860	+1.568	1.046	-0.307
D _ψ α, D _μ α	+0.06	+0.32	+0.06	-0.11	+0.06	+0.10	+0.06	-0.02
D _ψ δ, D _μ δ	-0.4	0.0	-0.4	0.0	-0.4	0.0	-0.4	-0.1

APPARENT PLACES OF STARS, 1919.

415

FOR THE UPPER TRANSIT AT WASHINGTON.

2 Canum Venat. Mag. 5.8		β Chamæleonis. Mag. 4.4		η Virginis. Mag. 4.0		α ¹ Crucis. Mag. 1.6	
Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
h m	° '	h m	° '	h m	° '	h m	° '
12 12	+41 5	12 13	-78 51	12 15	- 0 13	12 22	-62 38
s	"	s	"	s	"	s	"
5.399	78.20	36.74	31.79	46.868	8.19	6.55	50.35
5.793 ³⁹⁴	76.96	37.98 ¹²⁴	33.49 ¹⁷⁰	47.192 ³²⁴	10.27 ²⁰⁸	7.14 ⁵⁹	52.24 ¹⁸⁹
6.168 ³⁷⁵	76.23	39.14 ¹¹⁶	35.73 ²²⁴	47.499 ³⁰⁷	12.24 ¹⁹⁷	7.69 ⁵⁵	54.60 ²³⁶
6.512 ³⁴⁴	76.02	40.19 ¹⁰⁵	38.45 ²⁷²	47.780 ²⁸¹	14.02 ¹⁷⁸	8.20 ⁵¹	57.36 ²⁷⁶
6.816 ³⁰⁴	76.33	41.09 ⁹⁰	41.57 ³¹²	48.027 ²⁴⁷	15.57 ¹⁵⁵	8.65 ⁴⁵	60.45 ³⁰⁹
255	79	75	343	209	130	36	330
7.071	77.12	41.84	45.00	48.236	16.87	9.01	63.75
7.272 ²⁰¹	78.35	42.42 ⁵⁸	48.64 ³⁶⁴	48.405 ¹⁶⁹	17.89 ¹⁰²	9.32 ³¹	67.20 ³⁴⁵
7.417 ¹⁴⁵	79.95	42.82 ⁴⁰	52.41 ³⁷⁷	48.531 ¹²⁶	18.62 ⁷³	9.54 ²²	70.73 ³⁵³
7.505 ⁸⁸	81.82	43.06 ²⁴	56.22 ³⁸¹	48.618 ⁸⁷	19.10 ⁴⁸	9.69 ¹⁵	74.22 ³⁴⁹
7.541 ³⁶	83.88	43.13 ⁷	60.00 ³⁷⁸	48.668 ⁵⁰	19.32 ²²	9.77 ⁸	77.63 ³⁴¹
13	216	10	365	16	1	1	325
7.528	86.04	43.03	63.65	48.684	19.33	9.78	80.88
7.472 ⁵⁶	88.20	42.77 ²⁶	67.09 ³⁴⁴	48.671 ¹³	19.14 ¹⁹	9.72 ⁶	83.89 ³⁰¹
7.380 ⁹²	90.27	42.36 ⁴¹	70.27 ³¹⁸	48.634 ³⁷	18.81 ³³	9.61 ¹¹	86.64 ²⁷⁵
7.257 ¹²³	92.19	41.83 ⁵³	73.13 ²⁸⁶	48.577 ⁵⁷	18.36 ⁴⁵	9.44 ¹⁷	89.05 ²⁴¹
7.112 ¹⁴⁵	93.87	41.18 ⁶⁵	75.58 ²⁴⁵	48.503 ⁷⁴	17.81 ⁵⁵	9.23 ²¹	91.07 ²⁰²
162	141	76	201	85	61	26	161
6.950	95.28	40.42	77.59	48.418	17.20	8.97	92.68
6.777 ¹⁷³	96.36	39.58 ⁸⁴	79.11 ¹⁵²	48.323 ⁹⁵	16.55 ⁶⁵	8.68 ²⁹	93.84 ¹¹⁶
6.600 ¹⁷⁷	97.09	38.68 ⁹⁰	80.11 ¹⁰⁰	48.222 ¹⁰¹	15.87 ⁶⁸	8.37 ³¹	94.52 ⁶⁸
6.422 ¹⁷⁸	97.45	37.74 ⁹⁴	80.55 ⁴⁴	48.118 ¹⁰⁴	15.18 ⁶⁹	8.04 ³³	94.70 ¹⁸
6.250 ¹⁷²	97.45	36.79 ⁹⁵	80.45 ¹⁰	48.013 ¹⁰⁵	14.52 ⁶⁶	7.70 ³⁴	94.40 ³⁰
163	40	93	65	102	63	34	79
6.087	97.05	35.86	79.80	47.911	13.89	7.36	93.61
5.935 ¹⁵²	96.27	34.98 ⁸⁸	78.61 ¹¹⁹	47.815 ⁹⁶	13.31 ⁵⁸	7.04 ³²	92.35 ¹²⁶
5.801 ¹³⁴	95.13	34.17 ⁸¹	76.92 ¹⁶⁹	47.728 ⁸⁷	12.82 ⁴⁹	6.74 ³⁰	90.67 ¹⁶⁸
5.690 ¹¹¹	93.65	33.47 ⁷⁰	74.79 ²¹³	47.656 ⁷²	12.42 ⁴⁰	6.47 ²⁷	88.62 ²⁰⁵
5.604 ⁸⁶	91.86	32.91 ⁵⁶	72.28 ²⁵¹	47.602 ⁵⁴	12.16 ²⁶	6.26 ²¹	86.26 ²³⁶
53	211	40	279	30	11	15	259
5.551	89.75	32.51	69.49	47.572	12.05	6.11	83.67
5.534 ¹⁷	87.39	32.29 ²²	66.49 ³⁰⁰	47.570 ²	12.12 ⁷	6.03 ⁸	80.95 ²⁷²
5.559 ²⁵	84.79	32.27 ²	63.41 ³⁰⁸	47.602 ³²	12.41 ²⁹	6.05 ²	78.20 ²⁷⁵
5.630 ⁷¹	82.01	32.47 ²⁰	60.38 ³⁰³	47.670 ⁶⁸	12.94 ⁵³	6.14 ⁹	75.52 ²⁶⁸
5.749 ¹¹⁹	79.09	32.87 ⁴⁰	57.49 ²⁸⁹	47.780 ¹¹⁰	13.73 ⁷⁹	6.32 ¹⁸	73.04 ²⁴⁸
170	301	62	262	152	106	28	219
5.919	76.08	33.49	54.87	47.932	14.79	6.60	70.85
6.140 ²²¹	73.05	34.29 ⁸⁰	52.64 ²²³	48.126 ¹⁹⁴	16.10 ¹³¹	6.96 ³⁶	69.05 ¹⁸⁰
6.410 ²⁷⁰	70.08	35.27 ⁹⁸	50.88 ¹⁷⁶	48.359 ²³³	17.68 ¹⁵⁸	7.40 ⁴⁴	67.73 ¹³²
6.725 ³¹⁵	67.23	36.39 ¹¹²	49.68 ¹⁵⁰	48.629 ²⁷⁰	19.46 ¹⁷⁸	7.92 ⁵²	66.94 ⁷⁹
7.076 ³⁵¹	64.61	37.60 ¹²¹	49.08 ⁶⁰	48.927 ²⁹⁸	21.42 ¹⁹⁶	8.48 ⁵⁶	66.74 ²⁰
377	234	127	6	318	209	59	39
7.453	62.27	38.87	49.14	49.245	23.51	9.07	67.13
7.847 ³⁹⁴	60.32	40.16 ¹²⁹	49.82 ⁶⁸	49.572 ³²⁷	25.64 ²¹³	9.67 ⁶⁰	68.13 ¹⁰⁰
8.245 ³⁹⁸	58.80	41.43 ¹²⁷	51.14 ¹³²	49.899 ³²⁷	27.76 ²¹²	10.27 ⁶⁰	69.67 ¹⁵⁴
4.386	99.14	33.732	44.92	45.707	0.36	4.810	61.41
1.327	+0.873	5.178	-5.081	1.000	-0.004	2.177	-1.934
-0.06	+0.06	+0.07	-0.34	+0.06	0.00	+0.06	-0.13
0.4	-0.1	-0.4	-0.1	-0.4	-0.1	-0.4	-0.1

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	20 Comæ. Mag. 5.7		δ Corvi. Mag. 3.1		γ Crucis. Mag. 1.6		8 Canum Venat. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 12 25	° ' " +21 20	h m 12 25	° ' " -16 3	h m 12 26	° ' " -56 39	h m 12 29	° ' " +41 4
	s	"	s	"	s	"	s	"
Jan. 0.7	40.252 ³⁴¹	25.20 ¹⁷⁷	41.450 ³³⁶	54.66 ²¹⁹	41.199 ⁵¹⁴	24.64 ¹⁹³	54.890 ³⁶⁵	29.72 ¹³
10.7	40.593 ³²⁷	23.43 ¹⁴⁴	41.786 ³²⁰	56.85 ²²⁴	41.713 ⁴⁸⁴	26.57 ²³⁶	55.285 ³⁸³	28.34 ⁸
20.7	40.920 ³⁰¹	21.99 ¹⁰⁵	42.106 ²⁹²	59.09 ²²³	42.197 ⁴⁴³	28.93 ²⁷³	55.668 ³⁵⁵	27.48 ³
30.7	41.221 ²⁶⁸	20.94 ⁶⁵	42.398 ²⁵⁹	61.32 ²¹⁴	42.640 ³⁹¹	31.66 ³⁰²	56.023 ³¹⁸	27.16 ¹
Feb. 9.6	41.489 ²²⁹	20.29 ²³	42.657 ²²²	63.46 ²⁰²	43.031 ³³²	34.68 ³³⁰	56.341 ²⁷²	27.37 ⁷
19.6	41.718 ¹⁸⁸	20.06 ¹⁶	42.879 ¹⁸¹	65.48 ¹⁸⁵	43.363 ²⁷¹	37.88 ³³²	56.613 ²³⁰	28.10 ¹¹
Mar. 1.6	41.906 ¹⁴¹	20.22 ⁵¹	43.060 ¹⁴¹	67.33 ¹⁶³	43.634 ²⁰⁷	41.20 ³³⁶	56.833 ¹⁸⁶	29.29 ¹¹
11.6	42.047 ⁹⁸	20.73 ⁸²	43.201 ¹⁰⁰	68.96 ¹⁴²	43.841 ¹⁴²	44.56 ³³¹	56.999 ¹¹⁰	30.87 ¹¹
21.5	42.145 ⁵⁶	21.55 ¹⁰⁶	43.301 ⁶³	70.38 ¹¹⁸	43.983 ⁸³	47.87 ³²²	57.109 ⁵⁶	32.76 ²
31.5	42.201 ¹⁸	22.61 ¹²⁵	43.364 ²⁸	71.56 ⁹⁶	44.066 ²⁴	51.09 ³⁰³	57.165 ⁶	34.88 ²
Apr. 10.5	42.219 ¹⁵	23.86 ¹³⁶	43.392 ¹	72.52 ⁷³	44.090 ²⁹	54.12 ²⁸¹	57.171 ³⁸	37.12 ²
20.4	42.204 ⁴³	25.22 ¹⁴⁰	43.391 ²⁷	73.25 ⁵²	44.061 ²⁸	56.93 ²⁵⁴	57.133 ⁷⁸	39.39 ²
30.4	42.161 ⁶⁸	26.62 ¹⁴⁰	43.364 ⁴⁹	73.77 ⁸¹	43.983 ¹²²	59.47 ²²¹	57.055 ¹¹¹	41.60 ²
May 10.4	42.093 ⁸⁶	28.02 ¹³²	43.315 ⁶⁸	74.08 ¹⁰	43.861 ¹⁵⁹	61.68 ¹⁸⁵	56.944 ¹³⁶	43.66 ¹
20.4	42.007 ¹⁰¹	29.34 ¹²⁰	43.247 ⁸³	74.18 ⁷	43.702 ¹⁹³	63.53 ¹⁴⁵	56.808 ¹⁵⁷	45.51 ¹¹
30.3	41.906 ¹¹¹	30.54 ¹⁰⁶	43.164 ⁹⁴	74.11 ²⁶	43.509 ²²²	64.98 ¹⁰²	56.651 ¹⁷²	47.08 ¹¹
June 9.3	41.795 ¹¹⁹	31.60 ⁸⁸	43.070 ¹⁰⁴	73.85 ⁴²	43.287 ²⁴²	66.00 ⁵⁷	56.479 ¹⁸⁰	48.34 ¹
19.3	41.676 ¹²²	32.48 ⁶⁷	42.966 ¹¹⁰	73.43 ⁵⁷	43.045 ²⁶⁰	66.57 ¹²	56.299 ¹⁸⁵	49.25 ¹
29.3	41.554 ¹²³	33.15 ⁴⁵	42.856 ¹¹³	72.86 ⁷²	42.785 ²⁶⁷	66.69 ³⁶	56.114 ¹⁸⁴	49.78 ¹
July 9.2	41.431 ¹²¹	33.60 ²⁰	42.743 ¹¹³	72.14 ⁸²	42.518 ²⁶⁷	66.33 ⁷⁹	55.930 ¹⁷⁹	49.92 ¹
19.2	41.310 ¹¹³	33.80 ³	42.630 ¹⁰⁸	71.32 ⁹¹	42.251 ²⁵⁷	65.54 ¹²³	55.751 ¹⁶⁸	49.66 ¹
29.2	41.197 ¹⁰⁴	33.77 ²⁹	42.522 ¹⁰¹	70.41 ⁹⁸	41.994 ²⁴⁰	64.31 ¹⁶²	55.583 ¹⁵⁵	49.02 ¹¹
Aug. 8.1	41.093 ⁸⁹	33.48 ⁵⁴	42.421 ⁸⁷	69.43 ¹⁰⁰	41.754 ²¹¹	62.69 ¹⁹⁵	55.428 ¹³⁴	48.00 ¹
18.1	41.004 ⁷⁰	32.94 ⁸⁰	42.334 ⁶⁸	68.43 ⁹⁹	41.543 ¹⁷¹	60.74 ²²⁴	55.294 ¹⁰⁹	46.62 ¹
28.1	40.934 ⁴⁷	32.14 ¹⁰⁶	42.266 ⁴⁴	67.44 ⁹³	41.372 ¹²²	58.50 ²⁴³	55.185 ⁸⁰	44.83 ²
Sept. 7.1	40.887 ¹⁷	31.08 ¹³¹	42.222 ¹³	66.51 ⁸²	41.250 ⁶⁴	56.07 ²⁵⁵	55.105 ⁴⁵	42.83 ²
17.0	40.870 ¹⁷	29.77 ¹⁵⁶	42.209 ²²	65.69 ⁶⁴	41.186 ⁴	53.52 ²⁵⁶	55.060 ²	40.50 ²
27.0	40.887 ⁵⁵	28.21 ¹⁷⁹	42.231 ⁶¹	65.05 ⁴⁵	41.190 ⁷⁸	50.96 ²⁴⁹	55.058 ⁴³	37.90 ²
Oct. 7.0	40.942 ⁹⁷	26.42 ²⁰²	42.292 ¹⁰⁶	64.60 ¹⁶	41.268 ¹⁵⁶	48.47 ²²⁸	55.101 ⁹³	35.10 ²
17.0	41.039 ¹⁴⁰	24.40 ²²⁰	42.398 ¹⁵⁰	64.44 ¹³	41.424 ²³³	46.19 ¹⁹⁷	55.194 ¹⁴⁶	32.14 ²
26.9	41.179 ¹⁸⁶	22.20 ²³⁵	42.548 ¹⁹⁶	64.57 ⁴⁵	41.657 ³⁰⁸	44.22 ¹⁶⁹	55.340 ¹⁹⁸	29.06 ³
Nov. 5.9	41.365 ²²⁹	19.85 ²⁴⁶	42.744 ²³⁹	65.02 ⁸⁰	41.965 ³⁷⁷	42.63 ¹¹³	55.538 ²⁵⁰	25.95 ³
15.9	41.594 ²⁶⁸	17.39 ²⁵⁰	42.983 ²⁷⁵	65.82 ¹¹⁴	42.342 ⁴³³	41.50 ⁶⁰	55.788 ²⁹⁷	22.59 ²
25.8	41.862 ³⁰¹	14.89 ²³³	43.258 ³⁰⁶	66.96 ¹⁷³	42.775 ⁵¹⁰	40.90 ⁵³	56.085 ³⁶⁸	19.93 ²
Dec. 5.8	42.163 ³²⁴	12.42 ²¹⁹	43.564 ³³⁸	68.39 ²¹¹	43.255 ⁵¹³	40.86 ¹⁶¹	56.423 ³⁹⁷	17.17 ²
15.8	42.487 ³³⁹	10.04 ¹⁹⁵	43.891 ³³⁹	70.12 ¹⁹⁵	43.765 ⁵²²	41.39 ¹⁰⁹	56.791 ³⁸⁹	14.71 ²
25.8	42.826 ³⁴²	7.85 ¹⁹⁵	44.229 ³³⁹	72.07 ²¹¹	44.287 ⁵¹³	42.48 ¹⁶¹	57.180 ³⁹⁷	12.61 ²
35.7	43.168 ³⁴²	5.90 ¹⁹⁵	44.568 ³³⁹	74.18 ²¹¹	44.805 ⁵¹³	44.09 ¹⁶¹	57.577 ³⁹⁷	10.95 ¹
Mean Place	39.253	40.27	40.268	52.62	39.638	34.58	54.050	50.62
Sec δ, Tan δ	1.074	+0.391	1.041	-0.288	1.820	-1.520	1.341	+0.894
Dψa, Dωa	+0.06	+0.03	+0.06	-0.02	+0.07	-0.10	+0.06	+0.06
Dψδ, Dωδ	-0.4	-0.1	-0.4	-0.1	-0.4	-0.1	-0.4	-0.1

APPARENT PLACES OF STARS, 1919.

417

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	κ Draconis. Mag. 3.9		β Corvi. Mag. 2.8		24 Comae aeq. Mag. 5.2		α Muscae. Mag. 2.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 12 30	° ' +70 13	h m 12 30	° ' -22 56	h m 12 31	° ' +18 48	h m 12 32	° ' -68 41
Jan. 0.7	2.46	38.59	8.894	55.86	5.027	67.66	22.00	9.64
10.7	3.20 74	37.91 68	9.241 347	58.04 218	5.365 338	65.80 186	22.73 73	11.27 163
20.7	3.91 71	37.90 1	9.572 331	60.34 230	5.689 324	64.28 152	23.42 69	13.43 216
30.7	4.59 68	38.51 61	9.877 305	62.69 235	5.989 300	63.12 116	24.05 63	16.04 261
Feb. 9.6	5.20 61	39.75 124	10.148 271	65.04 235	6.258 260	62.35 77	24.61 56	19.02 268
19.6	5.72 52	41.53 178	10.381 233	67.31 227	6.490 232	61.98 37	25.09 48	22.28 326
Mar. 1.6	6.14 42	43.79 226	10.572 191	69.46 215	6.679 189	61.98 0	25.49 40	25.75 347
11.6	6.44 30	46.42 263	10.721 149	71.45 199	6.824 145	62.34 36	25.78 29	29.32 357
21.5	6.61 17	49.30 288	10.829 108	73.26 181	6.927 103	63.02 68	25.99 21	32.93 361
31.5	6.67 6	52.32 302	10.899 70	74.84 158	6.989 62	63.94 92	26.10 11	36.49 356
Apr. 10.5	6.61 18	55.35 293	10.933 4	76.20 112	7.014 8	65.07 124	26.14 6	39.92 326
20.4	6.43 27	58.28 272	10.937 24	77.32 90	7.006 36	66.31 131	26.08 14	43.18 299
30.4	6.16 35	61.00 241	10.913 48	78.22 65	6.970 59	67.62 132	25.94 20	46.17 267
May 10.4	5.81 42	63.41 203	10.865 84	78.87 42	6.911 80	68.94 128	25.74 27	48.84 233
20.4	5.39 47	65.44 159	10.797 18	79.29 18	6.831 94	70.22 117	25.47 32	51.17 189
30.3	4.92 51	67.03 110	10.713 99	79.47 3	6.737 106	71.39 105	25.15 38	53.06 144
June 9.3	4.41 53	68.13 58	10.614 109	79.44 27	6.631 113	72.44 90	24.77 41	54.50 96
19.3	3.88 54	68.71 5	10.505 118	79.17 47	6.518 120	73.34 70	24.36 43	55.46 44
29.3	3.34 53	68.76 49	10.387 121	78.70 68	6.398 120	74.04 51	23.93 46	55.90 7
July 9.2	2.81 50	68.27 101	10.266 122	78.02 86	6.278 117	74.55 29	23.47 45	55.83 59
19.2	2.31 48	67.26 150	10.144 118	77.16 101	6.161 115	74.84 7	23.02 44	55.24 109
29.2	1.83 44	65.76 196	10.026 111	76.15 114	6.046 105	74.91 18	22.58 42	54.15 156
Aug. 8.1	1.39 38	63.80 239	9.915 97	75.01 122	5.941 91	74.73 40	22.16 36	52.59 197
18.1	1.01 32	61.41 276	9.818 77	73.79 126	5.850 72	74.33 67	21.80 31	50.62 233
28.1	0.69 23	58.65 310	9.741 53	72.53 125	5.778 51	73.66 90	21.49 23	48.29 262
Sept. 7.1	0.46 17	55.55 335	9.668 20	71.28 117	5.727 21	72.76 117	21.26 12	45.67 280
17.0	0.29 7	52.20 356	9.668 17	70.11 104	5.706 12	71.59 140	21.14 4	42.87 288
27.0	0.22 2	48.64 389	9.635 60	69.07 85	5.718 48	70.19 165	21.10 8	39.99 286
Oct. 7.0	0.24 12	44.95 374	9.745 105	68.22 59	5.766 91	68.54 187	21.18 19	37.13 272
17.0	0.36 24	41.21 372	9.850 152	67.63 28	5.857 135	66.67 209	21.37 31	34.41 245
26.9	0.60 33	37.49 353	10.002 200	67.35 6	5.992 180	64.58 224	21.68 43	31.96 210
Nov. 5.9	0.93 44	33.91 339	10.202 245	67.41 42	6.172 223	62.34 237	22.11 54	29.86 163
15.9	1.37 53	30.52 308	10.447 283	67.83 81	6.395 262	59.97 243	22.65 59	28.23 112
25.8	1.90 61	27.44 270	10.730 316	68.64 117	6.657 295	57.54 244	23.24 67	27.11 54
Dec. 5.8	2.51 69	24.74 221	11.046 338	69.81 152	6.952 319	55.10 237	23.91 72	26.57 8
15.8	3.20 72	22.53 167	11.384 350	71.33 180	7.271 334	52.73 223	24.63 73	26.65 69
25.8	3.92 74	20.86 105	11.734 349	73.13 205	7.605 339	50.50 199	25.36 74	27.34 127
35.7	4.66	19.81	12.083	75.18	7.944	48.51	26.10	28.61
Mean Place	2.077	64.53	7.697	56.27	4.052	81.81	20.162	21.93
Sec δ , Tan δ	2.956	+2.782	1.086	-0.424	1.057	+0.341	2.752	-2.564
$\Delta\alpha$, $\Delta\delta$	+0.06	+0.18	+0.06	-0.03	+0.06	+0.02	+0.07	-0.17
$\Delta\alpha$, $\Delta\delta$	-0.4	-0.1	-0.4	-0.1	-0.4	-0.1	-0.4	-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	χ Virginis. Mag. 4.8		γ Centauri. Mag. 2.4		γ Virginis (mean). Mag. 2.9		ρ Virginis. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 12 35	° ' " - 7 33	h m 12 37	° ' " -48 30	h m 12 37	° ' " - 1 0	h m 12 37	° ' " +10 4
	s	"	s	"	s	"	s	"
Jan. 0.7	4.908	4.90	3.909	46.44	34.405	26.33	48.096	42.86
10.7	5.239 ³³¹	7.03 ²¹³	4.355 ⁴⁴⁶	48.37 ¹⁹³	34.732 ³²⁷	28.41 ²⁰⁸	48.427 ³³¹	40.87 ¹
20.7	5.554 ³¹⁵	9.10 ²⁰⁷	4.782 ⁴²⁷	50.66 ²²⁹	35.045 ³¹³	30.39 ¹⁹⁸	48.746 ³¹⁹	39.12 ¹
30.7	5.846 ²⁹²	11.09 ¹⁹⁹	5.174 ³⁹²	53.27 ²⁶¹	35.336 ²⁹¹	32.20 ¹⁸¹	49.042 ²⁹⁶	37.65 ¹
Feb. 9.6	6.108 ²⁶²	12.93 ¹⁸⁴	5.525 ³⁵¹	56.10 ²⁸³	35.597 ²⁶¹	33.78 ¹⁵⁸	49.307 ²⁶⁵	36.52 ¹
	225	162	302	298	225	134	231	
19.6	6.333	14.55	5.827	59.08	35.822	35.12	49.538	35.73
Mar. 1.6	6.521 ¹⁸⁸	15.95 ¹⁴⁰	6.078 ²⁵¹	62.14 ³⁰⁶	36.010 ¹⁸⁸	36.18 ¹⁰⁶	49.728 ¹⁹⁰	35.28
11.6	6.667 ¹⁴⁶	17.10 ¹¹⁵	6.274 ¹⁹⁶	65.19 ³⁰⁵	36.157 ¹⁴⁷	36.95 ⁷⁷	49.877 ¹⁴⁹	35.17
21.5	6.775 ¹⁰⁸	18.01 ⁹¹	6.418 ¹⁴⁴	68.18 ²⁹⁹	36.265 ¹⁰⁸	37.47 ⁵²	49.986 ¹⁰⁹	35.36
31.5	6.846 ⁷¹	18.67 ⁶⁶	6.509 ⁹¹	71.06 ²⁸⁸	36.336 ⁷¹	37.72 ²⁵	50.057 ⁷¹	35.81
	38	44	46	270	38	4	35	
Apr. 10.5	6.884	19.11	6.555	73.76	36.374	37.76	50.092	36.48
20.4	6.891 ⁷	19.33	6.556 ¹	76.23 ²⁴⁷	36.381 ⁷	37.59 ¹⁷	50.096 ⁴	37.30
30.4	6.872 ¹⁹	19.37 ⁴	6.515 ⁴¹	78.44 ²²¹	36.362 ¹⁹	37.28 ³¹	50.072 ²⁴	38.23
May 10.4	6.831 ⁴¹	19.25 ¹²	6.439 ⁷⁶	80.36 ¹⁹²	36.321 ⁴¹	36.83 ⁴⁵	50.026 ⁴⁶	39.23 ¹
20.4	6.772 ⁵⁹	18.99 ²⁶	6.330 ¹⁰⁹	81.93 ¹⁵⁷	36.262 ⁵⁹	36.29 ⁵⁴	49.960 ⁶⁶	40.24 ¹
	75	38	137	122	76	62	81	
30.3	6.697	18.61	6.193	83.15	36.186	35.67	49.879	41.23
June 9.3	6.611 ⁸⁶	18.13 ⁴⁸	6.031 ¹⁶²	83.99 ⁸⁴	36.099 ⁸⁷	35.01 ⁶⁶	49.786 ⁹³	42.16
19.3	6.515 ⁹⁶	17.56 ⁵⁷	5.850 ¹⁸¹	84.44 ⁴⁵	36.003 ⁹⁶	34.33 ⁶⁸	49.684 ¹⁰²	43.01
29.3	6.412 ¹⁰³	16.93 ⁶³	5.655 ¹⁹⁵	84.47 ³	35.899 ¹⁰⁴	33.64 ⁶⁹	49.576 ¹⁰⁸	43.74
July 9.2	6.304 ¹⁰⁸	16.22 ⁷¹	5.450 ²⁰⁵	84.08 ³⁹	35.793 ¹⁰⁶	32.97 ⁶⁷	49.465 ¹¹¹	44.35
	108	71	208	77	108	64	112	
19.2	6.196	15.51	5.242	83.31	35.685	32.33	49.353	44.82
29.2	6.090 ¹⁰⁶	14.78 ⁷³	5.040 ²⁰²	82.16 ¹¹⁵	35.579 ¹⁰⁶	31.74 ⁸⁹	49.245 ¹⁰⁸	45.12
Aug. 8.1	5.991 ⁹⁹	14.08 ⁷⁰	4.848 ¹⁹²	80.69 ¹⁴⁷	35.480 ⁹⁹	31.22 ⁸²	49.143 ¹⁰²	45.26
18.1	5.904 ⁸⁷	13.40 ⁶⁸	4.677 ¹⁷¹	78.90 ¹⁷⁹	35.392 ⁸⁸	30.80 ⁴²	49.053 ⁹⁰	45.21
28.1	5.833 ⁷¹	12.80 ⁶⁰	4.534 ¹⁴³	76.89 ²⁰¹	35.320 ⁷²	30.50 ³⁰	48.981 ⁷²	44.95
	49	49	104	219	51	15	53	
Sept. 7.1	5.784	12.31	4.430	74.70	35.269	30.35	48.928	44.48
17.0	5.764 ²⁰	11.97 ³⁴	4.373 ⁵⁷	72.43 ²²⁷	35.245 ²⁴	30.38 ³	48.903 ²⁵	43.78
27.0	5.776 ¹²	11.82 ¹⁵	4.371 ²	70.17 ²²⁶	35.254 ⁹	30.62 ²⁴	48.911 ⁸	42.86
Oct. 7.0	5.827 ⁵¹	11.88 ⁶	4.427 ⁵⁶	68.02 ²¹⁵	35.299 ⁴⁵	31.08 ⁴⁶	48.954 ⁴³	41.68 ¹
17.0	5.918 ⁹¹	12.21 ³³	4.549 ¹²²	66.05 ¹⁹⁷	35.386 ⁸⁷	31.80 ⁷²	49.039 ⁸⁵	40.27 ¹
	137	60	188	167	130	97	128	1
26.9	6.055	12.81	4.737	64.38	35.516	32.77	49.167	38.62
Nov. 5.9	6.236 ¹⁸¹	13.70 ⁸⁹	4.989 ²⁵²	63.07 ¹³¹	35.690 ¹⁷⁴	34.02 ¹²⁵	49.340 ¹⁷³	36.75 ¹
15.9	6.459 ²²³	14.89 ¹¹⁹	5.301 ³¹²	62.21 ⁸⁶	35.907 ²¹⁷	35.52 ¹⁵⁰	49.555 ²¹⁵	34.70 ²
25.8	6.721 ²⁶²	16.34 ¹⁴⁵	5.665 ³⁶⁴	61.82 ³⁹	36.162 ²⁵⁵	37.25 ¹⁷³	49.809 ²⁵⁴	32.53 ²
Dec. 5.8	7.013 ²⁹²	18.04 ¹⁷⁰	6.072 ⁴⁰⁷	61.95 ¹³	36.448 ²⁸⁶	39.15 ¹⁹⁰	50.095 ²⁸⁶	30.27 ²
	316	189	434	66	311	204	312	2
15.8	7.329	19.93	6.506	62.61	36.759	41.19	50.407	28.00
25.8	7.657 ³²⁸	21.96 ²⁰³	6.956 ⁴⁵⁰	63.78 ¹¹⁷	37.083 ³²⁴	43.30 ²¹¹	50.733 ³²⁶	25.78 ²
35.7	7.989 ³³²	24.07 ²¹¹	7.406 ⁴⁶⁰	65.42 ¹⁶⁴	37.410 ³²⁷	45.41 ²¹¹	51.064 ³³¹	23.71 ²
Mean Place	3.824	0.02	2.544	54.69	33.369	19.17	47.123	54.12
Sec δ , Tan δ	1.009	-0.133	1.510	-1.131	1.000	-0.018	1.018	+0.189
$D\mu\alpha$, $D\omega\alpha$	+0.06	-0.01	+0.07	-0.07	+0.06	0.00	+0.06	+0.01
$D\mu\delta$, $D\omega\delta$	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2

APPARENT PLACES OF STARS, 1919.

419

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	76 Ursæ Majoris. Mag. 5.9		β Crucis. Mag. 1.5		31 Comæ. Mag. 5.1		η Centauri. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 12 38	° ' +63 8	h m 12 42	° ' -59 14	h m 12 47	° ' +27 58	h m 12 48	° ' -39 44
	s 12 38	" "	s 12 42	" "	s 12 47	" "	s 12 48	" "
Jan. 0.8	2.35	62.37	60.088	35.76	46.050	35.54	57.892	12.95
10.7	2.93 58	61.40 97	60.641 553	37.44 168	46.403 353	33.75 179	58.294 402	14.86 191
20.7	3.50 57	61.07 33	61.168 527	39.59 215	46.747 344	32.35 140	58.682 388	17.07 221
30.7	4.04 54	61.38 31	61.658 490	42.13 254	47.071 324	31.41 94	59.042 360	19.51 244
Feb. 9.6	4.52 48	62.31 93	62.097 439	44.98 285	47.364 293	30.93 48	59.368 326	22.13 262
	42	149	381	311	256	2	284	270
19.6	4.94	63.80	62.478	48.09	47.620	30.91	59.652	24.83
Mar. 1.6	5.29 35	65.79 199	62.795 317	51.34 325	47.833 213	31.34 43	59.891 239	27.56 273
	24	238	251	333	169	83	193	268
11.6	5.53 16	68.17 268	63.046 184	54.67 334	48.002 123	32.17 117	60.084 147	30.24 259
21.5	5.69 8	70.85 286	63.230 120	58.01 327	48.125 79	33.34 143	60.231 103	32.83 245
31.5	5.77 2	73.71 292	63.350 58	61.28 314	48.204 39	34.77 163	60.334 61	35.28 228
Apr. 10.5	5.75 9	76.63 287	63.408 2	64.42 293	48.243 2	36.40 174	60.395 23	37.56 205
20.5	5.66 16	79.50 272	63.406 55	67.35 269	48.245 32	38.14 178	60.418 12	39.61 182
30.4	5.50 24	82.22 245	63.351 106	70.04 240	48.213 59	39.92 174	60.406 41	41.43 153
May 10.4	5.26 28	84.67 212	63.245 152	72.44 205	48.154 84	41.66 164	60.365 73	42.96 125
20.4	4.98 32	86.79 173	63.093 191	74.49 167	48.070 101	43.30 149	60.292 96	44.21 95
30.3	4.66 35	88.52 127	62.902 228	76.16 124	47.969 118	44.79 120	60.196 119	45.16 62
June 9.3	4.31 37	89.79 79	62.674 256	77.40 81	47.851 128	46.08 104	60.077 137	45.78 28
19.3	3.94 37	90.58 30	62.418 278	78.21 34	47.723 135	47.12 78	59.940 151	46.06 5
29.3	3.57 38	90.88 24	62.140 291	78.55 14	47.588 140	47.90 50	59.789 163	46.01 40
July 9.2	3.19 36	90.64 72	61.849 297	78.41 59	47.448 140	48.40 19	59.626 167	45.61 73
19.2	2.83 35	89.92 121	61.552 293	77.82 105	47.308 137	48.59 11	59.459 165	44.88 102
29.2	2.48 31	88.71 168	61.259 277	76.77 147	47.171 129	48.48 41	59.294 159	43.86 131
Aug. 8.2	2.17 29	87.03 210	60.982 249	75.30 184	47.042 115	48.07 73	59.135 146	42.55 155
18.1	1.88 22	84.93 250	60.733 210	73.46 215	46.927 98	47.34 104	58.989 122	41.00 172
28.1	1.66 19	82.43 283	60.523 161	71.31 240	46.829 75	46.30 132	58.867 94	39.28 185
Sept. 7.1	1.47 13	79.60 314	60.362 98	68.91 257	46.754 47	44.98 162	58.773 55	37.43 190
17.0	1.34 6	76.46 336	60.264 28	66.34 262	46.707 12	43.36 188	58.718 10	35.53 187
27.0	1.28 1	73.10 354	60.236 51	63.72 257	46.695 27	41.48 214	58.708 40	33.66 176
Oct. 7.0	1.29 9	69.56 363	60.287 134	61.15 243	46.722 70	39.34 254	58.748 97	31.90 155
17.0	1.38 17	65.93 365	60.421 219	58.72 217	46.792 117	37.00 254	58.845 155	30.35 129
26.9	1.55 27	62.28 358	60.640 300	56.55 181	46.909 166	34.46 266	59.000 212	29.06 93
Nov. 5.9	1.82 33	58.70 343	60.940 378	54.74 139	47.075 212	31.80 274	59.212 266	28.13 55
15.9	2.15 41	55.27 317	61.318 444	53.35 88	47.287 256	29.06 275	59.478 315	27.58 9
25.9	2.56 47	52.10 285	61.762 497	52.47 34	47.543 294	26.31 268	59.793 354	27.49 36
Dec. 5.8	3.03 52	49.25 240	62.259 534	52.13 23	47.837 323	23.63 253	60.147 383	27.85 82
15.8	3.55 57	46.85 189	62.793 554	52.36 80	48.160 344	21.10 231	60.530 400	28.67 129
25.8	4.12 58	44.96 134	63.347 556	53.16 135	48.504 353	18.79 200	60.930 404	29.96 167
35.7	4.70	43.62	63.903	54.51	48.857	16.79	61.334	31.63
Mean Place	1.913	87.31	58.614	46.59	45.254	52.25	56.689	19.02
Sec δ , Tan δ	2.214	+1.975	1.956	-1.680	1.132	+0.531	1.301	-0.831
$D\psi\alpha$, $D\omega\alpha$	+0.05	+0.13	+0.07	-0.11	+0.06	+0.03	+0.07	-0.05
$D\psi\delta$, $D\omega\delta$	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Ursa Majoris. (Aloth.) Mag. 1.7		δ Virginia. Mag. 3.7		ε Cap. Veni. seq. Mag. 2.9		ζ Muscae. Mag. 3.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 12 50	° ' " +56 23	h m 12 51	° ' " + 3 49	h m 12 52	° ' " +33 44	h m 12 56	° ' " -71 6
Jan. 0.8	28.645	33.70	32.277	65.99	15.139	60.34	42.04	51.95
10.7	29.140	32.43	32.605	63.94	15.523	58.72	42.36	52.29
20.7	29.627	31.77	32.923	62.04	15.909	57.57	42.66	52.66
30.7	30.088	31.72	33.230	60.37	16.293	56.94	44.40	53.36
Feb. 9.6	30.510	32.30	33.490	58.94	16.577	56.36	45.09	53.96
19.6	30.879	33.44	33.727	57.82	16.860	57.30	45.66	54.39
Mar. 1.6	31.185	35.10	33.926	57.01	17.097	58.22	46.19	54.86
11.6	31.421	37.20	34.086	56.50	17.283	59.37	46.56	55.30
21.5	31.586	39.62	34.207	56.29	17.419	61.27	46.91	55.86
31.5	31.677	42.29	34.291	56.33	17.504	63.24	47.12	56.36
Apr. 10.5	31.698	45.06	34.343	56.61	17.541	65.39	47.22	56.81
20.5	31.654	47.35	34.362	57.06	17.535	67.61	47.34	57.32
30.4	31.552	50.53	34.354	57.66	17.491	69.83	47.16	57.82
May 10.4	31.398	53.01	34.323	58.38	17.412	71.94	47.00	58.32
20.4	31.201	55.22	34.271	59.16	17.304	73.90	46.75	58.82
30.3	30.971	57.09	34.202	59.96	17.175	75.61	46.44	59.32
June 9.3	30.713	58.55	34.119	60.77	17.027	77.06	46.06	59.82
19.3	30.437	59.57	34.025	61.55	16.864	78.17	45.63	60.32
29.3	30.150	60.12	33.922	62.29	16.694	78.94	45.13	60.82
July 9.2	29.860	60.19	33.813	62.96	16.519	79.33	44.62	61.32
19.2	29.575	59.79	33.701	63.55	16.345	79.35	44.10	61.82
29.2	29.299	58.90	33.589	64.04	16.175	78.98	43.59	62.32
Aug. 8.2	29.043	57.56	33.482	64.42	16.015	78.22	43.10	62.82
18.1	28.811	55.79	33.385	64.65	15.869	77.10	42.64	63.32
28.1	28.611	53.62	33.301	64.73	15.744	75.62	42.24	63.82
Sept. 7.1	28.450	51.08	33.239	64.64	15.644	73.81	41.92	64.32
17.0	28.335	48.24	33.202	64.34	15.577	71.69	41.70	64.82
27.0	28.274	45.11	33.195	63.83	15.548	69.29	41.59	65.32
Oct. 7.0	28.272	41.79	33.226	63.08	15.563	66.63	41.61	65.82
17.0	28.334	38.31	33.298	62.07	15.625	63.79	41.76	66.32
26.9	28.466	34.77	33.413	60.83	15.739	60.79	42.03	66.82
Nov. 5.9	28.666	31.24	33.573	59.35	15.906	57.71	42.44	67.32
15.9	28.936	27.80	33.777	57.62	16.125	54.62	42.97	67.82
25.9	29.270	24.54	34.021	55.72	16.393	51.60	43.60	68.32
Dec. 5.8	29.663	21.58	34.298	53.67	16.704	48.73	44.32	68.82
15.8	30.102	18.98	34.602	51.52	17.049	46.10	45.10	69.32
25.8	30.574	16.84	34.922	49.36	17.418	43.78	45.91	69.82
35.7	31.066	15.21	35.249	47.25	17.799	41.87	46.74	70.32
Mean Place	28.231	57.31	31.350	74.59	14.477	80.03	40.410	44.10
Sec δ, Tan δ	1.806	+1.505	1.002	+0.067	1.282	+0.803	3.090	-2.923
D _{pa} , D _{wa}	+0.05	+0.10	+0.06	0.00	+0.06	+0.05	+0.08	-0.19
D _{pd} , D _{wd}	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2

APPARENT PLACES OF STARS, 1919.

421

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Virginis. Mag. 3.0			θ Virginis. Mag. 4.4			43 Comæ. Mag. 4.3			20 Canum Venat. Mag. 4.7		
	Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.	
	h m 12 58	° ' 30 +11 23		h m 13 5	° ' 30 - 5 6		h m 13 8	° ' 30 +28 16		h m 13 13	° ' 30 +40 59	
Jan. 0.8	9.527	28.09		46.136	29.92		6.364	62.18		55.275	36.00	
10.7	9.858 331	26.08 201		46.468 332	31.97 205		6.714 350	60.27 191		55.665 390	34.21 179	
20.7	10.181 323	24.29 179		46.791 323	33.98 201		7.060 346	58.79 148		56.051 386	32.92 129	
30.7	10.484 303	22.81 148		47.095 304	35.86 188		7.390 330	57.76 103		56.422 371	32.18 74	
Feb. 9.7	10.762 278	21.66 115		47.375 280	37.56 170		7.692 302	57.20 56		56.766 344	31.99 19	
	244	79		247	150		269	8		307	37	
19.6	11.006	20.87 45		47.622	39.06		7.961	57.12		57.073	32.36	
Mar. 1.6	11.213 207	20.42 8		47.834 212	40.30 124		8.191 230	57.51 39		57.337 264	33.25 89	
11.6	11.381 168	20.34 8		48.009 175	41.29 99		8.379 188	58.31 80		57.553 216	34.60 135	
21.6	11.509 128	20.57 23		48.148 139	42.01 72		8.522 143	59.49 118		57.717 164	36.34 174	
31.5	11.600 91	21.07 50		48.249 101	42.50 49		8.622 100	60.95 146		57.830 113	38.39 205	
	55	74		68	25		59	170		64	226	
Apr. 10.5	11.655 22	21.81 90		48.317 39	42.75 5		8.681 21	62.65 183		57.894 18	40.65 236	
20.5	11.677 5	22.71 102		48.356 9	42.80 12		8.702 14	64.48 189		57.912 25	43.01 238	
30.4	11.672 31	23.73 109		48.365 15	42.68 28		8.688 42	66.37 187		57.887 63	45.39 232	
May 10.4	11.641 52	24.82 111		48.350 36	42.40 39		8.646 70	68.24 180		57.824 95	47.71 215	
20.4	11.589 71	25.93 108		48.314 55	42.01 48		8.576 91	70.04 164		57.729 123	49.86 194	
30.4	11.518 86	27.01 103		48.259 73	41.53 56		8.485 111	71.68 146		57.606 145	51.80 164	
June 9.3	11.432 97	28.04 93		48.186 86	40.97 62		8.374 124	73.14 121		57.461 164	53.44 132	
19.3	11.335 108	28.97 82		48.100 97	40.35 64		8.250 136	74.35 96		57.297 177	54.76 96	
29.3	11.227 114	29.79 67		48.003 106	39.71 67		8.114 143	75.31 66		57.120 185	55.72 57	
July 9.3	11.113 118	30.46 52		47.897 112	39.04 67		7.971 148	75.97 36		56.935 190	56.29 17	
19.2	10.995 116	30.98 35		47.785 115	38.37 65		7.823 147	76.33 4		56.745 189	56.46 25	
29.2	10.879 114	31.33 15		47.670 112	37.72 61		7.676 143	76.37 28		56.556 184	56.21 64	
Aug. 8.2	10.765 104	31.48 3		47.558 105	37.11 55		7.533 133	76.09 61		56.372 172	55.57 105	
18.1	10.661 91	31.45 25		47.453 93	36.56 47		7.400 118	75.48 92		56.200 153	54.52 141	
28.1	10.570 71	31.20 46		47.360 73	36.09 85		7.282 98	74.56 124		56.047 123	53.11 179	
Sept. 7.1	10.499 46	30.74 71		47.287 49	35.74 19		7.184 71	73.32 154		55.918 100	51.32 213	
17.1	10.453 14	30.03 94		47.238 18	35.55 2		7.113 37	71.78 182		55.818 61	49.19 242	
27.0	10.439 22	29.09 119		47.220 20	35.53 20		7.076 1	69.96 209		55.757 18	46.77 271	
Oct. 7.0	10.461 63	27.90 143		47.240 61	35.73 43		7.077 93	67.87 232		55.739 31	44.06 291	
17.0	10.524 107	26.47 168		47.301 105	36.16 70		7.121 93	65.55 252		55.770 85	41.15 310	
26.9	10.631 153	24.79 188		47.406 151	36.86 96		7.214 142	63.03 268		55.855 141	38.05 318	
Nov. 5.9	10.784 197	22.91 208		47.557 197	37.82 124		7.356 190	60.35 276		55.996 195	34.87 322	
15.9	10.981 237	20.83 221		47.754 237	39.06 147		7.546 235	57.59 280		56.191 249	31.65 317	
25.9	11.218 274	18.62 229		47.991 274	40.53 171		7.781 277	54.79 274		56.440 296	28.48 302	
Dec. 5.8	11.492 302	16.33 231		48.265 302	42.24 188		8.058 311	52.05 261		56.736 336	25.46 279	
15.8	11.794 321	14.02 225		48.567 320	44.12 199		8.369 334	49.44 239		57.072 366	22.67 247	
25.8	12.115 328	11.77 213		48.887 329	46.11 205		8.703 347	47.05 211		57.438 384	20.20 207	
35.8	12.443	9.64		49.216	48.16		9.050	44.94		57.822	18.13	
Mean Place	8.687	39.18		45.242	24.79		5.723	78.47		54.838	55.61	
Sec δ, Tan δ	1.020	+0.201		1.004	-0.089		1.136	+0.538		1.325	+0.869	
D _ψ a, D _ω a	+0.06	+0.01		+0.06	-0.01		+0.06	+0.03		+0.05	+0.06	
D _ψ δ, D _ω δ	-0.4	-0.3		-0.4	-0.3		-0.4	-0.3		-0.4	-0.3	

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Hydræ. Mag. 3.3		ϵ Centauri. Mag. 2.9		ζ^1 Ursæ Majoris. (Mizar.) Mag. 2.4		α Virginis. (Spica.) Mag. 1.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 13 14	° ' " -22 44	h m 13 16	° ' " -36 17	h m 13 20	° ' " +55 20	h m 13 20	° ' " -10 44
Jan. 0.8	31.794	39.14	3.200	2.02	40.146	30.52	56.245	22.70
10.7	32.149 ³⁵⁵	41.03 ¹⁸⁰	3.593 ³⁶³	3.71 ¹⁶⁰	40.622 ⁴⁷⁶	28.89 ¹⁶³	56.581 ³³⁶	24.68 ¹⁹⁸
20.7	32.494 ³⁴⁵	43.07 ²⁰⁴	3.976 ³⁸³	5.68 ¹⁹⁷	41.101 ⁴⁷⁹	27.85 ¹⁰⁴	56.911 ³³⁰	26.68 ²⁰⁰
30.7	32.821 ³²⁷	45.19 ²¹²	4.340 ³⁶⁴	7.89 ²²¹	41.565 ⁴⁶⁴	27.44 ⁴¹	57.224 ³¹³	28.62 ¹⁹⁴
Feb. 9.7	33.122 ³⁰¹	47.32 ²¹³	4.674 ³³⁴	10.23 ²³⁴	41.999 ⁴³⁴	27.66 ²²	57.515 ³⁰¹	30.45 ¹⁸³
19.6	33.391 ²⁶⁹	49.39 ²⁰⁷	4.973 ²⁹⁹	12.66 ²⁴³	42.389 ³⁹⁰	28.49 ⁸³	57.775 ²⁸⁰	32.11 ¹⁶⁸
Mar. 1.6	33.626 ²³⁵	51.38 ¹⁹⁹	5.232 ²⁵⁹	15.11 ²⁴⁵	42.726 ³³⁷	29.88 ¹³⁹	58.001 ²³⁸	33.59 ¹⁴⁸
11.6	33.821 ¹⁹⁵	53.23 ¹⁸⁵	5.450 ²¹⁸	17.53 ²⁴²	43.000 ²⁷⁴	31.76 ¹⁸⁷	58.193 ¹⁹²	34.83 ¹²⁴
21.6	33.978 ¹⁵⁷	54.90 ¹⁶⁷	5.626 ¹⁷⁶	19.87 ²³⁴	43.209 ²⁰⁹	34.04 ²³⁸	58.348 ¹⁵⁵	35.86 ¹⁰³
31.5	34.098 ¹²⁰	56.40 ¹⁵⁰	5.760 ¹³⁴	22.08 ²²¹	43.348 ¹³⁹	36.62 ²⁶⁸	58.467 ¹¹⁹	36.65 ⁷⁹
Apr. 10.5	34.183 ⁸⁵	57.71 ¹³¹	5.856 ⁹⁶	24.12 ²⁰⁴	43.420 ⁷²	39.39 ²⁷⁷	58.554 ⁸⁷	37.23 ⁵⁸
20.5	34.236 ⁵³	58.80 ¹⁰⁹	5.914 ⁵⁸	26.00 ¹⁸⁸	43.428 ⁸	42.23 ²⁸⁴	58.609 ⁵⁵	37.60 ³⁷
30.4	34.258 ²²	59.70 ⁹⁰	5.937 ²³	27.66 ¹⁶⁶	43.375 ⁵³	45.04 ³⁶¹	58.635 ²⁶	37.78 ¹⁵
May 10.4	34.254 ⁴	60.39 ⁶⁹	5.928 ⁹	29.09 ¹⁴³	43.269 ¹⁰⁶	47.72 ²⁶⁸	58.636 ¹	37.80 ²
20.4	34.224 ³⁰	60.89 ⁵⁰	5.890 ³⁸	30.27 ¹¹⁸	43.115 ¹⁵⁴	50.17 ²⁴⁵	58.612 ²⁴	37.68 ¹²
30.4	34.173 ⁵¹	61.17 ²⁸	5.824 ⁶⁶	31.19 ⁹²	42.921 ¹⁹⁴	52.32 ²¹⁵	58.569 ⁴³	37.42 ²⁶
June 9.3	34.100 ⁷³	61.26 ⁹	5.734 ⁹⁰	31.82 ⁶³	42.694 ²²⁷	54.11 ¹⁷⁹	58.505 ⁶⁴	37.06 ³⁶
19.3	34.010 ⁹⁰	61.16 ¹⁰	5.621 ¹¹³	32.17 ³⁵	42.440 ²⁵⁴	55.50 ¹³⁰	58.425 ⁸⁰	36.81 ⁴⁵
29.3	33.905 ¹⁰⁶	60.87 ²⁹	5.490 ¹³¹	32.23 ⁶	42.168 ²⁷²	56.43 ⁹³	58.331 ⁹⁴	36.07 ⁵⁴
July 9.3	33.787 ¹¹⁸	60.40 ⁴⁷	5.344 ¹⁴⁶	31.98 ²⁵	41.885 ²⁸³	56.87 ⁴⁴	58.225 ¹⁰⁶	35.47 ⁶⁰
19.2	33.661 ¹²⁶	59.75 ⁶⁵	5.188 ¹⁵⁶	31.45 ⁵³	41.596 ²⁸⁹	56.84 ³	58.109 ¹¹⁶	34.81 ⁶⁶
29.2	33.531 ¹³⁰	58.96 ⁷⁹	5.027 ¹⁶¹	30.63 ⁸²	41.309 ²⁸⁷	56.33 ⁵¹	57.989 ¹²⁰	34.11 ⁷⁰
Aug. 8.2	33.401 ¹³⁰	58.03 ⁹³	4.867 ¹⁶⁰	29.56 ¹⁰⁷	41.031 ²⁷⁸	55.35 ⁹⁸	57.869 ¹²⁰	33.40 ⁷¹
18.1	33.278 ¹²³	57.01 ¹⁰²	4.714 ¹⁶³	28.27 ¹²⁹	40.772 ²⁵⁹	53.90 ¹⁴⁵	57.755 ¹¹⁴	32.71 ⁶⁹
28.1	33.168 ¹¹⁰	55.92 ¹⁰⁹	4.577 ¹³⁷	26.80 ¹⁴⁷	40.536 ²³⁶	52.03 ¹⁸⁷	57.650 ¹⁰⁶	32.05 ⁶⁶
Sept. 7.1	33.078 ⁹⁰	54.81 ¹¹¹	4.465 ¹¹²	25.21 ¹⁵⁹	40.333 ²⁰³	49.76 ²²⁷	57.563 ⁸⁷	31.46 ⁵⁹
17.1	33.016 ⁶²	53.73 ¹⁰⁸	4.385 ⁸⁰	23.54 ¹⁶⁷	40.172 ¹⁶¹	47.12 ²⁶⁴	57.500 ⁶³	30.97 ⁴⁹
27.0	32.988 ²⁸	52.73 ¹⁰⁰	4.346 ³⁹	21.89 ¹⁶⁵	40.059 ¹¹³	44.17 ²⁹⁵	57.469 ³¹	30.63 ³⁴
Oct. 7.0	33.000 ¹²	51.88 ⁸⁵	4.353 ⁷	20.31 ¹⁵⁸	40.001 ⁵⁸	40.96 ³²¹	57.474 ⁵	30.49 ¹⁴
17.0	33.059 ⁵⁹	51.24 ⁶⁴	4.414 ⁶¹	18.89 ¹⁴²	40.007 ⁶	37.56 ³⁴⁰	57.521 ⁴⁷	30.55 ⁶
27.0	33.166 ¹⁰⁷	50.84 ⁴⁰	4.531 ¹¹⁷	17.72 ¹¹⁷	40.079 ⁷²	34.01 ³⁵⁵	57.614 ⁹³	30.88 ³³
Nov. 5.9	33.322 ¹⁵⁶	50.74 ¹⁰	4.704 ¹⁷³	16.82 ⁹⁰	40.222 ¹⁴³	30.42 ³⁵⁹	57.756 ¹⁴²	31.48 ⁶⁹
15.9	33.530 ²⁰⁸	50.98 ²⁴	4.933 ²²⁹	16.30 ⁵²	40.436 ²¹⁴	26.88 ³⁵⁴	57.942 ¹⁹⁶	32.36 ⁸⁶
25.9	33.782 ²⁵²	51.55 ⁵⁷	5.213 ²⁹⁰	16.17 ¹³	40.718 ²⁸²	23.45 ³⁴³	58.174 ²³²	33.52 ¹¹⁶
Dec. 5.8	34.072 ²⁹⁰	52.46 ⁹¹	5.537 ³²⁴	16.46 ²⁹	41.062 ³⁴⁴	20.24 ³²¹	58.443 ²⁶⁹	34.94 ¹⁴³
15.8	34.393 ³²¹	53.70 ¹²⁴	5.894 ³⁵⁷	17.17 ⁷¹	41.460 ³⁹⁸	17.37 ²⁸⁷	58.743 ³⁰⁰	36.59 ¹⁶⁵
25.8	34.734 ³⁴¹	55.23 ¹⁵³	6.272 ³⁷⁸	18.28 ¹¹¹	41.900 ⁴⁴⁰	14.91 ²⁴⁶	59.063 ³³⁰	38.40 ¹⁸¹
35.8	35.085 ³⁵¹	56.99 ¹⁷⁶	6.661 ³⁸⁹	19.76 ¹⁴⁸	42.367 ⁴⁶⁷	12.95 ¹⁹⁶	59.395 ³³²	40.33 ¹⁸⁸
Mean Place	30.850	40.30	2.190	7.50	40.092	52.99	55.405	19.88
Sec δ , Tan δ	1.064	-0.419	1.241	-0.734	1.759	+1.447	1.018	-0.190
$D\alpha$, D_{ω}	+0.06	-0.03	+0.07	-0.05	+0.05	+0.09	+0.06	-0.01
$D\delta$, $D_{\omega\delta}$	-0.4	-0.3	-0.4	-0.3	-0.4	-0.3	-0.4	-0.3

APPARENT PLACES OF STARS, 1919.

423

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.		Groombridge 2001. Mag. 6.1		70 Virginis. Mag. 5.2		ζ Virginis. Mag. 3.4		17 H. Canum Venat. Mag. 5.0	
		Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
		h m 13 24	° ' " +72 48	h m 13 24	° ' " +14 12	h m 13 30	° ' " - 0 10	h m 13 31	° ' " +37 35
		s 2.87	" 17.84	s 28.745	" 28.30	s 34.565	" 61.97	s 11.275	" 31.44
Jan.	0.8	2.87	17.84	28.745	28.30	34.565	61.97	11.275	31.44
	10.8	3.67	16.51	29.079	26.21	34.893	64.01	11.649	29.45
	20.7	4.50	15.84	29.407	24.38	35.217	65.94	12.023	27.95
	30.7	5.30	15.84	29.721	22.88	35.527	67.71	12.386	26.97
Feb.	9.7	6.06	16.51	30.013	21.74	35.817	69.25	12.726	26.55
	19.6	6.75	17.80	30.276	20.99	36.079	70.53	13.034	26.66
Mar.	1.6	7.34	19.66	30.506	20.62	36.309	71.54	13.303	27.30
	11.6	7.82	22.00	30.698	20.62	36.504	72.24	13.529	28.43
	21.6	8.18	24.73	30.851	20.97	36.663	72.67	13.708	29.96
	31.5	8.39	27.72	30.967	21.63	36.788	72.82	13.840	31.83
Apr.	10.5	8.48	30.84	31.048	22.53	36.879	72.74	13.926	33.95
	20.5	8.44	33.99	31.096	23.62	36.939	72.45	13.968	36.21
	30.5	8.28	37.03	31.113	24.85	36.970	72.01	13.970	38.54
May	10.4	7.98	39.88	31.103	26.14	36.976	71.43	13.934	40.83
	20.4	7.61	42.42	31.067	27.45	36.956	70.75	13.865	43.01
	30.4	7.14	44.59	31.011	28.72	36.916	70.02	13.769	45.01
June	9.3	6.60	46.33	30.935	29.90	36.857	69.26	13.647	46.76
	19.3	6.01	47.58	30.844	30.97	36.779	68.50	13.505	48.23
	29.3	5.38	48.31	30.739	31.90	36.687	67.75	13.345	49.35
July	9.3	4.74	48.51	30.622	32.66	36.582	67.05	13.174	50.11
	19.2	4.09	48.16	30.499	33.23	36.468	66.38	12.995	50.49
	29.2	3.44	47.29	30.372	33.60	36.348	65.79	12.814	50.51
Aug.	8.2	2.82	45.89	30.244	33.75	36.226	65.29	12.634	50.11
	18.2	2.24	44.02	30.122	33.67	36.109	64.89	12.461	49.32
	28.1	1.71	41.70	30.012	33.35	36.000	64.63	12.303	48.14
Sept.	7.1	1.26	38.97	29.917	32.80	35.906	64.50	12.165	46.60
	17.1	0.88	35.89	29.845	31.98	35.836	64.55	12.054	44.72
	27.0	0.60	32.53	29.802	30.90	35.793	64.80	11.978	42.51
Oct.	7.0	0.42	28.93	29.796	29.58	35.787	65.27	11.942	40.02
	17.0	0.35	25.19	29.830	27.99	35.821	65.98	11.954	37.28
	27.0	0.40	21.38	29.908	26.18	35.899	66.92	12.016	34.34
Nov.	5.9	0.58	17.58	30.033	24.14	36.024	68.13	12.133	31.25

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON

Washington Mean Time.	ε Centauri. Mag. 2.6		m Virginis. Mag. 5.2		τ Boötis. Mag. 4.5		η Ursæ Majoris. (Alkaid). Mag. 1.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 13 34	° ' " -53 3	h m 13 37	° ' " - 8 17	h m 13 43	° ' " +17 51	h m 13 44	° ' " +49 42
Jan. 0.8	45.676	8.58	22.226	44.35	25.271	23.79	21.031	41.11
10.8	46.174	9.72	22.558	46.30	25.601	21.67	21.455	39.14
20.7	46.665	11.30	22.888	48.24	25.932	19.83	21.885	37.74
30.7	47.136	13.26	23.205	50.10	26.254	18.35	22.309	36.93
Feb. 9.7	47.578	15.53	23.500	51.83	26.556	17.27	22.711	36.73
19.7	47.979	18.06	23.769	53.37	26.833	16.61	23.080	37.16
Mar. 1.6	48.334	20.77	24.008	54.70	27.077	16.38	23.406	38.16
11.6	48.639	23.59	24.212	55.80	27.286	16.55	23.682	39.69
21.6	48.892	26.47	24.380	56.66	27.458	17.09	23.903	41.66
31.5	49.093	29.33	24.515	57.27	27.594	17.96	24.067	43.98
Apr. 10.5	49.242	32.13	24.617	57.67	27.693	19.10	24.173	46.56
20.5	49.341	34.81	24.688	57.86	27.757	20.44	24.223	49.28
30.5	49.390	37.31	24.729	57.88	27.790	21.91	24.219	52.04
May 10.4	49.392	39.62	24.743	57.74	27.793	23.45	24.167	54.75
20.4	49.350	41.66	24.734	57.47	27.769	24.99	24.072	57.29
30.4	49.265	43.40	24.701	57.10	27.722	26.49	23.937	59.61
June 9.4	49.142	44.83	24.649	56.64	27.652	27.89	23.768	61.60
19.3	48.982	45.89	24.577	56.11	27.563	29.15	23.572	63.24
29.3	48.792	46.56	24.489	55.53	27.458	30.23	23.352	64.48
July 9.3	48.576	46.84	24.386	54.91	27.338	31.12	23.116	65.29
19.2	48.341	46.70	24.272	54.27	27.208	31.77	22.869	65.64
29.2	48.097	46.15	24.151	53.62	27.071	32.19	22.618	65.52
Aug. 8.2	47.849	45.21	24.027	52.98	26.932	32.34	22.368	64.94
18.2	47.610	43.90	23.905	52.37	26.795	32.25	22.126	63.91
28.1	47.391	42.25	23.793	51.82	26.667	31.88	21.900	62.43
Sept. 7.1	47.203	40.34	23.694	51.36	26.554	31.22	21.700	60.55
17.1	47.056	38.20	23.618	50.99	26.461	30.31	21.531	58.28
27.1	46.964	35.95	23.570	50.80	26.397	29.11	21.402	55.66
Oct. 7.0	46.933	33.65	23.558	50.78	26.368	27.64	21.321	52.73
17.0	46.973	31.41	23.588	50.98	26.380	25.90	21.294	49.56
27.0	47.088	29.33	23.663	51.42	26.436	23.93	21.328	46.21
Nov. 5.9	47.279	27.48	23.786	52.13	26.540	21.74	21.426	42.73
15.9	47.544	25.98	23.957	53.09	26.693	19.37	21.589	39.22
25.9	47.878	24.88	24.172	54.32	26.893	16.89	21.816	35.77

APPARENT PLACES OF STARS, 1919.

425

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	89 Virginis. Mag. 5.1			ζ Centauri. Mag. 3.1			η Boötis. Mag. 2.8			θ Apodis. Var. 5.5-6.6		
	Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.	
	h m 13 45	° ' " -17 43		h m 13 50	° ' " -46 53		h m 13 50	° ' " +18 47		h m 13 57	° ' " -76 24	
	s	"		s	"		s	"		s	"	
Jan. 0.8	28.738	52.08		29.520	16.30		50.124	59.74		23.96	9.77	
10.8	29.081 ³⁴³	53.86 ¹⁷⁸		29.969 ⁴⁴⁹	17.41 ¹¹¹		50.454 ³³⁰	57.59 ²¹⁵		25.08 ¹¹²	9.98 ²¹	
20.7	29.423 ³⁴²	55.74 ¹⁸⁸		30.416 ⁴⁴⁷	18.89 ¹⁴⁸		50.786 ³³²	55.72 ¹⁸⁷		26.21 ¹¹³	10.77 ⁷⁹	
30.7	29.752 ³²⁹	57.64 ¹⁹⁰		30.847 ⁴³¹	20.71 ¹⁸²		51.110 ³²⁴	54.22 ¹⁵⁰		27.32 ¹¹¹	12.11 ¹³⁴	
Feb. 9.7	30.061 ³⁰⁹	59.51 ¹⁸⁷		31.256 ⁴⁰⁹	22.80 ²⁰⁹		51.417 ³⁰⁷	53.12 ¹¹⁰		28.37 ¹⁰⁵	13.93 ¹⁸²	
19.7	30.345 ²⁸⁴	61.31 ¹⁸⁰		31.631 ³⁷⁵	25.10 ²³⁰		51.699 ²⁸²	52.46 ⁶⁶		29.65 ⁹⁸	16.20 ²²⁷	
Mar. 1.6	30.596 ²⁵¹	62.97 ¹⁶⁶		31.968 ³³⁷	27.55 ²⁴⁵		51.950 ²⁵¹	52.23 ²³		30.24 ⁸⁹	18.86 ²⁶⁶	
11.6	30.814 ²¹⁸	64.48 ¹⁵¹		32.262 ²⁹⁴	30.09 ²⁵⁴		52.166 ²¹⁶	52.41 ¹⁸		31.02 ⁷⁸	21.81 ²⁹⁵	
21.6	30.999 ¹⁸⁵	65.81 ¹³³		32.512 ²⁵⁰	32.65 ²⁵⁶		52.347 ¹⁸¹	52.98 ⁵⁷		31.69 ⁶⁷	25.00 ³¹⁹	
31.6	31.147 ¹⁴⁸	66.94 ¹¹³		32.716 ²⁰⁴	35.20 ²⁵⁵		52.491 ¹⁴⁴	53.88 ⁹⁰		32.23 ⁵⁴	28.34 ³³⁴	
	115	95		160	247		107	119		41	342	
Apr. 10.5	31.262	67.89		32.876	37.67		52.598	55.07		32.64	31.76	
20.5	31.347 ⁸⁵	68.63 ⁷⁴		32.992 ¹¹⁶	40.03 ²³⁶		52.670 ⁷²	56.46 ¹³⁹		32.91 ²⁷	35.19 ³⁴³	
30.5	31.401 ⁵⁴	69.21 ⁵⁸		33.065 ⁷³	42.24 ²²¹		52.711 ⁴¹	57.98 ¹⁵²		33.05 ¹⁴	38.54 ³³⁵	
May 10.4	31.426 ²⁵	69.61 ⁴⁰		33.096 ³¹	44.25 ²⁰¹		52.721 ¹⁰	59.58 ¹⁶⁰		33.05 ⁰	41.78 ³²⁴	
20.4	31.426 ⁰	69.84 ²³		33.087 ⁹	46.05 ¹⁸⁰		52.703 ¹⁸	61.19 ¹⁶¹		32.92 ¹³	44.81 ³⁰³	
	26	9		46	153		43	155		25	277	
30.4	31.400	69.93		33.041	47.58		52.660	62.74		32.67	47.58	
June 9.4	31.352 ⁴⁸	69.87 ⁶		32.959 ⁸²	48.83 ¹²⁵		52.594 ⁶⁶	64.20 ¹⁴⁶		32.29 ³⁸	49.99 ²⁴¹	
19.3	31.282 ⁷⁰	69.67 ²⁰		32.842 ¹¹⁷	49.78 ⁹⁵		52.509 ⁸⁵	65.51 ¹³¹		31.81 ⁴⁸	52.04 ²⁰⁵	
29.3	31.193 ⁸⁹	69.35 ³²		32.697 ¹⁴⁵	50.39 ⁶¹		52.405 ¹⁰⁴	66.63 ¹¹²		31.23 ⁵⁸	53.64 ¹⁶⁰	
July 9.3	31.088 ¹⁰⁵	68.90 ⁴⁵		32.524 ¹⁷³	50.65 ²⁶		52.286 ¹¹⁹	67.54 ⁹¹		30.56 ⁶⁷	54.77 ¹¹³	
	119	56		192	10		130	68		71	59	
19.3	30.969	68.34		32.332	50.55		52.156	68.22		29.85	55.36	
29.2	30.840 ¹²⁹	67.69 ⁶⁵		32.126 ²⁰⁶	50.09 ⁴⁶		52.017 ¹³⁹	68.66 ⁴⁴		29.09 ⁷⁶	55.43 ⁷	
Aug. 8.2	30.708 ¹³²	66.94 ⁷⁵		31.913 ²¹³	49.28 ⁸¹		51.874 ¹⁴³	68.82 ¹⁶		28.32 ⁷⁷	54.97 ⁴⁶	
18.2	30.576 ¹³²	66.15 ⁷⁹		31.704 ²⁰⁹	48.14 ¹¹⁴		51.734 ¹⁴⁰	68.72 ¹⁰		27.57 ⁷⁵	53.96 ¹⁰¹	
28.1	30.451 ¹²⁵	65.32 ⁸³		31.506 ¹⁹⁸	46.72 ¹⁴²		51.600 ¹³⁴	68.34 ³⁸		26.87 ⁷⁰	52.47 ¹⁴⁹	
	108	82		173	168		119	67		63	196	
Sept. 7.1	30.343	64.50		31.333	45.04		51.481	67.67		26.24	50.51	
17.1	30.256 ⁸⁷	63.72 ⁷⁸		31.192 ¹⁴¹	43.18 ¹⁸⁶		51.382 ⁹⁹	66.72 ⁹⁵		25.72 ⁵²	48.18 ²³³	
27.1	30.200 ⁵⁶	63.03 ⁶⁹		31.096 ⁹⁶	41.21 ¹⁹⁷		51.311 ⁷¹	65.48 ¹²⁴		25.34 ³⁸	45.52 ²⁶⁶	
Oct. 7.0	30.181 ¹⁹	62.47 ⁵⁶		31.053 ⁴³	39.20 ²⁰¹		51.274 ³⁷	63.97 ¹⁵¹		25.10 ²⁴	42.65 ²⁸⁷	
17.0	30.205 ²⁴	62.09 ³⁸		31.071 ¹⁸	37.24 ¹⁹⁶		51.278 ⁴	62.19 ¹⁷⁸		25.04 ⁶	39.67 ²⁹⁸	
	72	15		85	182		49	203		12	297	
27.0	30.277	61.94		31.156	35.42		51.327	60.16		25.16	36.70	
Nov. 6.0	30.398 ¹²¹	62.06 ¹²		31.308 ¹⁵²	33.82 ¹⁶⁰		51.423 ⁹⁶	57.93 ²²³		25.47 ³¹	33.86 ²⁸⁴	
15.9	30.570 ¹⁷²	62.45 ³⁹		31.528 ²²⁰	32.54 ¹²⁸		51.569 ¹⁴⁶	55.51 ²⁴²		25.96 ⁴⁹	31.26 ²⁶⁰	
25.9	30.789 ²¹⁹	63.14 ⁶⁹		31.813 ²⁸⁵	31.61 ⁹³		51.762 ¹⁹³	52.98 ²⁵³		26.62 ⁶⁶	29.01 ²²⁵	
Dec. 5.9	31.050 ²⁶¹	64.12 ⁹⁸		32.152 ³³⁹	31.10 ⁵¹		51.998 ²³⁶	50.38 ²⁶⁰		27.44 ⁸²	27.19 ¹⁸²	
	295	126		385	6		274	257		93	130	
15.8	31.345	65.38		32.537	31.04		52.272	47.81		28.37	25.89	
25.8	31.666 ³²¹	66.87 ¹⁴⁹		32.955 ⁴¹⁸	31.43 ³⁹		52.575 ³⁰³	45.33 ²⁴⁸		29.40 ¹⁰³	25.15 ⁷⁴	
35.8	32.002 ³³⁶	68.55 ¹⁶⁸		33.392 ⁴³⁷	32.26 ⁸³		52.896 ³²¹	43.02 ²³¹		30.49 ¹⁰⁹	24.99 ¹⁶	
Mean Place	27.996	52.12		28.678	25.05		49.681	71.75		23.197	23.83	
Sec δ, Tan δ	1.050	-0.320		1.463	-1.068		1.056	+0.340		4.256	-4.136	
D ϕ α , D ω α	+0.06	-0.02		+0.07	-0.06		+0.06	+0.02		+0.11	-0.24	
D ϕ δ , D ω δ	-0.4	-0.4		-0.4	-0.5		-0.4	-0.5		-0.3	-0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	11 Boötis. Mag. 6.1			τ Virginis. Mag. 4.3			β Centauri. Mag. 0.9			π Hydræ. Mag. 3.5		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	13	57	+27 46	13	57	+ 1 55	13	58	-59 58	14	1	-26 1
	s		"	s		"	s		"	s		"
Jan. 0.8	30.460		23.68	31.925		63.26	6.462	46.83	45.961	31.00		
10.8	30.800	340	21.48	32.248	323	61.23	7.040	47.48	46.319	32.50	1	
20.7	31.146	346	19.67	32.573	325	59.31	7.620	48.62	46.679	34.19	1	
30.7	31.485	339	18.30	32.889	316	57.59	8.186	50.20	47.029	36.01	1	
Feb. 9.7	31.808	323	17.40	33.189	300	56.10	8.724	52.18	47.362	37.89	1	
		298			277			498		307		1
19.7	32.106		17.01	33.466		54.89	9.222	54.48	47.669	39.79		
Mar. 1.6	32.373	267	17.12	33.714	248	53.98	9.673	57.05	47.948	41.65	1	
11.6	32.605	232	17.69	33.931	217	53.39	10.070	59.81	48.192	43.44	1	
21.6	32.798	193	18.70	34.115	184	53.11	10.410	62.70	48.402	45.10	1	
31.6	32.952	154	20.05	34.264	149	53.09	10.689	65.66	48.577	46.64	1	
		114			118			220		142		1
Apr. 10.5	33.066		21.71	34.382		53.34	10.909	68.62	48.719	48.03		
20.5	33.142	76	23.57	34.470	88	53.79	11.067	71.53	48.827	49.25	1	
30.5	33.183	41	25.56	34.525	55	54.41	11.164	74.33	48.902	50.31	1	
May 10.4	33.189	6	27.59	34.554	29	55.17	11.203	76.96	48.948	51.20		
20.4	33.165	24	29.60	34.558	4	56.00	11.183	79.39	48.963	51.91		
		52			22			75		13		
30.4	33.113		31.51	34.536		56.88	11.108	81.54	48.950	52.44		
June 9.4	33.035	78	33.26	34.494	42	57.78	10.979	83.39	48.911	52.80		
19.3	32.936	99	34.79	34.429	65	58.66	10.800	84.87	48.846	52.97		
29.3	32.815	121	36.08	34.346	83	59.49	10.578	85.97	48.758	52.96		
July 9.3	32.679	136	37.09	34.247	99	60.27	10.317	86.66	48.649	52.76		
		149			114			289		126		
19.3	32.530		37.79	34.133		60.96	10.028	86.90	48.523	52.38		
29.2	32.372	158	38.16	34.010	123	61.56	9.717	86.69	48.384	51.83		
Aug. 8.2	32.210	162	38.21	33.881	129	62.05	9.398	86.04	48.237	51.11		
18.2	32.050	160	37.91	33.752	129	62.41	9.083	84.95	48.088	50.26		
28.1	31.896	154	37.26	33.628	124	62.62	8.786	83.47	47.945	49.28		
		139			112			265		130		
Sept. 7.1	31.757		36.28	33.516		62.67	8.521	81.64	47.815	48.23		
17.1	31.640	117	34.96	33.423	93	62.53	8.302	79.50	47.709	47.14		
27.1	31.550	90	33.32	33.358	65	62.20	8.143	77.16	47.633	46.07		
Oct. 7.0	31.496	54	31.39	33.325	33	61.64	8.057	74.70	47.596	45.06		
17.0	31.485	11	29.17	33.331	6	60.85	8.053	72.20	47.604	44.18		
		35			51			84		58		
27.0	31.520		26.72	33.382		59.82	8.137	69.78	47.662	43.49		
Nov. 6.0	31.606	86	24.05	33.479	97	58.53	8.313	67.52	47.774	43.03		
15.9	31.743	137	21.25	33.625	146	57.02	8.580	65.56	47.940	42.86		
25.9	31.932	189	18.36	33.816	191	55.30	8.931	63.95	48.157	42.99		
Dec. 5.9	32.166	234	15.47	34.049	233	53.42	9.358	62.76	48.421	43.44		
		275			270			487		302		
15.8	32.441		12.66	34.319		51.41	9.845	62.06	48.723	44.23		
25.8	32.749	308	10.02	34.616	297	49.34	10.380	61.87	49.054	45.32		
35.8	33.079	330	7.63	34.930	314	47.27	10.944	62.19	49.405	46.67		
Mean Place	30.172		38.10	31.371		69.56	5.649	58.48	45.264	34.04		
Sec δ , Tan δ	1.130		+0.527	1.001		+0.033	1.999	-1.731	1.115	-0.494		
$D\psi\alpha$, $D\omega\alpha$	+0.05		+0.03	+0.06		0.00	+0.08	-0.10	+0.07	-0.03		
$D\psi\delta$, $D\omega\delta$	-0.3		-0.5	-0.3		-0.5	-0.3	-0.5	-0.3	-0.5		

APPARENT PLACES OF STARS, 1919.

427

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Centauri. Mag. 2.3		α Draconis. Mag. 3.6		δ Boötis. Mag. 4.8		κ Virginis. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 14 1	° ' -35 58	h m 14 2	° ' +64 45	h m 14 6	° ' +25 27	h m 14 8	° ' - 9 53
	s	"	s	"	s	"	s	"
Jan. 0.8	55.292	13.53	10.78	23.60	42.596	75.64	34.924	52.37
10.8	55.680 388	14.79 126	11.35 57	21.65 195	42.930 334	73.40 224	35.252 328	54.18 181
20.8	56.070 390	16.35 156	11.94 59	20.33 132	43.270 340	71.51 189	35.584 332	56.00 182
30.7	56.451 381	18.14 179	12.53 59	19.65 68	43.605 335	70.05 146	35.908 324	57.77 177
Feb. 9.7	56.810 359	20.09 195	13.10 57	19.65 0	43.927 322	69.05 100	36.216 308	59.42 165
	335	207	54	66	298	52	288	151
19.7	57.145	22.16	13.64	20.31	44.225	68.53	36.504	60.93
Mar. 1.6	57.446 301	24.29 213	14.12 48	21.58 127	44.494 269	68.50 3	36.764 260	62.23 130
11.6	57.712 266	26.43 214	14.54 42	23.43 185	44.730 236	68.94 44	36.994 230	63.33 110
21.6	57.942 230	28.51 208	14.88 34	25.74 231	44.929 199	69.81 87	37.192 198	64.20 87
31.6	58.132 190	30.53 202	15.12 24	28.43 269	45.090 161	71.05 124	37.357 165	64.83 63
	153	192	16	295	124	153	135	43
Apr. 10.5	58.285	32.45	15.28	31.38	45.214	72.58	37.492	65.26
20.5	58.401 116	34.23 178	15.36 8	34.47 309	45.302 88	74.34 176	37.595 103	65.48 22
30.5	58.482 81	35.85 162	15.35 1	37.58 311	45.353 51	76.23 189	37.669 74	65.54 6
May 10.5	58.529 47	37.30 145	15.26 9	40.61 303	45.372 19	78.20 197	37.715 46	65.45 9
20.4	58.541 12	38.55 125	15.09 17	43.46 285	45.360 12	80.16 196	37.734 19	65.22 23
	19	105	23	257	40	188	6	32
30.4	58.522	39.60	14.86	46.03	45.320	82.04	37.728	64.90
June 9.4	58.473 49	40.43 83	14.55 31	48.24 221	45.253 67	83.78 174	37.697 31	64.49 41
19.3	58.393 80	41.01 58	14.21 34	50.05 181	45.164 89	85.33 155	37.643 54	64.01 48
29.3	58.287 106	41.33 32	13.83 38	51.40 135	45.053 111	86.66 133	37.567 76	63.48 53
July 9.3	58.158 129	41.40 7	13.41 42	52.25 85	44.924 129	87.72 106	37.473 94	62.91 57
	148	21	43	33	142	77	112	60
19.3	58.010	41.19	12.98	52.58	44.782	88.49	37.361	62.31
29.2	57.846 164	40.73 46	12.54 44	52.40 18	44.628 154	88.96 47	37.238 123	61.70 61
Aug. 8.2	57.674 172	40.01 72	12.10 44	51.69 71	44.469 159	89.10 14	37.107 131	61.08 62
18.2	57.502 172	39.06 95	11.67 43	50.48 121	44.309 160	88.91 19	36.973 134	60.48 60
28.2	57.338 164	37.90 116	11.27 40	48.79 169	44.155 154	88.40 51	36.842 131	59.92 56
	150	132	37	215	141	85	118	50
Sept. 7.1	57.188	36.58	10.90	46.64	44.014	87.55	36.724	59.42
17.1	57.066 122	35.14 144	10.58 32	44.08 256	43.892 122	86.38 117	36.623 101	59.02 40
27.1	56.978 88	33.65 149	10.31 27	41.15 293	43.797 95	84.89 149	36.549 74	58.74 28
Oct. 7.0	56.932 46	32.17 148	10.11 20	37.92 323	43.737 60	83.10 179	36.508 41	58.62 12
17.0	56.938 6	30.77 140	9.99 12	34.42 350	43.717 20	81.02 208	36.508 0	58.68 6
	62	123	4	366	27	232	44	30
27.0	57.000	29.54	9.95	30.76	43.744	78.70	36.552	58.98
Nov. 6.0	57.120 120	28.51 103	10.01 6	26.99 377	43.820 76	76.15 255	36.646 94	59.50 52
15.9	57.299 179	27.78 73	10.17 16	23.23 376	43.947 127	73.45 270	36.789 143	60.29 79
25.9	57.536 237	27.37 41	10.41 24	19.56 367	44.124 177	70.64 281	36.979 190	61.33 104
Dec. 5.9	57.821 285	27.33 4	10.74 33	16.08 348	44.350 226	67.81 283	37.212 233	62.61 128
	327	34	42	317	266	278	271	148
15.9	58.148	27.67	11.16	12.91	44.616	65.03	37.483	64.09
25.8	58.507 359	28.38 71	11.65 49	10.14 277	44.916 300	62.40 263	37.784 301	65.75 166
35.8	58.885 378	29.44 106	12.19 54	7.85 229	45.237 321	59.98 242	38.102 318	67.51 176
Mean Place	54.559	19.44	11.802	45.51	42.338	89.02	34.350	50.27
Sec δ , Tan δ	1.236	-0.726	2.345	+2.121	1.108	+0.476	1.015	-0.175
$D_{\phi a}$, $D_{\omega a}$	+0.07	-0.04	+0.03	+0.12	+0.05	+0.03	+0.06	-0.05
$D_{\phi \delta}$, $D_{\omega \delta}$	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	4 Ursæ Minoris. Mag. 5.0		ι Virginis. Mag. 4.2		α Boötis. (Arcturus.) Mag. 0.2		λ Boötis. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 14 9	° ' " +77 55	h m 14 11	° ' " - 5 36	h m 14 11	° ' " +19 35	h m 14 13	° ' " +46 27
	s 14 9	" "	s 14 11	" "	s 14 11	" "	s 14 13	" "
Jan. 0.8	4.98	18.46	46.407	55.74	58.273	61.31	18.144	16.79
10.8	6.00	16.68	46.731	57.64	58.595	59.03	18.535	14.53
20.8	7.08	15.53	47.058	59.60	58.924	57.05	18.939	12.89
30.7	8.19	15.05	47.379	61.27	59.249	55.43	19.343	11.63
Feb. 9.7	9.27	15.24	47.685	62.87	59.569	54.23	19.734	11.08
19.7	10.30	16.11	47.971	64.28	59.850	53.46	20.102	11.14
Mar. 1.6	11.23	17.60	48.230	65.45	60.113	53.14	20.435	11.79
11.6	12.04	19.64	48.460	66.37	60.345	53.27	20.728	13.00
21.6	12.69	22.13	48.657	67.03	60.542	53.78	20.971	14.70
31.6	13.16	24.98	48.823	67.45	60.703	54.67	21.165	16.82
Apr. 10.5	13.45	28.08	48.959	67.63	60.829	55.85	21.308	19.25
20.5	13.56	31.29	49.062	67.62	60.922	57.26	21.399	21.89
30.5	13.48	34.49	49.137	67.42	60.981	58.83	21.440	24.64
May 10.5	13.22	37.58	49.184	67.08	61.008	60.60	21.434	27.39
20.4	12.81	40.46	49.204	66.64	61.007	62.17	21.386	30.05
30.4	12.24	43.03	49.199	66.10	60.977	63.80	21.295	32.53
June 9.4	11.55	45.21	49.168	65.51	60.923	65.34	21.169	34.76
19.3	10.73	46.96	49.116	64.89	60.845	66.74	21.010	36.69
29.3	9.85	48.21	49.041	64.24	60.747	67.95	20.824	38.24
July 9.3	8.90	48.94	48.948	63.60	60.629	68.95	20.615	39.39
19.3	7.91	49.14	48.839	62.96	60.496	69.70	20.390	40.11
29.2	6.91	48.79	48.716	62.35	60.352	70.21	20.152	40.38
Aug. 8.2	5.91	47.91	48.585	61.79	60.201	70.43	19.909	40.20
18.2	4.94	46.52	48.451	61.28	60.048	70.37	19.668	39.56
28.2	4.02	44.64	48.320	60.85	59.899	70.01	19.435	38.47
Sept. 7.1	3.17	42.31	48.201	60.52	59.761	69.36	19.220	36.95
17.1	2.43	39.57	48.098	60.33	59.642	68.42	19.030	35.02
27.1	1.80	36.47	48.021	60.28	59.548	67.16	18.874	32.73
Oct. 7.0	1.29	33.09	47.977	60.40	59.487	65.63	18.760	30.08
17.0	0.94	29.48	47.972	60.74	59.465	63.82	18.696	27.13
27.0	0.77	25.73	48.011	61.30	59.488	61.76	18.689	23.96
Nov. 6.0	0.76	21.92	48.099	62.11	59.559	59.47	18.743	20.61
15.9	0.94	18.13	48.236	63.15	59.681	56.99	18.859	17.16
25.9	1.29	14.47	48.420	64.44	59.852	54.37	19.039	13.70
Dec. 5.9	1.83	11.05	48.647	65.94	60.068	51.69	19.280	10.32
15.9	2.54	7.96	48.912	67.63	60.324	49.01	19.574	7.12
25.8	3.39	5.31	49.205	69.43	60.612	46.43	19.913	4.22
35.8	4.36	3.17	49.519	71.31	60.924	44.01	20.286	1.69
Mean Place	8.497	41.04	45.878	52.32	57.972	72.75	18.371	35.07
Sec δ, Tan δ	4.780	+4.674	1.005	-0.098	1.061	+0.356	1.452	+1.052
D ₄ α, D _ω α	-0.01	+0.26	+0.06	-0.01	+0.06	+0.02	+0.05	+0.06
D ₄ δ, D _ω δ	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5

APPARENT PLACES OF STARS, 1919.

429

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	λ Virginis. Mag. 4.6		β Libræ. Mag. 6.3		θ Boötis. Mag. 4.1		f Boötis. Mag. 5.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 14 14	° ' " -12 59	h m 14 19	° ' " -11 20	h m 14 22	° ' " +52 12	h m 14 22	° ' " +19 34
	s "	"	s "	"	s "	"	s "	"
Jan. 0.8	43.953	56.99	4.453	42.37	25.894	69.93	41.519	74.58
10.8	44.284 331	58.71 172	4.780 327	44.11 174	26.310 416	67.61 232	41.839 320	72.31 227
20.8	44.618 334	60.48 177	5.112 332	45.88 177	26.746 436	65.85 176	42.168 329	70.35 196
30.7	44.947 329	62.23 175	5.439 327	47.62 174	27.186 440	64.67 118	42.495 327	68.75 160
Feb. 9.7	45.282 315	63.90 167	5.753 314	49.26 164	27.616 430	64.15 52	42.811 316	67.55 120
	202	156	293	151	407	10	296	75
19.7	45.554	65.46	6.046	50.77	28.023	64.25	43.107	66.80
Mar. 1.7	45.820 266	66.85 139	6.313 267	52.10 133	28.397 374	64.98 73	43.379 272	66.50 30
11.6	46.058 238	68.05 130	6.552 239	53.22 112	28.725 328	66.29 131	43.619 240	66.64 14
21.6	46.263 205	69.06 101	6.760 206	54.14 92	29.002 277	68.11 182	43.827 208	67.20 56
31.6	46.436 173	69.85 79	6.936 176	54.83 69	29.224 222	70.36 225	44.000 173	68.11 91
	143	59	146	49	164	258	139	124
Apr. 10.5	46.579	70.44	7.082	55.32	29.388	72.94	44.139	69.35
20.5	46.690 111	70.85 41	7.196 114	55.61 29	29.494 106	75.73 279	44.244 105	70.82 147
30.5	46.771 81	71.07 22	7.281 85	55.74 13	29.542 48	78.63 290	44.315 71	72.47 165
May 10.5	46.825 54	71.15 8	7.338 57	55.72 2	29.535 7	81.54 291	44.356 41	74.22 175
20.4	46.851 26	71.10 5	7.367 29	55.57 15	29.477 56	84.36 282	44.366 10	75.99 177
	0	17	3	27	106	263	19	175
30.4	46.851	70.93	7.370	55.30	29.371	86.99	44.347	77.74
June 9.4	46.824 27	70.66 27	7.347 23	54.96 34	29.221 150	89.35 236	44.303 44	79.38 164
19.4	46.774 50	70.31 35	7.301 46	54.54 42	29.035 186	91.38 203	44.233 70	80.88 150
29.3	46.701 73	69.88 43	7.230 71	54.06 48	28.815 220	93.02 164	44.142 91	82.22 134
July 9.3	46.609 111	69.39 54	7.139 106	53.54 56	28.567 267	94.23 76	44.029 129	83.34 88
19.3	46.498	68.85	7.031	52.98	28.300	94.99	43.900	84.22
29.2	46.372 126	68.26 59	6.907 124	52.39 59	28.019 281	95.27 28	43.758 142	84.82 60
Aug. 8.2	46.238 134	67.64 62	6.774 133	51.79 60	27.730 299	95.07 20	43.607 151	85.16 34
18.2	46.101 137	67.01 63	6.636 138	51.19 60	27.442 288	94.38 69	43.452 155	85.21 5
28.2	45.966 135	66.38 63	6.500 136	50.62 57	27.162 280	93.22 116	43.300 152	84.96 25
	123	59	126	53	260	161	143	54
Sept. 7.1	45.843	65.79	6.374	50.09	26.902	91.61	43.157	84.42
17.1	45.736 107	65.27 52	6.265 109	49.64 45	26.668 234	89.56 205	43.031 126	83.58 84
27.1	45.656 80	64.84 43	6.182 83	49.30 34	26.471 197	87.13 243	42.929 102	82.43 115
Oct. 7.1	45.608 48	64.56 28	6.131 51	49.11 19	26.320 151	84.34 279	42.859 70	80.99 144
17.0	45.602 6	64.44 12	6.120 11	49.09 2	26.224 96	81.24 310	42.828 31	79.27 172
	39	9	35	19	35	333	14	198
27.0	45.641	64.63	6.155	49.28	26.189	77.91	42.842	77.29
Nov. 6.0	45.730 89	64.86 33	6.239 84	49.71 43	26.220 31	74.39 352	42.903 61	75.07 222
15.9	45.871 141	65.44 58	6.372 133	50.38 67	26.322 102	70.79 360	43.015 112	72.67 240
25.9	46.058 187	66.28 84	6.554 182	51.30 92	26.494 172	67.18 361	43.177 162	70.11 256
Dec. 5.9	46.290 232	67.38 110	6.781 227	52.47 117	26.734 240	63.68 350	43.385 208	67.48 263
	271	131	266	137	302	331	250	263
15.9	46.561	68.69	7.047	53.84	27.036	60.37	43.635	64.85
25.8	46.862 301	70.20 151	7.343 296	55.40 156	27.391 355	57.37 300	43.918 293	62.30 255
35.8	47.182 320	71.86 166	7.660 317	57.09 169	27.786 395	54.76 261	44.227 309	59.91 239
Mean Place	43.394	56.03	3.926	40.97	26.416	88.79	41.283	85.57
Sec δ , Tan δ	1.026	-0.231	1.020	-0.201	1.632	+1.290	1.061	+0.356
$D_{\delta a}$, $D_{\delta a}$	+0.06	-0.01	+0.07	-0.01	+0.04	+0.07	+0.06	+0.02
$D_{\delta \delta}$, $D_{\delta \delta}$	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6	-0.3	-0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	φ Virginis. Mag. 5.0		δ Ursæ Minoris. Mag. 4.4		ρ Boötis. Mag. 3.8		γ Boötis. Mag. 3.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 14 24	° ' " - 1 51	h m 14 27	° ' " +76 2	h m 14 28	° ' " +30 43	h m 14 28	° ' " +38
	s " "	s " "	s " "	s " "	s " "	s " "	s " "	s " "
Jan. 0.8	2.076 ³¹⁸	59.89 ¹⁹⁴	37.27 ⁸⁶	60.86 ²⁰⁴	20.412 ³³²	21.16 ²³⁷	48.895 ³⁵¹	27.53
10.8	2.394 ³²³	61.83 ¹⁸⁶	38.13 ⁹³	58.82 ¹⁴²	20.744 ³⁴⁵	18.79 ¹⁹⁷	49.246 ³⁶⁶	25.14
20.8	2.717 ³¹⁹	63.69 ¹⁷¹	39.06 ⁹⁷	57.40 ⁷⁷	21.089 ³⁴⁶	16.82 ¹⁸³	49.612 ³⁶⁸	23.20
30.7	3.036 ³⁰⁷	65.40 ¹⁵⁴	40.03 ⁹⁶	56.63 ⁹	21.435 ³³⁶	15.30 ¹⁰³	49.980 ³⁶⁰	21.79
Feb. 9.7	3.343 ²⁸⁹	66.94 ¹²⁷	40.99 ⁹²	56.54 ⁵⁹	21.771 ³¹⁸	14.28 ⁴⁶	50.340 ³⁴⁰	20.92
19.7	3.632 ²⁶⁴	68.21 ¹⁰³	41.91 ⁸⁵	57.13 ¹²³	22.089 ³⁰⁰	13.79 ⁵	50.680 ³¹²	20.63
Mar. 1.7	3.896 ²³⁷	69.24 ⁷³	42.76 ⁷⁶	58.36 ¹⁸¹	22.379 ²⁸⁰	13.84 ⁵⁶	50.992 ²⁷⁹	20.92
11.6	4.133 ²⁰⁵	69.97 ⁴⁴	43.52 ⁶²	60.17 ²³²	22.639 ²²³	14.40 ¹⁰³	51.271 ¹⁹⁷	21.76
21.6	4.338 ¹⁷⁵	70.41 ²⁰	44.14 ⁴⁹	62.49 ²⁷²	22.862 ¹⁸⁸	15.43 ¹⁴³	51.610 ¹⁵⁴	23.09
31.6	4.513 ¹⁴⁵	70.61 ⁶	44.63 ³³	65.21 ³⁰²	23.060 ¹⁴⁷	16.85 ¹⁷⁷	51.707 ¹¹⁰	24.85
Apr. 10.6	4.658 ¹¹³	70.55 ²⁹	44.96 ¹⁷	68.23 ³¹⁸	23.197 ¹⁰⁹	18.62 ²⁰²	51.861 ⁹⁸	26.96
20.5	4.771 ⁸⁵	70.26 ⁴⁵	45.13 ¹	71.41 ³²⁴	23.306 ⁷²	20.64 ²¹⁹	51.971 ²⁶	29.31
30.5	4.856 ⁵⁶	69.81 ⁵⁹	45.14 ¹⁴	74.65 ³¹⁸	23.378 ³⁵	22.83 ²²⁶	52.039 ¹²	31.81
May 10.5	4.912 ²⁸	69.22 ⁷⁶	45.00 ⁴³	77.83 ²⁷⁵	23.413 ⁸¹	25.09 ²¹⁸	52.065 ⁴⁸	34.38
20.4	4.940 ³	68.52 ⁷⁶	44.71 ⁴³	80.83 ²⁴⁰	23.415 ⁶²	27.34 ²⁰²	52.053 ⁸³	36.91
30.4	4.943 ²³	67.76 ⁷⁹	44.28 ⁵⁴	83.58 ¹⁹⁹	23.384 ⁸⁹	29.52 ¹⁸²	52.005 ¹⁴⁰	39.32
June 9.4	4.920 ⁴⁶	66.97 ⁵⁰	43.74 ⁶⁴	85.98 ¹⁵³	23.322 ¹¹⁴	31.54 ¹⁶⁶	51.922 ¹⁶⁴	41.55
19.4	4.874 ⁷⁰	66.17 ⁷⁸	43.10 ⁷³	87.97 ¹⁰²	23.233 ¹⁵⁵	33.36 ¹²⁷	51.809 ¹⁸³	43.51
29.3	4.804 ⁸⁹	65.39 ⁷⁶	42.37 ⁸¹	89.50 ⁵⁰	23.119 ¹³⁶	34.92 ⁹⁴	51.669 ¹⁹⁸	45.17
July 9.3	4.715 ¹⁰⁷	64.63 ⁶⁹	41.56 ⁸⁴	90.52 ⁵	22.983 ¹⁰⁹	36.19 ⁵⁹	51.505 ¹²⁴	46.48
19.3	4.608 ¹²³	63.94 ⁶³	40.72 ⁸⁷	91.02 ⁵⁷	22.828 ¹⁷⁸	37.13 ²³	51.322 ²¹⁰	47.42
29.3	4.485 ¹³²	63.31 ⁵⁵	39.85 ⁸⁷	90.97 ¹¹⁰	22.659 ¹⁸²	37.72 ⁵¹	51.124 ¹⁹⁴	47.95
Aug. 8.2	4.353 ¹³⁸	62.76 ⁴⁵	38.98 ⁸⁶	90.40 ¹⁸⁰	22.481 ²⁰⁷	37.95 ⁸⁹	50.917 ¹⁷⁴	48.06
18.2	4.215 ¹³⁶	62.31 ³⁴	38.12 ⁸²	89.30 ²⁰⁷	22.299 ¹⁵²	37.81 ¹⁶¹	50.707 ¹⁴⁷	47.76
28.2	4.079 ¹²⁸	61.97 ²⁰	37.30 ⁷⁸	87.70 ²⁵⁰	22.120 ¹²⁴	37.30 ¹⁹²	50.501 ¹¹⁰	47.04
Sept. 7.1	3.951 ¹¹¹	61.77 ⁶	36.52 ⁷⁰	85.63 ²⁸⁹	21.952 ⁹³	36.41 ²²⁵	50.307 ¹⁶	45.90
17.1	3.840 ⁸⁸	61.71 ¹¹	35.82 ⁶²	83.13 ³²¹	21.800 ⁵¹	35.16 ²⁵¹	50.133 ³⁹	44.36
27.1	3.752 ⁵⁵	61.82 ³²	35.20 ⁵⁰	80.24 ³⁴⁹	21.676 ⁴	33.55 ²⁸¹	49.986 ¹⁷⁴	42.46
Oct. 7.1	3.697 ²⁰	62.14 ⁵²	34.70 ³⁷	77.03 ³⁶⁷	21.583 ⁴⁸	31.63 ¹⁰¹	49.876 ⁹⁸	40.20
17.0	3.677 ²⁵	62.66 ⁷⁷	34.33 ²³	73.54 ³⁷⁸	21.532 ¹⁰¹	29.38 ²⁹⁰	49.810 ¹⁵⁵	37.62
27.0	3.702 ⁷³	63.43 ⁹⁹	34.10 ⁸	69.87 ³⁸⁰	21.528 ¹⁵⁵	26.87 ³⁰²	49.794 ²¹⁰	34.78
Nov. 6.0	3.775 ¹²²	64.42 ¹²³	34.02 ⁸	66.09 ³⁵⁴	21.576 ²⁵²	24.13 ²⁸¹	49.833 ³⁰³	31.71
16.0	3.897 ¹⁷⁰	65.65 ¹⁴⁵	34.10 ²⁵	62.29 ³²⁵	21.677 ²⁸⁸	21.23 ²⁵⁶	49.931 ³³⁵	28.51
25.9	4.067 ²¹⁴	67.10 ¹⁶⁵	34.35 ⁴¹	58.56 ²⁸⁵	21.832 ³¹⁹	18.22 ²⁸¹	50.086 ²⁸¹	25.24
Dec. 5.9	4.281 ²⁵⁴	68.75 ¹⁷⁹	34.76 ⁵⁶	55.02 ²³⁹	22.037 ²⁵²	15.20 ²⁹⁷	50.296 ²⁶⁰	21.98
15.9	4.535 ²⁸⁴	70.54 ¹⁸⁹	35.32 ⁷⁰	51.77 ²⁸⁵	22.289 ²⁸⁸	12.23 ²⁸¹	50.556 ³⁰³	18.83
25.8	4.819 ³⁰⁶	72.43 ¹⁹³	36.02 ⁸²	48.92 ²³⁹	22.577 ³¹⁹	9.42 ²⁵⁶	50.859 ³³⁵	15.91
35.8	5.125 ³⁰⁶	74.36 ¹⁹³	36.84 ⁸²	46.53 ²³⁹	22.896 ³¹⁹	6.86 ²⁵⁶	51.194 ³³⁵	13.28
Mean Place	1.637	55.59	40.660	82.13	20.381	34.97	49.034	43.26
Sec δ, Tan δ	1.001	-0.033	4.149	+4.027	1.163	+0.594	1.281	+0.800
D _μ α, D _ω α	+0.06	0.00	0.00	+0.22	+0.05	+0.03	+0.05	+0.04
D _μ δ, D _ω δ	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

APPARENT PLACES OF STARS, 1919.

431

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	η Centauri. Mag. 2.6		σ Boötis. Mag. 4.5		α^2 Centauri. Mag. 0.3		33 Boötis. Mag. 5.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 14 30	° ' " -41 48	h m 14 31	° ' " +30 5	h m 14 34	° ' " -60 29	h m 14 35	° ' " +44 44
	s 14 30	" 48	s 14 31	" 5	s 14 34	" 29	s 14 35	" 44
Jan. 0.8	21.995	2.14	9.285	33.66	6.36	49.48	49.073	55.66
10.8	22.404 409	2.94 80	9.616 331	31.28 238	6.93 57	49.71 23	49.441 368	53.21 245
20.8	22.822 418	4.07 113	9.959 343	29.29 199	7.51 58	50.41 70	49.828 387	51.25 196
30.7	23.235 413	5.49 142	10.303 344	27.75 154	8.08 57	51.57 116	50.220 392	49.85 140
Feb. 9.7	23.635 400	7.15 166	10.639 336	26.70 105	8.64 56	53.13 156	50.606 386	49.03 82
19.7	24.013 378	8.99 184	10.957 318	26.17 53	9.16 52	55.04 191	50.975 369	48.83 20
Mar. 1.7	24.361 348	10.97 198	11.249 292	26.19 2	9.65 49	57.25 221	51.315 340	49.23 40
11.6	24.676 315	13.03 206	11.510 261	26.71 52	10.09 44	59.68 243	51.619 304	50.22 99
21.6	24.956 280	15.12 209	11.736 226	27.69 98	10.47 38	62.29 261	51.882 263	51.72 150
31.6	25.197 241	17.21 209	11.926 190	29.08 139	10.80 33	65.00 271	52.099 217	53.67 195
Apr. 10.6	25.400 203	19.26 205	12.076 150	30.82 174	11.07 27	67.77 277	52.269 170	55.97 230
20.5	25.564 164	21.23 197	12.189 113	32.81 199	11.27 20	70.53 276	52.390 121	58.53 256
30.5	25.689 125	23.09 186	12.264 75	34.98 217	11.42 15	73.24 271	52.468 73	61.25 272
May 10.5	25.775 86	24.83 174	12.304 40	37.22 234	11.49 7	75.83 259	52.489 26	64.02 277
20.4	25.824 49	26.39 156	12.310 6	39.47 225	11.51 2	78.27 244	52.471 18	66.75 273
30.4	25.834 10	27.78 139	12.283 27	41.64 217	11.48 8	80.49 222	52.412 59	69.34 259
June 9.4	25.806 28	28.95 117	12.225 58	43.66 202	11.38 10	82.45 196	52.315 97	71.73 239
19.4	25.742 64	29.89 94	12.141 84	45.49 183	11.22 16	84.11 166	52.182 133	73.84 211
29.3	25.645 97	30.57 68	12.030 111	47.06 157	11.02 20	85.42 131	52.018 164	75.60 176
July 9.3	25.516 129	30.98 41	11.897 133	48.34 128	10.77 25	86.35 93	51.830 188	76.99 139
19.3	25.359 157	31.09 11	11.746 151	49.31 97	10.47 30	86.87 52	51.617 213	77.96 97
29.3	25.182 177	30.90 19	11.579 167	49.93 62	10.15 32	86.96 9	51.389 228	78.50 54
Aug. 8.2	24.990 192	30.42 48	11.403 176	50.19 26	9.81 34	86.62 34	51.150 239	78.59 9
18.2	24.791 199	29.64 78	11.223 180	50.08 11	9.47 34	85.84 78	50.908 242	78.22 37
28.2	24.593 198	28.61 103	11.045 178	49.61 47	9.13 34	84.64 120	50.669 239	77.40 82
Sept. 7.1	24.408 185	27.32 129	10.878 167	48.76 85	8.82 31	83.06 158	50.442 227	76.14 126
17.1	24.247 161	25.86 146	10.726 152	47.55 121	8.54 28	81.16 190	50.237 205	74.46 168
27.1	24.120 127	24.25 161	10.600 126	45.98 157	8.32 22	78.99 217	50.061 176	72.38 208
Oct. 7.1	24.037 83	22.58 167	10.506 94	44.10 188	8.17 15	76.63 236	49.923 138	69.94 244
17.0	24.006 31	20.93 165	10.453 53	41.90 220	8.10 7	74.18 245	49.832 91	67.17 277
27.0	24.035 29	19.34 159	10.447 6	39.42 248	8.12 2	71.73 245	49.795 37	64.12 305
Nov. 6.0	24.128 93	17.91 143	10.493 46	36.73 269	8.23 11	69.38 235	49.816 21	60.87 325
16.0	24.286 158	16.71 120	10.591 98	33.86 287	8.44 21	67.24 214	49.900 84	57.48 339
25.9	24.506 220	15.80 91	10.743 152	30.88 298	8.74 30	65.39 185	50.048 148	54.03 345
Dec. 5.9	24.785 279	15.24 56	10.946 203	27.87 301	9.12 38	63.91 148	50.256 208	50.62 341
15.9	25.112 327	15.04 20	11.195 249	24.91 296	9.57 45	62.86 105	50.520 264	47.34 328
25.8	25.480 368	15.23 19	11.481 286	22.10 281	10.08 51	62.29 57	50.831 311	44.31 303
35.8	25.874 394	15.79 56	11.798 317	19.55 255	10.63 55	62.21 8	51.181 350	41.60 271
Mean Place	21.420	9.76	9.262	47.16	5.166	66.63	49.437	72.27
Sec δ , Tan δ	1.342	-0.894	1.156	+0.579	2.031	-1.768	1.408	+0.991
$D_{\alpha\alpha}$, $D_{\omega\alpha}$	+0.08	-0.05	+0.05	+0.03	+0.09	-0.09	+0.04	+0.05
$D_{\delta\delta}$, $D_{\omega\delta}$	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Apodis. Mag. 3.8		μ Virginis. Mag. 4.0		ϵ Boötis. Mag. 2.7		109 Virginis. Mag. 3.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 14 37	° ' " -78 41	h m 14 38	° ' " - 5 18	h m 14 41	° ' " +27 24	h m 14 42	° ' " + 2 13
	s	"	s	"	s	"	s	"
Jan. 0.8	43.42	54.55	47.755	27.13	26.980	41.76	9.461	55.57
10.8	44.72	54.09	48.070	28.95	27.301	39.36	9.770	53.59
20.8	46.06	54.19	48.393	30.74	27.635	37.31	10.088	51.71
30.8	47.42	54.85	48.715	32.42	27.972	35.68	10.406	50.02
Feb. 9.7	48.74	56.05	49.028	33.96	28.303	34.52	10.715	48.55
19.7	50.02	57.72	49.323	35.31	28.618	33.87	11.009	47.36
Mar. 1.7	51.21	59.83	49.598	36.41	28.909	33.73	11.282	46.48
11.6	52.31	62.31	49.845	37.26	29.172	34.09	11.529	45.92
21.6	53.27	65.09	50.064	37.85	29.403	34.93	11.747	45.68
31.6	54.11	68.12	50.255	38.18	29.598	36.18	11.937	45.73
Apr. 10.6	54.80	71.31	50.415	38.29	29.758	37.78	12.096	46.05
20.5	55.32	74.60	50.546	38.20	29.881	39.64	12.225	46.59
30.5	55.69	77.93	50.647	37.92	29.969	41.70	12.325	47.33
May 10.5	55.90	81.21	50.720	37.50	30.021	43.85	12.396	48.20
20.4	55.93	84.39	50.766	36.99	30.040	46.03	12.440	49.16
30.4	55.80	87.38	50.783	36.39	30.026	48.15	12.455	50.17
June 9.4	55.51	90.12	50.774	35.74	29.983	50.16	12.443	51.19
19.4	55.05	92.54	50.738	35.06	29.910	51.99	12.406	52.19
29.3	54.47	94.58	50.678	34.38	29.812	53.59	12.343	53.14
July 9.3	53.76	96.19	50.596	33.71	29.690	54.93	12.258	54.02
19.3	52.94	97.32	50.492	33.06	29.548	55.96	12.154	54.81
29.3	52.05	97.95	50.371	32.45	29.388	56.67	12.030	55.47
Aug. 8.2	51.12	98.03	50.238	31.89	29.217	57.04	11.895	56.02
18.2	50.18	97.55	50.098	31.40	29.041	57.06	11.753	56.44
28.2	49.25	96.55	49.956	30.99	28.864	56.72	11.608	56.69
Sept. 7.1	48.39	95.04	49.821	30.67	28.695	56.03	11.470	56.78
17.1	47.63	93.06	49.701	30.49	28.541	54.98	11.346	56.70
27.1	47.00	90.69	49.602	30.45	28.411	53.59	11.242	56.40
Oct. 7.1	46.54	87.99	49.534	30.57	28.311	51.87	11.169	55.90
17.0	46.26	85.09	49.504	30.89	28.250	49.83	11.132	55.17
27.0	46.20	82.07	49.517	31.42	28.235	47.52	11.137	54.21
Nov. 6.0	46.37	79.07	49.577	32.19	28.270	44.96	11.190	53.00
16.0	46.76	76.19	49.687	33.18	28.357	42.22	11.292	51.57
25.9	47.38	73.56	49.846	34.41	28.498	39.35	11.442	49.92
Dec. 5.9	48.19	71.28	50.051	35.84	28.689	36.42	11.638	48.11
15.9	49.18	69.42	50.297	37.45	28.925	33.52	11.874	46.18
25.8	50.31	68.05	50.575	39.18	29.200	30.73	12.145	44.17
35.8	51.54	67.23	50.877	40.98	29.506	28.17	12.440	42.15
Mean Place	43.585	68.50	47.368	24.29	26.975	54.04	9.149	60.63
Sec δ , Tan δ	5.106	-5.006	1.004	-0.093	1.126	+0.519	1.001	+0.039
$D\psi\alpha$, $D\omega\alpha$	+0.14	-0.26	+0.06	0.00	+0.05	+0.03	+0.06	0.00
$D\psi\delta$, $D\omega\delta$	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

APPARENT PLACES OF STARS, 1919.

433

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	8 Libræ. Mag. 5.3		α Libræ. Mag. 2.9		Groombridge 2164. Mag. 5.7		β Ursæ Minoris. Mag. 2.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 14 46	° ' " -15 39	h m 14 46	° ' " -15 42	h m 14 49	° ' " +59 36	h m 14 50	° ' " +74 28
	s "	"	s "	"	s "	"	s "	"
Jan. 0.8	12.599	39.72	24.049	20.86	21.735	63.61	52.20	51.90
10.8	12.925 ³²⁶	41.21 ¹⁴⁹	24.372 ³²³	22.35 ¹⁴⁹	22.186 ⁴⁵¹	61.12 ²⁴⁹	52.95 ⁷⁵	49.58 ²³²
20.8	13.259 ³³⁴	42.78 ¹⁵⁷	24.706 ³³⁴	23.91 ¹⁵⁶	22.672 ⁴⁸⁶	59.18 ¹⁹⁴	53.76 ⁸¹	47.83 ¹⁷⁵
30.8	13.592 ³³³	44.37 ¹⁵⁹	25.039 ³³³	25.49 ¹⁵⁸	23.176 ⁵⁰⁴	57.85 ¹³³	54.63 ⁸⁷	46.73 ¹¹⁰
Feb. 9.7	13.917 ³²⁵	45.92 ¹⁵⁵	25.363 ³²⁴	27.04 ¹⁵⁵	23.680 ⁵⁰⁴	57.17 ⁶⁸	55.50 ⁸⁷	46.30 ⁴³
	308	146	309	147	488	0	86	26
19.7	14.225	47.38	25.672	28.51	24.168	57.17	56.36	46.56
Mar. 1.7	14.513 ²⁸⁸	48.72 ¹³⁴	25.959 ²⁸⁷	29.84 ¹³³	24.626 ⁴⁵⁶	57.82 ⁶⁵	57.16 ⁸⁰	47.49 ⁹³
11.6	14.774 ²⁶¹	49.90 ¹¹⁸	26.222 ²⁶³	31.02 ¹¹⁸	25.040 ⁴¹⁴	59.08 ¹²⁶	57.88 ⁷²	49.03 ¹⁵⁴
21.6	15.009 ²³⁵	50.91 ¹⁰¹	26.455 ²³³	32.03 ¹⁰¹	25.400 ³⁶⁰	60.93 ¹⁸⁵	58.51 ⁶³	51.11 ²⁰⁸
31.6	15.213 ²⁰⁴	51.73 ⁸²	26.660 ²⁰⁵	32.85 ⁸²	25.698 ²⁹⁸	63.24 ²³¹	59.03 ⁵²	53.66 ²⁵⁵
	174	64	175	64	229	268	38	288
Apr. 10.6	15.387	52.37	26.835	33.49	25.927	65.92	59.41	56.54
20.5	15.533 ¹⁴⁶	52.85 ⁴⁸	26.981 ¹⁴⁶	33.97 ⁴⁸	26.087	68.86 ²⁰⁴	59.64 ²³	59.67 ³¹³
30.5	15.648 ¹¹⁵	53.17 ³²	27.096 ¹¹⁵	34.30 ³³	26.175 ⁸⁸	71.97 ³¹¹	59.75 ¹¹	62.91 ³²⁴
May 10.5	15.735 ⁸⁷	53.34 ¹⁷	27.183 ⁸⁷	34.48 ¹⁸	26.194 ¹⁹	75.11 ³¹⁴	59.71 ⁴	66.16 ³²⁵
20.5	15.791 ⁵⁶	53.40 ⁶	27.241 ⁵⁶	34.54 ⁶	26.144 ⁵⁰	78.17 ³⁰⁶	59.53 ¹⁸	69.30 ³¹⁴
	28	5	28	5	112	292	31	292
30.4	15.819	53.35	27.269	34.49	26.032	81.09	59.22	72.22
June 9.4	15.820 ¹	53.21 ¹⁴	27.269 ⁰	34.35 ¹⁴	25.862 ¹⁷⁰	83.73 ²⁶⁴	58.80 ⁴²	74.85 ²⁶³
19.4	15.791 ²⁹	52.97 ²⁴	27.241 ²⁸	34.11 ²⁴	25.638 ²²⁴	86.07 ²³⁴	58.28 ⁵²	77.12 ²²⁷
29.3	15.736 ⁵⁵	52.66 ³¹	27.186 ⁵⁵	33.81 ³⁰	25.368 ²⁷⁰	88.01 ¹⁹⁴	57.66 ⁶²	78.96 ¹⁸⁴
July 9.3	15.655 ⁸¹	52.29 ³⁷	27.104 ⁸²	33.44 ³⁷	25.058 ³¹⁰	89.52 ¹⁵¹	56.98 ⁶⁸	80.32 ¹³⁶
	103	44	103	44	341	103	74	86
19.3	15.552	51.85	27.001	33.00	24.717	90.55	56.24	81.18
29.3	15.428 ¹²⁴	51.36 ⁴⁹	26.877 ¹²⁴	32.51 ⁴⁹	24.353 ³⁶⁴	91.09 ⁵⁴	55.46 ⁷⁸	81.51 ³³
Aug. 8.2	15.291 ¹³⁷	50.81 ⁵⁵	26.740 ¹³⁷	31.97 ⁵⁴	23.974 ³⁷⁹	91.12 ³	54.66 ⁸⁰	81.31 ²⁰
18.2	15.145 ¹⁴⁶	50.23 ⁵⁸	26.593 ¹⁴⁷	31.39 ⁵⁸	23.590 ³⁸⁴	90.63 ⁴⁹	53.86 ⁸⁰	80.58 ⁷³
28.2	14.996 ¹⁴⁹	49.64 ⁵⁹	26.444 ¹⁴⁹	30.79 ⁶⁰	23.212 ³⁷⁸	89.64 ⁹⁹	53.08 ⁷³	79.34 ¹²⁴
	144	59	143	60	362	147	74	174
Sept. 7.2	14.852	49.05	26.301	30.19	22.850	88.17	52.34	77.60
17.1	14.723 ¹²⁰	48.48 ⁵⁷	26.171 ¹³⁰	29.62 ⁵⁷	22.515 ³³⁵	86.23 ¹⁹⁴	51.64 ⁷⁰	75.40 ²²⁰
27.1	14.617 ¹⁰⁶	47.97 ⁵¹	26.065 ¹⁰⁶	29.11 ⁵¹	22.219 ²⁹⁶	83.87 ²³⁶	51.03 ⁶¹	72.78 ²⁶²
Oct. 7.1	14.542 ⁷⁵	47.56 ⁴¹	25.990 ⁷⁵	28.70 ⁴¹	21.974 ²⁴⁵	81.11 ²⁷⁶	50.51 ⁵²	69.79 ²⁹⁹
17.0	14.505 ³⁷	47.30 ²⁶	25.954 ³⁶	28.43 ²⁷	21.789 ¹⁸⁵	78.01 ³¹⁰	50.09 ⁴²	66.50 ³²⁹
	9	11	8	11	115	337	29	355
27.0	14.514	47.19	25.962	28.32	21.674	74.64	49.80	62.95
Nov. 6.0	14.572 ⁵⁸	47.29 ¹⁰	26.021 ⁵⁹	28.43 ¹¹	21.637 ³⁷	71.06 ³⁵⁸	49.65 ¹⁵	59.24 ³⁷¹
16.0	14.682 ¹¹⁰	47.62 ³³	26.131 ¹¹⁰	28.75 ³²	21.684 ⁴⁷	67.36 ³⁷⁰	49.64 ¹	55.45 ³⁷⁹
25.9	14.843 ¹⁶¹	48.19 ⁵⁷	26.291 ¹⁶⁰	29.32 ⁵⁷	21.814 ¹³⁰	63.64 ³⁷²	49.79 ¹⁵	51.68 ³⁷⁷
Dec. 5.9	15.051 ²⁰⁸	49.01 ⁸²	26.500 ²⁰⁹	30.13 ⁸¹	22.026 ²¹²	59.99 ³⁶⁵	50.09 ³⁰	48.03 ³⁶⁵
	251	104	251	105	294	346	43	341
15.9	15.302	50.05	26.751	31.18	22.320	56.53	50.52	44.62
25.9	15.587 ²⁸⁵	51.31 ¹²⁶	27.035 ²⁸⁴	32.43 ¹²⁵	22.682 ³⁶²	53.35 ³¹⁸	51.10 ⁵⁸	41.54 ³⁰⁸
35.8	15.898 ³¹¹	52.72 ¹⁴¹	27.346 ³¹¹	33.83 ¹⁴⁰	23.104 ⁴²²	50.57 ²⁷⁸	51.78 ⁶⁸	38.89 ²⁶⁵
Mean Place	12.189	40.19	23.636	21.34	22.965	81.82	55.657	71.37
Sec δ, Tan δ	1.039	-0.280	1.039	-0.281	1.977	+1.706	3.738	+3.602
D _{4a} , D _{4s}	+0.07	-0.01	+0.07	-0.01	+0.03	+0.08	0.00	+0.13
D _{4s} , D _{4s}	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

5234°—1919—28

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ϵ Libræ. Mag. 5.6		Piazzi 221. Mag. 5.8		β Lupi. Mag. 2.8		δ Libræ. Var. 4.8-6.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 14 52	° ' " -11 5	h m 14 52	° ' " +14 46	h m 14 53	° ' " -42 48	h m 14 56	° ' " - 8 11
	s	"	s	"	s	"	s	"
Jan. 0.8	22.539 ³¹⁶	1.58 ¹⁵⁹	23.883 ³⁰⁵	14.19 ²²⁵	13.443 ⁴⁰⁶	23.52 ⁵⁰	38.816 ³¹⁰	55.46 ¹⁶⁶
10.8	22.855 ³²⁶	3.17 ¹⁶³	24.188 ³¹⁶	11.94 ²⁰¹	13.849 ⁴¹⁹	24.02 ⁸⁶	39.126 ³²²	57.13 ¹⁶⁶
20.8	23.181 ³²⁷	4.80 ¹⁶⁰	24.504 ³²¹	9.93 ¹⁷²	14.268 ⁴²¹	24.88 ¹¹⁵	39.448 ³²³	58.80 ¹⁵⁸
30.8	23.508 ³²⁰	6.40 ¹⁵¹	24.825 ³¹⁴	8.21 ¹³⁸	14.689 ⁴¹³	26.03 ¹³⁹	39.771 ³¹⁷	60.39 ¹⁴⁶
Feb. 9.7	23.828 ³⁰⁴	7.91 ¹³⁸	25.139 ³⁰⁰	6.83 ⁹⁵	15.102 ³⁹⁴	27.42 ¹⁶¹	40.088 ³⁰³	61.88 ¹³²
19.7	24.132 ²⁸⁵	9.29 ¹²⁰	25.439 ²⁸¹	5.88 ⁵⁴	15.496 ³⁷⁰	29.03 ¹⁷⁶	40.391 ²⁸⁴	63.21 ¹¹¹
Mar. 1.7	24.417 ²⁶⁰	10.49 ¹⁰¹	25.720 ²⁵⁶	5.34 ¹²	15.866 ³⁴¹	30.79 ¹⁸⁷	40.675 ²⁶⁰	64.33 ⁹
11.7	24.677 ²³⁴	11.50 ⁷⁸	25.976 ²²⁹	5.22 ²⁹	16.207 ³⁰⁷	32.66 ¹⁹³	40.935 ²³⁴	65.23 ⁶
21.6	24.911 ²⁰⁶	12.28 ⁵⁹	26.205 ¹⁹⁷	5.51 ⁶⁷	16.514 ²⁷²	34.59 ¹⁹⁷	41.169 ²⁰⁶	65.89 ⁴
31.6	25.117 ¹⁷⁶	12.87 ³⁸	26.402 ¹⁶⁶	6.18 ⁹⁷	16.786 ²³⁵	36.56 ¹⁹⁴	41.375 ¹⁷⁸	66.33 ²
Apr. 10.6	25.293 ¹⁴⁸	13.25 ¹⁸	26.568 ¹³⁶	7.15 ¹²⁵	17.021 ¹⁹⁶	38.50 ¹⁹⁰	41.553 ¹⁴⁹	66.53 ¹
20.5	25.441 ¹¹⁸	13.43 ³	26.704 ¹⁰⁴	8.40 ¹⁴⁴	17.217 ¹⁵⁸	40.40 ¹⁸⁴	41.702 ¹²⁰	66.55 ¹
30.5	25.559 ⁹⁰	13.46 ¹¹	26.808 ⁷²	9.84 ¹⁵⁸	17.375 ¹¹⁸	42.24 ¹⁷⁴	41.822 ⁹²	66.39 ³
May 10.5	25.649 ⁶⁰	13.35 ²⁴	26.880 ⁴⁴	11.42 ¹⁶⁵	17.493 ⁷⁸	43.98 ¹⁶¹	41.914 ⁶³	66.09 ⁴
20.5	25.709 ³²	13.11 ³¹	26.924 ¹³	13.07 ¹⁶⁵	17.571 ³⁸	45.59 ¹⁴⁶	41.977 ³⁴	65.69 ⁴
30.4	25.741 ⁵	12.80 ³⁹	26.937 ¹⁶	14.72 ¹⁶⁰	17.609 ²	47.05 ¹²⁸	42.011 ⁷	65.20 ³
June 9.4	25.746 ²⁵	12.41 ⁴⁵	26.921 ⁴²	16.32 ¹⁵¹	17.607 ⁴²	48.33 ¹⁰⁷	42.018 ²²	64.66 ²
19.4	25.721 ⁵⁰	11.96 ⁴⁹	26.879 ⁷⁰	17.83 ¹³⁷	17.565 ⁸¹	49.40 ⁸⁵	41.996 ⁴⁹	64.08 ¹
29.4	25.671 ⁷⁷	11.47 ⁵⁴	26.809 ¹¹⁴	19.20 ¹¹⁹	17.484 ¹¹⁶	50.25 ⁵⁷	41.947 ⁷⁵	63.48 ¹
July 9.3	25.594 ⁹⁹	10.96 ⁵⁴	26.714 ¹¹⁴	20.39 ¹⁰⁰	17.368 ¹⁴⁷	50.82 ³⁰	41.872 ⁹⁷	62.87 ¹
19.3	25.495 ¹²⁰	10.42 ⁵⁴	26.600 ¹³³	21.39 ⁷⁷	17.221 ¹⁷⁶	51.12 ²	41.775 ¹¹⁹	62.27 ¹
29.3	25.375 ¹³⁴	9.88 ⁵⁵	26.467 ¹⁴⁶	22.16 ⁵⁴	17.045 ¹⁹⁵	51.14 ²⁸	41.656 ¹³³	61.69 ¹
Aug. 8.2	25.241 ¹⁴⁵	9.33 ⁵⁴	26.321 ¹⁵⁶	22.70 ²⁹	16.850 ²⁰⁶	50.86 ⁵⁸	41.523 ¹⁴⁴	61.13 ¹
18.2	25.096 ¹⁴⁷	8.79 ⁵¹	26.165 ¹⁵⁸	22.99 ³	16.644 ²¹⁰	50.28 ⁸⁶	41.379 ¹⁴⁸	60.62 ¹
28.2	24.949 ¹⁴³	8.28 ⁴⁷	26.007 ¹⁵³	23.02 ²⁶	16.434 ²⁰³	49.42 ¹¹²	41.231 ¹⁴⁴	60.16 ¹
Sept. 7.2	24.806 ¹³¹	7.81 ⁴⁰	25.854 ¹⁴²	22.76 ⁵²	16.231 ¹⁸³	48.30 ¹³³	41.087 ¹³³	59.77 ¹
17.1	24.675 ¹⁰⁹	7.41 ³⁰	25.712 ¹¹⁹	22.24 ⁸²	16.048 ¹⁵²	46.97 ¹⁵⁰	40.954 ¹¹¹	59.47 ¹
27.1	24.566 ⁸⁰	7.11 ¹⁸	25.593 ⁹⁸	21.42 ¹¹⁰	15.896 ¹¹⁰	45.47 ¹⁶³	40.843 ⁸³	59.30 ¹
Oct. 7.1	24.486 ⁴²	6.93 ³	25.500 ⁵⁵	20.32 ¹³⁷	15.786 ⁶¹	43.84 ¹⁶⁵	40.760 ⁴⁸	59.26 ¹
17.1	24.444 ²	6.90 ¹⁸	25.445 ¹³	18.95 ¹⁶⁵	15.725 ¹	42.19 ¹⁶²	40.712 ⁴	59.39 ¹
27.0	24.446 ⁵⁰	7.08 ³⁶	25.432 ³³	17.30 ¹⁸⁸	15.726 ⁶³	40.57 ¹⁵¹	40.708 ⁴⁴	59.72 ¹
Nov. 6.0	24.496 ¹⁰⁰	7.44 ⁶⁰	25.465 ⁸⁴	15.42 ²¹²	15.789 ¹³⁰	39.06 ¹³⁴	40.752 ⁹⁵	60.26 ¹
16.0	24.596 ¹⁵¹	8.04 ⁸³	25.549 ¹³⁴	13.30 ²²⁸	15.919 ¹⁹⁷	37.72 ¹⁰⁸	40.847 ¹⁴⁴	61.03 ¹
25.9	24.747 ¹⁹⁸	8.87 ¹⁰⁴	25.683 ¹⁸¹	11.02 ²⁴¹	16.116 ²⁵⁶	36.64 ⁷⁷	40.991 ¹⁹²	62.02 ¹
Dec. 5.9	24.945 ²⁴¹	9.91 ¹²⁶	25.864 ²²⁵	8.61 ²⁴⁶	16.372 ³¹⁰	35.87 ⁴⁴	41.183 ²³³	63.23 ¹
15.9	25.186 ²⁷⁵	11.17 ¹⁴²	26.089 ²⁶¹	6.15 ²⁴⁵	16.682 ³⁵⁵	35.43 ⁸	41.416 ²⁷⁰	64.61 ¹
25.9	25.461 ³⁰¹	12.59 ¹⁵⁵	26.350 ²⁸⁹	3.70 ²³⁵	17.037 ³⁸⁷	35.35 ²⁹	41.686 ²⁹⁶	66.13 ¹
35.8	25.762	14.14	26.639	1.35	17.424	35.64	41.982	67.78 ¹
Mean Place	22.182	0.81	23.753	22.53	13.008	31.36	38.497	53.93
Sec δ , Tan δ	1.019	-0.196	1.034	+0.264	1.363	-0.926	1.010	-0.144
$D\mu\alpha$, $D\mu\alpha$	+0.07	-0.01	+0.06	+0.01	+0.08	-0.04	+0.06	-0.01
$D\mu\delta$, $D\mu\delta$	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

APPARENT PLACES OF STARS, 1919.

435

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Boötis. Mag. 3.6		γ Scorpil. Mag. 3.4		ψ Boötis. Mag. 4.7		ϵ Boötis. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 14 58	° ' +40 42	h m 14 59	° ' -24 57	h m 15 0	° ' +27 15	h m 15 3	° ' +25 10
	s "	"	s "	"	s "	"	s "	"
Jan. 0.8	53.289	19.52	19.908	48.43	58.366	34.77	44.509	51.29
10.8	53.627 ³³⁸	16.92 ²⁰⁰	20.245 ³³⁷	49.54 ¹¹¹	58.676 ⁸¹⁰	32.28 ²⁴⁹	44.816 ³⁰⁷	48.83 ²⁴⁶
20.8	53.987 ³⁶⁰	14.76 ²¹⁶	20.595 ³⁵⁰	50.80 ¹²⁶	59.003 ⁸²⁷	30.14 ²¹⁴	45.139 ³²³	46.69 ²¹⁴
30.8	54.857 ³⁷⁰	13.11 ¹⁶⁵	20.946 ³⁵¹	52.18 ¹³⁸	59.336 ⁸³³	28.40 ¹⁷⁴	45.469 ³³⁰	44.93 ¹⁷⁶
Feb. 9.7	54.726 ³⁶⁹	12.02 ¹⁰⁹	21.291 ³⁴⁵	53.63 ¹⁴⁵	59.666 ⁸³⁰	27.13 ¹²⁷	45.797 ³²⁸	43.62 ¹³¹
	54.726 ³⁵⁶	12.02 ⁴⁹	21.291 ³³¹	53.63 ¹⁴⁷	59.666 ⁸¹⁹	27.13 ⁷⁶	45.797 ³¹⁶	43.62 ⁸²
19.7	55.082	11.53	21.622	55.10	59.985	26.37	46.113	42.80
Mar. 1.7	55.418 ³³⁶	11.64 ¹¹	21.931 ³⁰⁹	56.55 ¹⁴⁵	60.284 ²⁹⁹	26.12 ²⁵	46.410 ²⁹⁷	42.48 ³²
11.7	55.724 ³⁰⁶	12.32 ⁶⁸	22.218 ²⁸⁷	57.94 ¹³⁹	60.559 ²⁷⁵	26.39 ²⁷	46.684 ²⁷⁴	42.66 ¹⁸
21.6	55.995 ²⁷¹	13.55 ¹²³	22.476 ²⁵⁸	59.24 ¹³⁰	60.804 ²⁴⁵	27.14 ⁷⁵	46.929 ²⁴⁵	43.32 ⁶⁶
31.6	56.228 ²³³	15.25 ¹⁷⁰	22.706 ²³⁰	60.42 ¹¹⁸	61.016 ²¹²	28.33 ¹¹⁹	47.142 ²¹³	44.41 ¹⁰⁹
	56.228 ¹⁹⁰	15.25 ²¹⁰	22.706 ²⁰⁰	60.42 ¹⁰⁷	61.016 ¹⁷⁸	28.33 ¹⁵⁶	47.142 ¹⁸¹	44.41 ¹⁴⁵
Apr. 10.6	56.418	17.35	22.906	61.49	61.194	29.89	47.323	45.86
20.5	56.565 ¹⁴⁷	19.74 ²³⁹	23.075 ¹⁶⁹	62.44 ⁹⁵	61.338 ¹⁴⁴	31.74 ¹⁸⁵	47.468 ¹⁴⁵	47.62 ¹⁷⁶
30.5	56.669 ¹⁰⁴	22.34 ²⁰⁰	23.214 ¹³⁹	63.27 ⁸³	61.446 ¹⁰⁸	33.81 ²⁰⁷	47.580 ¹¹²	49.58 ¹⁹⁶
May 10.5	56.729 ⁶⁰	25.04 ²⁷⁰	23.320 ¹⁰⁶	63.97 ⁷⁰	61.518 ⁷²	36.00 ²¹⁹	47.658 ⁷⁸	51.69 ²¹¹
20.5	56.747 ¹⁸	27.75 ²⁷¹	23.396 ⁷⁶	64.56 ⁵⁹	61.558 ⁴⁰	38.24 ²²⁴	47.703 ⁴⁵	53.85 ²¹⁶
	56.747 ²²	27.75 ²⁶³	23.396 ⁴⁵	64.56 ⁴⁶	61.558 ⁵	38.24 ²²¹	47.703 ¹¹	53.85 ²¹³
30.4	56.725	30.38	23.441	65.02	61.563	40.45	47.714	55.98
June 9.4	56.664 ⁶¹	32.85 ²⁴⁷	23.452 ¹¹	65.37 ³⁵	61.535 ²⁸	42.55 ²¹⁰	47.693 ²¹	58.03 ²⁰⁵
19.4	56.568 ⁹⁶	35.09 ²²⁴	23.432 ²⁰	65.58 ²¹	61.477 ⁵⁸	44.50 ¹⁹⁵	47.643 ⁵⁰	59.93 ¹⁹⁰
29.4	56.438 ¹³⁰	37.04 ¹⁹⁵	23.382 ⁵⁰	65.68 ¹⁰	61.390 ⁸⁷	46.23 ¹⁷³	47.563 ⁸⁰	61.63 ¹⁷⁰
July 9.3	56.278 ¹⁶⁰	38.64 ¹⁶⁰	23.302 ⁸⁰	65.65 ³	61.276 ¹¹⁴	47.71 ¹⁴⁸	47.455 ¹⁰⁸	63.09 ¹⁴⁶
	56.278 ¹⁸⁴	38.64 ¹²²	23.302 ¹⁰⁷	65.65 ¹⁸	61.276 ¹³⁶	47.71 ¹¹⁸	47.455 ¹²⁹	63.09 ¹¹⁷
19.3	56.094	39.86	23.195	65.47	61.140	48.89	47.326	64.26
29.3	55.887 ²⁰⁷	40.68 ⁸²	23.066 ¹²⁹	65.17 ³⁰	60.982 ¹⁵⁸	49.76 ⁸⁷	47.176 ¹⁵⁰	65.14 ⁸⁸
Aug. 8.2	55.666 ²²¹	41.07 ³⁹	22.919 ¹⁴⁷	64.74 ⁴³	60.809 ¹⁷³	50.28 ⁵²	47.009 ¹⁶⁷	65.69 ⁵⁵
18.2	55.437 ²²⁹	41.02 ⁵	22.760 ¹⁵⁹	64.17 ⁵⁷	60.628 ¹⁸¹	50.45 ¹⁷	46.833 ¹⁷⁶	65.90 ²¹
28.2	55.206 ²³¹	40.54 ⁴⁸	22.596 ¹⁶⁴	63.48 ⁶⁹	60.443 ¹⁸⁵	50.26 ¹⁹	46.653 ¹⁸⁰	65.76 ¹⁴
	55.206 ²²⁴	40.54 ⁹²	22.596 ¹⁵⁹	63.48 ⁷⁶	60.443 ¹⁸⁰	50.26 ⁵⁶	46.653 ¹⁷⁷	65.76 ⁴⁷
Sept. 7.2	54.982	39.62	22.437	62.72	60.263	49.70	46.476	65.29
17.1	54.774 ²⁰⁸	38.27 ¹³⁵	22.291 ¹⁴⁶	61.90 ⁸²	60.096 ¹⁶⁷	48.80 ⁹⁰	46.313 ¹⁶³	64.45 ⁸⁴
27.1	54.589 ¹⁸⁵	36.51 ¹⁷⁶	22.168 ¹²³	61.05 ⁸⁵	59.948 ¹⁴⁸	47.53 ¹²⁷	46.168 ¹⁴⁵	63.27 ¹¹⁸
Oct. 7.1	54.439 ¹⁵⁰	34.37 ²¹⁴	22.076 ⁹²	60.21 ⁸⁴	59.830 ¹¹⁸	45.91 ¹⁶²	46.052 ¹¹⁶	61.75 ¹⁵²
17.1	54.330 ¹⁰⁹	31.88 ²⁴⁹	22.026 ⁵⁰	59.44 ⁷⁷	59.749 ⁸¹	43.98 ¹⁹³	45.973 ⁷⁹	59.93 ¹⁸²
	54.330 ⁸⁹	31.88 ²⁷⁹	22.026 ⁴	59.44 ⁶⁴	59.749 ³⁶	43.98 ²²³	45.973 ³⁷	59.93 ²¹³
27.0	54.271	29.09	22.022	58.80	59.713	41.75	45.936	57.80
Nov. 6.0	54.268 ³	26.04 ³⁰⁵	22.073 ⁵¹	58.31 ⁴⁹	59.725 ¹²	39.25 ²⁵⁰	45.948 ¹²	55.42 ²³⁸
16.0	54.324 ⁵⁶	22.81 ³²³	22.177 ¹⁰⁴	58.03 ²⁸	59.790 ⁶⁵	36.55 ²⁷⁰	46.012 ⁶⁴	52.81 ²⁶¹
25.9	54.439 ¹¹⁵	19.47 ³²⁴	22.335 ¹⁵⁸	57.98 ⁵	59.908 ¹¹⁸	33.70 ²⁸⁵	46.129 ¹¹⁷	50.05 ²⁷⁶
Dec. 5.9	54.614 ¹⁷⁵	16.12 ³³⁵	22.545 ²¹⁰	58.20 ²²	60.079 ¹⁷¹	30.78 ²⁹²	46.297 ¹⁶⁸	47.20 ²⁸⁵
	54.614 ²³⁰	16.12 ³²⁸	22.545 ²⁵⁵	58.20 ⁴⁸	60.079 ²¹⁷	30.78 ²⁹³	46.297 ²¹⁶	47.20 ²⁸⁶
15.9	54.844	12.84	22.800	58.68	60.296	27.85	46.513	44.34
25.9	55.122 ²⁷⁸	9.74 ³¹⁰	23.093 ²⁹³	59.42 ⁷⁴	60.555 ²⁵⁹	25.02 ²⁸³	46.769 ²⁵⁶	41.56 ²⁷⁸
35.8	55.439 ³¹⁷	6.92 ²⁸²	23.414 ³²¹	60.38 ⁹⁶	60.847 ²⁹²	22.38 ²⁶⁴	47.057 ²⁸⁸	38.94 ²⁶²
Mean Place	53.702	33.88	19.523	51.73	58.475	45.97	44.596	61.84
Sec δ , Tan δ	1.319	+0.860	1.103	-0.466	1.125	+0.515	1.104	+0.470
D_{α}, D_{ω}	+0.05	+0.04	+0.07	-0.02	+0.05	+0.02	+0.05	+0.02
D_{δ}, D_{ϵ}	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Lupi. Mag. 3.5		ι Libræ. Mag. 4.7		3 Serpentis. Mag. 5.4		γ Triang. Aust. Mag. 3.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 15 6	° ' " -51 47	h m 15 7	° ' " -19 29	h m 15 11	° ' " + 5 14	h m 15 11	° ' " -68 22
	s	"	s	"	s	"	s	"
Jan. 0.9	27.718	20.64	36.350	8.21	9.811	16.52	19.43	41.91
10.8	28.177 ⁴⁸⁹	20.66 ²	36.671 ³²¹	9.44 ¹²³	10.105 ²⁹⁴	14.50 ²⁰²	20.14 ⁷¹	41.28 ⁶⁸
20.8	28.656 ⁴⁷⁹	21.10 ⁴⁴	37.006 ³³⁵	10.78 ¹³⁴	10.414 ³⁰⁹	12.60 ¹⁹⁰	20.88 ⁷⁴	41.14 ¹⁴
30.8	29.141 ⁴⁸⁵	21.90 ⁸⁰	37.344 ³³⁸	12.18 ¹⁴⁰	10.729 ³¹⁵	10.91 ¹⁶⁹	21.65 ⁷⁷	41.50 ³⁶
Feb. 9.7	29.622 ⁴⁸¹	23.04 ¹¹⁴	37.678 ³³⁴	13.61 ¹⁴³	11.040 ³¹¹	9.46 ¹⁴⁵	22.41 ⁷⁶	42.33 ⁸³
	464	144	322	138	300	113	74	126
19.7	30.086	24.48	38.000	14.99	11.340	8.33	23.15	43.59
Mar. 1.7	30.526 ⁴⁴⁰	26.17 ¹⁶⁹	38.303 ³⁰³	16.29 ¹³⁰	11.624 ²⁸⁴	7.53 ⁸⁰	23.86 ⁷¹	45.24 ¹⁶⁵
11.7	30.935 ⁴⁰⁹	28.05 ¹⁸⁸	38.582 ²⁷⁹	17.47 ¹¹⁸	11.887 ²⁶³	7.07 ⁴⁶	24.52 ⁶⁶	47.24 ²⁰⁰
21.6	31.308 ³⁷³	30.09 ²⁰⁴	38.837 ²⁵⁵	18.53 ¹⁰⁶	12.126 ²³⁹	6.97 ¹⁰	25.13 ⁶¹	49.51 ²²⁷
31.6	31.642 ³³⁴	32.24 ²¹⁵	39.065 ²²⁸	19.44 ⁹¹	12.337 ²¹¹	7.20 ²³	25.67 ⁵⁴	52.02 ²⁵¹
	293	221	199	75	184	50	47	268
Apr. 10.6	31.935	34.45	39.264	20.19	12.521	7.70	26.14	54.70
20.6	32.180 ²⁴⁵	36.69 ²²⁴	39.434 ¹⁷⁰	20.80 ⁶¹	12.676 ¹⁵⁵	8.46 ⁷⁶	26.54 ⁴⁰	57.49 ²⁷³
30.5	32.381 ²⁰¹	38.91 ²²²	39.576 ¹⁴²	21.28 ⁴⁸	12.801 ¹²⁵	9.41 ⁹⁵	26.86 ³²	60.35 ²⁸⁶
May 10.5	32.535 ¹⁵⁴	41.07 ²¹⁶	39.686 ¹¹⁰	21.64 ³⁶	12.899 ⁹⁸	10.52 ¹¹¹	27.09 ²³	63.21 ²⁸⁶
20.5	32.639 ¹⁰⁴	43.13 ²⁰⁶	39.766 ⁸⁰	21.87 ²³	12.966 ⁶⁷	11.73 ¹²¹	27.23 ¹⁴	66.01 ²⁸⁰
	54	193	51	14	39	125	5	268
30.4	32.693	45.06	39.817	22.01	13.005	12.98	27.28	68.69
June 9.4	32.697 ⁴	46.82 ¹⁷⁶	39.836 ¹⁹	22.05 ⁴	13.015 ¹⁰	14.23 ¹²⁵	27.25 ³	71.19 ²⁵⁰
19.4	32.652 ⁴⁵	48.35 ¹⁵³	39.825 ¹¹	22.01 ⁴	12.996 ¹⁹	15.44 ¹²¹	27.13 ¹²	73.45 ²²⁶
29.4	32.558 ⁹⁴	49.63 ¹²⁸	39.784 ⁴¹	21.87 ¹⁴	12.949 ⁴⁷	16.57 ¹¹³	26.93 ²⁰	75.41 ¹⁹⁶
July 9.3	32.419 ¹³⁹	50.63 ¹⁰⁰	39.713 ⁷¹	21.65 ²⁴	12.874 ⁷⁵	17.62 ¹⁰⁵	26.65 ²⁸	77.02 ¹⁶¹
	180	67	97	29	97	91	36	122
19.3	32.239	51.30	39.616	21.36	12.777	18.53	26.29	78.24
29.3	32.024 ²¹⁵	51.63 ³³	39.495 ¹²¹	20.99 ³⁷	12.658 ¹¹⁹	19.30 ⁷⁷	25.89 ⁴⁰	79.01 ⁷⁷
Aug. 8.3	31.784 ²⁴⁰	51.60 ³	39.356 ¹³⁹	20.54 ⁴⁵	12.521 ¹³⁷	19.91 ⁶¹	25.44 ⁴⁵	79.32 ³¹
18.2	31.526 ²⁵⁸	51.20 ⁴⁰	39.204 ¹⁵²	20.01 ⁵³	12.373 ¹⁴⁸	20.36 ⁴⁵	24.97 ⁴⁷	79.15 ¹⁷
28.2	31.263 ²⁶³	50.44 ⁷⁶	39.046 ¹⁵⁸	19.43 ⁵⁸	12.219 ¹⁵⁴	20.61 ²⁵	24.48 ⁴⁹	78.49 ⁶⁶
	255	111	156	62	153	7	47	113
Sept. 7.2	31.008	49.33	38.890	18.81	12.066	20.68	24.01	77.36
17.1	30.773 ²³⁵	47.93 ¹⁴⁰	38.745 ¹⁴⁵	18.18 ⁶³	11.923 ¹⁴³	20.53 ¹⁵	23.58 ⁴³	75.80 ¹⁵⁶
27.1	30.573 ²⁰⁰	46.24 ¹⁶⁹	38.622 ¹²³	17.57 ⁶¹	11.798 ¹²⁵	20.17 ³⁶	23.21 ³⁷	73.84 ¹⁹⁶
Oct. 7.1	30.418 ¹⁵⁵	44.38 ¹⁸⁶	38.526 ⁹⁶	17.00 ⁵⁷	11.698 ¹⁰⁰	19.58 ⁵⁹	22.92 ²⁹	71.57 ²²⁷
17.1	30.323 ⁹⁵	42.39 ¹⁹⁹	38.470 ⁵⁶	16.53 ⁴⁷	11.633 ⁶⁵	18.75 ⁸³	22.72 ²⁰	69.05 ²⁵³
	28	203	12	35	24	107	9	265
27.0	30.295	40.36	38.458	16.18	11.609	17.68	22.63	66.40
Nov. 6.0	30.343 ⁴⁸	38.38 ¹⁹⁸	38.496 ³⁸	16.02 ¹⁶	11.632 ²³	16.38 ¹³⁰	22.66 ³	63.71 ²⁶⁵
16.0	30.468 ¹²⁵	36.53 ¹⁸⁵	38.587 ⁹¹	16.05 ³	11.702 ⁷⁰	14.84 ¹⁵⁴	22.81 ¹⁵	61.10 ²⁶¹
26.0	30.671 ²⁰³	34.90 ¹⁶³	38.731 ¹⁴⁴	16.32 ²⁷	11.822 ¹²⁰	13.11 ¹⁷³	23.10 ²⁹	58.66 ²⁴¹
Dec. 5.9	30.946 ²⁷⁵	33.54 ¹³⁶	38.925 ¹⁹⁴	16.81 ⁴⁹	11.990 ¹⁶⁸	11.21 ¹⁹⁰	23.50 ⁴⁰	56.49 ²¹⁷
	339	100	240	74	212	202	50	18
15.9	31.285	32.54	39.165	17.55	12.202	9.19	24.00	54.67
25.9	31.679 ³⁹⁴	31.91 ⁶³	39.442 ²⁷⁷	18.50 ⁹⁵	12.452 ²⁵⁰	7.12 ²⁰⁷	24.60 ⁶⁰	53.27 ¹⁴⁶
35.8	32.115 ⁴³⁶	31.69 ²²	39.747 ³⁰⁵	19.63 ¹¹³	12.730 ²⁷⁸	5.05 ²⁰⁷	25.26 ⁶⁶	52.33 ⁹
Mean Place	27.405	30.31	36.022	10.09	9.668	21.45	19.475	54.18
Sec δ, Tan δ	1.617	-1.270	1.061	-0.354	1.004	+0.092	2.714	-2.524
Dψα, Dωα	+0.08	-0.06	+0.07	-0.02	+0.06	0.00	+0.11	-0.11
Dψδ, Dωδ	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

APPARENT PLACES OF STARS, 1919.

437

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	δ Boötis. Mag. 3.5		β Libræ. Mag. 2.7		γ Ursæ Minoris. Mag. 3.1		μ Boötis <i>pr.</i> Mag. 4.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 15 12	° ' " +33 36	h m 15 12	° ' " - 9 5	h m 15 20	° ' " +72 6	h m 15 21	° ' " +37 39
	s	"	s	"	s	"	s	"
Jan. 0.9	13.937	46.52	38.992	6.42	47.45	62.99	25.357	25.82
10.8	14.249 ³¹²	43.91 ²⁶¹	39.297 ³⁰⁵	7.99 ¹⁵⁷	48.05 ⁶⁰	60.34 ²⁶⁵	25.671 ³¹⁴	23.13 ²⁶⁹
20.8	14.583 ³³⁴	41.67 ²²⁴	39.614 ³¹⁷	9.58 ¹⁵⁰	48.73 ⁶⁸	58.21 ²¹³	26.009 ³³⁸	20.82 ²³¹
30.8	14.927 ³⁴⁴	39.88 ¹⁷⁹	39.936 ³²²	11.12 ¹⁵⁴	49.47 ⁷⁴	56.69 ¹⁵²	26.361 ³⁵²	18.98 ¹⁸⁴
Feb. 9.7	15.272 ³⁴⁵	38.61 ¹²⁷	40.255 ³¹⁹	12.55 ¹⁴³	50.23 ⁷⁶	55.84 ⁸⁵	26.717 ³⁵⁶	17.68 ¹³⁰
	15.608 ³³⁶	37.87 ⁷⁴	40.562 ³⁰⁷	13.83 ¹²⁸	51.00 ⁷⁷	55.66 ¹⁸	27.064 ³⁴⁷	16.95 ⁷³
Mar. 1.7	15.927 ³¹⁹	37.71 ¹⁶	40.853 ²⁹¹	14.91 ¹⁰⁸	51.74 ⁷⁴	56.18 ⁵²	27.397 ³³³	16.81 ¹⁴
11.7	16.220 ²⁹³	38.10 ³⁹	41.123 ²⁷⁰	15.79 ⁸⁸	52.42 ⁶⁸	57.33 ¹¹⁵	27.706 ³⁰⁹	17.26 ⁴⁵
21.6	16.484 ²⁶⁴	39.02 ⁹²	41.368 ²⁴⁵	16.43 ⁶⁴	53.04 ⁶²	59.09 ¹⁷⁶	27.987 ²⁸¹	18.26 ¹⁰⁰
31.6	16.716 ²³²	40.40 ¹³⁸	41.588 ²²⁰	16.86 ⁴³	53.57 ⁵³	61.36 ²²⁷	28.233 ²⁴⁶	19.75 ¹⁴⁹
	16.911 ¹⁹⁵	42.19 ¹⁷⁹	41.781 ¹⁸³	17.06 ²⁰	53.99 ⁴²	64.05 ²⁶⁹	28.443 ²¹⁰	21.65 ¹⁹⁰
Apr. 10.6	17.069 ¹⁵⁸	44.30 ²¹¹	41.945 ¹⁶⁴	17.08 ²	54.28 ²⁹	67.06 ³⁰¹	28.613 ¹⁷⁰	23.90 ²²⁵
20.6	17.189 ¹³⁰	46.63 ²³³	42.082 ¹³⁷	16.94 ¹⁴	54.47 ¹⁹	70.26 ³²⁰	28.742 ¹²⁹	26.39 ²⁴⁹
30.5	17.270 ⁸¹	49.10 ²⁴⁷	42.190 ¹⁰⁸	16.65 ²⁹	54.54 ⁷	73.54 ³²⁸	28.831 ⁸⁹	29.04 ²⁶⁵
May 10.5	17.315 ⁴⁵	51.62 ²⁵²	42.269 ⁷⁹	16.27 ³⁸	54.48 ⁶	76.80 ³²⁶	28.881 ⁵⁰	31.73 ²⁶⁹
	17.321 ⁶	54.10 ²⁴⁸	42.319 ⁵⁰	15.80 ⁴⁷	54.30 ¹⁸	79.92 ³¹²	28.890 ⁹	34.38 ²⁶⁵
June 9.4	17.292 ²⁹	56.48 ²³⁸	42.339 ²⁰	15.28 ⁵²	54.02 ²⁸	82.82 ²⁹⁰	28.860 ³⁰	36.91 ²⁵³
19.4	17.228 ⁶⁴	58.66 ²¹⁸	42.329 ¹⁰	14.72 ⁵⁶	53.64 ³⁸	85.41 ²⁵⁹	28.792 ⁶⁸	39.26 ²³⁵
29.4	17.133 ⁹⁵	60.60 ¹⁹⁴	42.291 ³⁸	14.14 ⁵⁸	53.18 ⁴⁶	87.63 ²²²	28.689 ¹⁰³	41.36 ²¹⁰
July 9.3	17.007 ¹²⁶	62.25 ¹⁶⁵	42.224 ⁶⁷	13.56 ⁵⁸	52.63 ⁵⁵	89.41 ¹⁷⁸	28.555 ¹³⁴	43.14 ¹⁷⁸
	16.856 ¹⁵¹	63.57 ¹³²	42.133 ⁹¹	12.98 ⁵⁸	52.03 ⁶⁰	90.72 ¹³¹	28.391 ¹⁶⁴	44.59 ¹⁴⁵
19.3	16.681 ¹⁷⁵	64.53 ⁹⁶	42.018 ¹¹⁵	12.42 ⁵⁶	51.36 ⁶⁷	91.52 ⁸⁰	28.203 ¹⁸⁸	45.64 ¹⁰⁵
29.3	16.490 ¹⁹¹	65.11 ⁵⁸	41.885 ¹³³	11.88 ⁵⁴	50.67 ⁶⁹	91.81 ²⁹	27.995 ²⁰⁸	46.29 ⁶⁵
Aug. 8.3	16.288 ²⁰²	65.29 ¹⁸	41.739 ¹⁴⁶	11.38 ⁵⁰	49.97 ⁷⁰	91.57 ²⁴	27.775 ²²⁰	46.52 ²³
18.2	16.081 ²⁰⁷	65.07 ²²	41.587 ¹⁵²	10.92 ⁴⁶	49.26 ⁷¹	90.80 ⁷⁷	27.549 ²²⁶	46.32 ²⁰
28.2	15.877 ²⁰⁴	64.44 ⁶³	41.436 ¹⁵¹	10.52 ⁴⁰	48.57 ⁶⁹	89.51 ¹²⁹	27.325 ²²⁴	45.69 ⁶³
Sept. 7.2	15.684 ¹⁹³	63.41 ¹⁰³	41.294 ¹⁴²	10.21 ³¹	47.92 ⁶⁵	87.74 ¹⁷⁷	27.112 ²¹³	44.63 ¹⁰⁶
17.1	15.513 ¹⁷¹	62.00 ¹⁴¹	41.172 ¹²²	10.01 ²⁰	47.32 ⁶⁰	85.51 ²²³	26.918 ¹⁹⁴	43.16 ¹⁴⁷
Oct. 7.1	15.370 ¹⁴³	60.21 ¹⁷⁹	41.075 ⁹⁷	9.93 ⁸	46.79 ⁵³	82.86 ²⁶⁵	26.755 ¹⁶³	41.31 ¹⁸⁵
17.1	15.265 ¹⁰⁵	58.06 ²¹⁵	41.015 ⁶⁰	10.00 ⁷	46.35 ⁴⁴	79.84 ³⁰²	26.629 ¹²⁶	39.08 ²²³
	15.206 ⁵⁹	55.60 ²⁴⁶	40.996 ²⁷	10.27 ²⁷	46.00 ³⁵	76.53 ³³¹	26.549 ⁸⁰	36.52 ²⁵⁶
Nov. 6.0	15.197 ⁹	52.88 ²⁷²	41.025 ²⁹	10.72 ⁴⁵	45.79 ²¹	72.97 ³⁵⁶	26.522 ²⁷	33.69 ²⁸³
16.0	15.244 ⁴⁷	49.95 ²⁹³	41.104 ⁷⁹	11.40 ⁶⁸	45.69 ¹⁰	69.26 ³⁷¹	26.551 ²⁹	30.62 ³⁰⁷
26.0	15.346 ¹⁰²	46.85 ³¹⁰	41.233 ¹²⁹	12.28 ⁸⁸	45.73 ⁴	65.49 ³⁷⁷	26.638 ⁸⁷	27.41 ³²¹
Dec. 5.9	15.504 ¹⁵⁸	43.69 ³¹⁶	41.411 ¹⁷⁸	13.39 ¹¹¹	45.90 ¹⁷	61.76 ³⁷³	26.785 ¹⁴⁷	24.14 ³²⁷
	15.713 ²⁰⁹	40.56 ³¹³	41.632 ²²¹	14.67 ¹²⁸	46.21 ³¹	58.19 ³⁵⁷	26.986 ²⁰¹	20.89 ³²⁵
15.9	15.969 ²⁵⁶	37.55 ³⁰¹	41.891 ²⁵⁹	16.10 ¹⁴³	46.65 ⁴⁴	54.87 ³³²	27.236 ²⁵⁰	17.77 ³¹²
25.9	16.260 ²⁹¹	34.75 ²⁸⁰	42.178 ²⁸⁷	17.63 ¹⁵³	47.19 ⁵⁴	51.93 ²⁹⁴	27.527 ²⁹¹	14.88 ²⁸⁹
Mean Place	14.245	58.54	38.743	5.52	50.833	79.86	25.828	38.09
Sec δ , Tan δ	1.201	+0.665	1.013	-0.160	3.257	+3.100	1.263	+0.772
$D_{\alpha\alpha}$, $D_{\alpha\delta}$	+0.05	+0.03	+0.06	-0.01	0.00	+0.13	+0.05	+0.03
$D_{\delta\delta}$, $D_{\delta\alpha}$	-0.3	-0.7	-0.3	-0.7	-0.3	-0.8	-0.3	-0.8

APPARENT PLACES OF STARS, 1919. .

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	τ^1 Serpentis. Mag. 5.5		ι Draconis. Mag. 3.5		β Libræ. Mag. 5.9		β Coronæ Borealis. Mag. 3.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 15 22	° ' " +15 42	h m 15 23	° ' " +59 14	h m 15 23	° ' " -16 26	h m 15 24	° ' " +29 22
Jan. 0.9	1.852 288	35.96 230	6.110 408	42.09 279	41.350 310	4.77 125	29.089 297	52.74 280
10.8	2.140 307	33.66 208	6.518 453	39.30 229	41.660 334	6.02 133	29.386 319	50.15 227
20.8	2.447 315	31.58 179	6.971 481	37.01 171	41.984 331	7.35 136	29.705 330	47.88 186
30.8	2.762 315	29.79 144	7.452 496	35.30 108	42.315 329	8.71 135	30.035 333	46.03 180
Feb. 9.8	3.077 306	28.35 102	7.948 490	34.22 41	42.644 319	10.06 127	30.368 327	44.64 87
19.7	3.333 292	27.33 60	8.438 474	33.81 27	42.963 303	11.33 115	30.695 311	43.77 28
Mar. 1.7	3.675 271	26.73 16	8.912 440	34.08 92	43.266 285	12.48 102	31.006 290	43.44 21
11.7	3.946 247	26.57 27	9.352 396	35.00 152	43.551 261	13.50 87	31.296 264	43.65 73
21.6	4.193 220	26.84 66	9.748 344	36.52 205	43.812 237	14.37 69	31.560 235	44.37 130
31.6	4.413 193	27.50 100	10.092 283	38.57 250	44.049 209	15.06 54	31.795 201	45.57 138
Apr. 10.6	4.606 162	28.50 131	10.375 218	41.07 282	44.258 183	15.60 39	31.996 168	47.16 182
20.6	4.768 133	29.81 153	10.593 149	43.89 307	44.441 153	15.99 23	32.164 132	49.08 217
30.5	4.901 101	31.34 169	10.742 80	46.96 318	44.594 128	16.22 13	32.296 98	51.25 232
May 10.5	5.002 70	33.03 178	10.822 12	50.14 319	44.719 95	16.35 2	32.394 60	53.57 240
20.5	5.072 40	34.81 180	10.834 55	53.33 309	44.814 64	16.37 7	32.454 25	55.97 239
30.5	5.112 8	36.61 177	10.779 118	56.42 292	44.878 33	16.30 13	32.479 9	58.36 231
June 9.4	5.120 22	38.38 166	10.661 177	59.34 264	44.911 3	16.17 21	32.470 44	60.67 214
19.4	5.098 52	40.04 155	10.484 230	61.98 231	44.914 30	15.96 26	32.426 76	62.81 196
29.4	5.046 80	41.59 137	10.254 279	64.29 190	44.884 60	15.70 31	32.350 107	64.77 168
July 9.3	4.966 106	42.96 116	9.975 320	66.19 146	44.824 88	15.39 36	32.243 134	66.45 139
19.3	4.860 128	44.12 94	9.655 353	67.65 99	44.736 114	15.03 40	32.109 159	67.84 106
29.3	4.732 147	45.06 68	9.302 376	68.64 49	44.622 134	14.63 44	31.950 178	68.90 71
Aug. 8.3	4.585 161	45.74 42	8.926 391	69.13 4	44.488 149	14.19 47	31.772 190	69.61 34
18.2	4.424 168	46.16 14	8.535 396	69.09 53	44.339 158	13.72 50	31.582 198	69.95 3
28.2	4.256 168	46.30 14	8.139 389	68.56 105	44.181 159	13.22 51	31.384 198	69.92 43
Sept. 7.2	4.088 159	46.16 42	7.750 371	67.51 153	44.022 151	12.71 51	31.186 188	69.49 81
17.2	3.929 143	45.74 73	7.379 339	65.98 200	43.871 133	12.20 47	30.998 170	68.68 118
27.1	3.786 118	45.01 103	7.040 296	63.98 243	43.738 106	11.73 40	30.828 143	67.50 155
Oct. 7.1	3.668 84	43.98 131	6.744 241	61.55 280	43.632 70	11.33 31	30.685 109	65.95 189
17.1	3.584 43	42.67 159	6.503 176	58.75 315	43.562 27	11.02 17	30.576 66	64.06 221
27.0	3.541 2	41.08 184	6.327 102	55.60 342	43.535 21	10.85 1	30.510 17	61.85 250
Nov. 6.0	3.543 52	39.24 209	6.225 23	52.18 360	43.556 72	10.84 19	30.493 36	59.35 273
16.0	3.595 103	37.15 227	6.202 64	48.58 371	43.628 125	11.03 39	30.529 90	56.63 289
26.0	3.698 152	34.88 241	6.266 148	44.87 370	43.753 175	11.42 62	30.619 145	53.74 300
Dec. 5.9	3.850 198	32.47 248	6.414 231	41.17 360	43.928 221	12.04 83	30.764 195	50.74 301
15.9	4.048 238	29.99 248	6.645 306	37.57 338	44.149 261	12.87 102	30.959 239	47.73 283
25.9	4.286 271	27.51 242	6.951 373	34.19 304	44.410 291	13.89 119	31.198 276	44.80 275
35.9	4.557	25.09	7.324	31.15	44.701	15.08	31.474	42.05
Mean Place	1.883	43.20	7.660	57.64	41.112	6.06	29.370	63.08
Sec δ , Tan δ	1.039	+0.281	1.956	+1.680	1.043	-0.295	1.148	+0.563
$D\psi\alpha$, $D\omega\alpha$	+0.06	+0.01	+0.03	+0.07	+0.07	-0.01	+0.05	+0.02
$D\psi\delta$, $D\omega\delta$	-0.3	-0.8	-0.3	-0.8	-0.3	-0.8	-0.2	-0.8

APPARENT PLACES OF STARS, 1919.

439

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ^1 Boötis. Mag. 5.2		γ Lupi (mean). Mag. 3.0		γ Libræ. Mag. 4.0		α Coronæ Borealis. Mag. 2.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m	° '	h m	° '	h m	° '	h m	° '
	15 28	+41 6	15 29	-40 53	15 30	-14 31	15 31	+26 58
	s	"	s	"	s	"	s	"
Jan. 0.9	0.574	18.18	44.438	37.36	59.759	11.66	15.205	61.97
10.8	0.890 ³¹⁶	15.40 ²⁷⁸	44.814 ³⁷⁶	37.57 ²¹	60.061 ³⁰²	12.94 ¹²⁸	15.495 ²⁹⁰	59.39 ²⁵⁸
20.8	1.235 ³⁴⁵	13.03 ²³⁷	45.212 ³⁹⁸	38.06 ⁴⁹	60.380 ³¹⁹	14.29 ¹³⁵	15.807 ³¹²	57.12 ²²⁷
30.8	1.596 ³⁶¹	11.16 ¹⁸⁷	45.618 ⁴⁰⁶	38.83 ⁷⁷	60.706 ³²⁶	15.65 ¹³⁶	16.132 ³²⁵	55.22 ¹⁹⁰
Feb. 9.8	1.963 ³⁶⁷	9.83 ¹³³	46.025 ⁴⁰⁷	39.83 ¹⁰⁰	61.031 ³²⁵	16.96 ¹³¹	16.460 ³²⁸	53.78 ¹⁴⁴
		74		120		121		93
19.7	2.325	9.09	46.421	41.03	61.348	18.17	16.782	52.85
Mar. 1.7	2.672 ³⁴⁷	8.96 ¹³	46.802 ³⁸¹	42.38 ¹³⁵	61.651 ³⁰⁸	19.27 ¹¹⁰	17.091 ³⁰⁹	52.44 ⁴¹
11.7	2.998 ³²⁶	9.45 ⁴⁹	47.159 ³⁵⁷	43.84 ¹⁴⁶	61.936 ²⁸⁵	20.21 ⁹⁴	17.381 ²⁹⁰	52.54 ¹⁰
21.7	3.293 ²⁹⁶	10.49 ¹⁰⁴	47.491 ³³²	45.38 ¹⁵⁴	62.199 ²⁶³	20.97 ⁷⁶	17.646 ²⁶⁵	53.15 ⁶¹
31.6	3.554 ²⁶¹	12.05 ¹⁵⁶	47.794 ³⁰³	46.96 ¹⁵⁸	62.439 ²⁴⁰	21.56 ⁵⁹	17.883 ²³⁷	54.23 ¹⁰⁸
		200		161		41		148
Apr. 10.6	3.776	14.05	48.065	48.57	62.653	21.97	18.089	55.71
20.6	3.957 ¹⁸¹	16.39 ²³⁴	48.301 ²³⁶	50.16 ¹⁵⁹	62.840 ¹⁸⁷	22.21 ²⁴	18.263 ¹⁷⁴	57.51 ¹⁸⁰
30.5	4.098 ¹⁴¹	19.00 ²⁶¹	48.503 ²⁰²	51.72 ¹⁵⁶	62.999 ¹⁵⁹	22.32 ¹¹	18.404 ¹⁴¹	59.58 ²⁰⁷
May 10.5	4.194 ⁹⁶	21.76 ²⁷⁶	48.666 ¹⁶³	53.23 ¹⁵¹	63.129 ¹³⁰	22.31 ¹	18.509 ¹⁰⁵	61.80 ²²²
20.5	4.246 ⁵²	24.57 ²⁸¹	48.790 ¹²⁴	54.67 ¹⁴⁴	63.231 ¹⁰²	22.20 ¹¹	18.580 ⁷¹	64.11 ²³¹
		10		134		19		232
30.5	4.256	27.36	48.874 ⁴³	56.01 ¹²¹	63.301 ⁴⁰	22.01	18.615 ²	66.43 ²²⁵
June 9.4	4.224 ⁸²	30.01 ²⁶⁵	48.917 ¹	57.22 ¹⁰⁸	63.341 ⁷	21.74 ²⁷	18.617 ³³	68.68 ²¹¹
19.4	4.152 ⁷²	32.48 ²⁴⁷	48.918 ⁴²	58.30 ⁹⁰	63.348 ²⁵	21.43 ³¹	18.584 ⁶⁵	70.79 ¹⁹³
29.4	4.043 ¹⁰⁹	34.68 ²²⁰	48.876 ⁸¹	59.20 ⁷⁴	63.323 ⁵⁴	21.08 ³⁸	18.519 ¹²⁵	72.72 ¹⁶⁸
July 9.4	3.899 ¹⁷⁵	36.57 ¹⁸²	48.795 ¹²⁰	59.90 ⁴⁸	63.269 ⁸⁵	20.70 ⁴¹	18.423 ¹²⁵	74.40 ¹⁴¹
19.3	3.724	38.09	48.675	60.38	63.184	20.29	18.298	75.81
29.3	3.521 ²⁰³	39.21 ¹¹²	48.522 ¹⁵³	60.62 ²⁴	63.074 ¹¹⁰	19.86 ⁴³	18.149 ¹⁴⁹	76.91 ¹¹⁰
Aug. 8.3	3.299 ²²²	39.90 ⁶⁹	48.343 ¹⁷⁹	60.61 ¹	62.942 ¹³²	19.41 ⁴⁵	17.979 ¹⁷⁰	77.66 ⁷⁵
18.2	3.062 ²³⁷	40.16 ²⁶	48.144 ¹⁹⁹	60.31 ³⁰	62.794 ¹⁴⁸	18.94 ⁴⁷	17.795 ¹⁸⁴	78.08 ⁴²
28.2	2.818 ²⁴⁴	39.97 ¹⁹	47.933 ²¹¹	59.77 ⁵⁴	62.636 ¹⁶⁸	18.46 ⁴⁸	17.603 ¹⁹²	78.13 ⁵
		63		81		46		33
Sept. 7.2	2.576	39.34	47.723	58.96	62.477	18.00	17.410	77.80
17.2	2.343 ²³³	38.25 ¹⁰⁹	47.523 ²⁰⁰	57.94 ¹⁰²	62.324 ¹⁵³	17.56 ⁴⁴	17.224 ¹⁸⁶	77.10 ⁷⁰
27.1	2.131 ²¹²	36.74 ¹⁵¹	47.348 ¹⁷⁵	56.71 ¹²³	62.188 ¹³⁶	17.17 ³⁹	17.056 ¹⁶⁸	76.04 ¹⁰⁶
Oct. 7.1	1.948 ¹⁸³	34.83 ¹⁹¹	47.204 ¹⁴⁴	55.35 ¹³⁶	62.078 ¹¹⁰	16.86 ³¹	16.913 ¹⁴³	74.63 ¹⁴¹
17.1	1.804 ¹⁴⁴	32.53 ²³⁰	47.106 ⁹⁸	53.91 ¹⁴⁴	62.002 ⁷⁶	16.66 ²⁰	16.803 ¹¹⁰	72.86 ¹⁷⁷
		97		147		7		208
27.1	1.707 ⁴²	29.88 ²⁰²	47.063 ¹⁷	52.44 ¹⁴²	61.968 ¹³	16.59 ¹⁰	16.735 ²⁰	70.78 ²³⁶
Nov. 6.0	1.665 ¹⁶	26.96 ³¹⁶	47.080 ⁸¹	51.02 ¹³⁰	61.981 ⁶⁴	16.69 ³⁰	16.715 ³²	68.42 ²⁶¹
16.0	1.681 ⁷⁶	23.80 ³³¹	47.161 ¹⁴⁸	49.72 ¹¹¹	62.045 ¹¹⁶	16.99 ⁵⁰	16.747 ⁸⁵	65.81 ²⁷⁸
26.0	1.757 ¹³⁹	20.49 ³³⁸	47.309 ²⁰⁶	48.61 ⁸⁹	62.161 ¹⁶⁶	17.49 ⁷¹	16.832 ¹³⁸	63.03 ²⁹⁰
Dec. 5.9	1.896 ¹⁹⁵	17.11 ³³⁵	47.517 ²⁶⁶	47.72 ⁶⁰	62.327 ²¹³	18.20 ⁹⁰	16.970 ¹⁸⁸	60.13 ²⁹³
15.9	2.091	13.76	47.783	47.12	62.540	19.10	17.158	57.20
25.9	2.338 ²⁴⁷	10.55 ³²¹	48.098 ³¹⁵	46.82 ³⁰	62.792 ²⁶²	20.18 ¹⁰⁸	17.390 ²³²	54.33 ²⁸⁷
35.9	2.630 ²⁹²	7.58 ²⁹⁷	48.452 ³⁶⁴	46.82 ⁰	63.074 ²⁸²	21.41 ¹²³	17.660 ²⁷⁰	51.61 ²⁷²
Mean Place	1.192	30.63	44.205	44.58	59.562	12.57	15.471	71.37
Sec δ , Tan δ	1.327	+0.872	1.323	-0.866	1.033	-0.259	1.122	+0.508
$D\gamma_a$, D_{aa}	+0.04	+0.04	+0.08	-0.04	+0.07	-0.01	+0.05	+0.02
$D\gamma_\delta$, $D_{a\delta}$	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Cor. Bor. seq. Mag. 5.1		α Serpents. Mag. 2.8		β Serpents. Mag. 3.7		κ Serpents. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 15 36	" ' s +36 53	h m 15 40	" ' s + 6 40	h m 15 42	" ' s +15 40	h m 15 45	" ' s +18 23
Jan. 0.9	19.137 ³⁰⁰	42.10 ²⁷⁷	16.605 ²⁷⁸	42.43 ²⁰⁴	26.827 ²⁷⁵	21.67 ²³²	5.387 ²⁷⁴	20.17 ²⁴⁰
10.9	19.437 ³²⁷	39.33 ²³⁹	16.883 ²⁹⁶	40.39 ¹⁹¹	27.102 ²⁹⁶	19.35 ²¹¹	5.661 ²⁹⁶	17.77 ²¹⁷
20.8	19.764 ³⁴⁴	36.94 ¹⁹⁵	17.179 ³⁰⁹	38.48 ¹⁷⁰	27.398 ³¹⁰	17.24 ¹⁸⁴	5.957 ³¹⁰	15.60 ¹⁸⁸
30.8	20.108 ³⁵⁰	34.99 ¹⁴²	17.488 ³⁰⁹	36.78 ¹⁴⁵	27.708 ³¹²	15.40 ¹⁴⁸	6.267 ³¹⁴	13.72 ¹³⁰
Feb. 9.8	20.458 ³⁴⁸	33.57 ⁸⁶	17.797 ³⁰³	35.33 ¹¹³	28.020 ³⁰⁷	13.92 ¹⁰⁹	6.581 ³¹⁰	12.22 ¹⁰⁸
19.7	20.806 ³³⁵	32.71 ²⁷	18.100 ²⁹³	34.20 ⁷⁷	28.327 ²⁹⁸	12.83 ⁶⁵	6.891 ²⁹⁹	11.14 ⁶²
Mar. 1.7	21.141 ³¹⁴	32.44 ³¹	18.393 ²⁷⁶	33.43 ⁴³	28.625 ²⁸⁰	12.18 ²¹	7.190 ²⁸⁴	10.52 ¹⁶
11.7	21.455 ²⁸⁹	32.75 ⁸⁷	18.669 ²⁵⁶	33.00 ⁵	28.905 ²⁵⁹	11.97 ²³	7.474 ²⁶²	10.36 ³⁰
21.7	21.744 ²⁵⁷	33.62 ¹³⁸	18.925 ²³³	32.95 ³⁰	29.164 ²³⁶	12.20 ⁶³	7.736 ²³⁹	10.66 ⁷³
31.6	22.001 ²²²	35.00 ¹⁸³	19.158 ²⁰⁶	33.25 ⁶¹	29.400 ²⁰⁹	12.83 ⁹⁹	7.975 ²¹²	11.39 ¹¹⁰
Apr. 10.6	22.223 ¹⁸⁷	36.83 ²¹⁹	19.364 ¹⁸¹	33.86 ⁸⁷	29.609 ¹⁸²	13.82 ¹³¹	8.187 ¹⁸⁴	12.49 ¹⁴²
20.6	22.410 ¹⁴⁷	39.02 ²⁴⁴	19.545 ¹⁵³	34.73 ¹¹⁰	29.791 ¹⁵²	15.13 ¹⁵⁴	8.371 ¹⁵³	13.91 ¹⁶⁹
30.6	22.557 ¹⁰⁶	41.46 ²⁶³	19.698 ¹²⁴	35.83 ¹²⁵	29.943 ¹²¹	16.67 ¹⁷³	8.524 ¹²²	15.60 ¹⁸⁵
May 10.5	22.663 ⁶⁷	44.09 ²⁷⁰	19.822 ⁹⁵	37.08 ¹³⁵	30.064 ⁹¹	18.40 ¹⁸²	8.646 ⁹²	17.45 ¹⁹⁶
20.5	22.730 ²⁷	46.79 ²⁷⁰	19.917 ⁶⁴	38.43 ¹⁴¹	30.155 ⁵⁸	20.22 ¹⁸⁷	8.738 ⁵⁸	19.41 ²⁰⁰
30.5	22.757 ¹³	49.49 ²⁵⁹	19.981 ³³	39.84 ¹⁴²	30.213 ²⁶	22.09 ¹⁸⁴	8.796 ²⁵	21.41 ¹⁹⁷
June 9.4	22.744 ⁵⁰	52.08 ²⁴³	20.014 ³	41.26 ¹³⁷	30.239 ⁵	23.93 ¹⁷⁶	8.821 ⁷	23.38 ¹⁸⁹
19.4	22.694 ⁸⁸	54.51 ²²⁰	20.017 ²⁹	42.63 ¹³⁰	30.234 ³⁸	25.69 ¹⁶⁴	8.814 ⁴⁰	25.27 ¹⁷⁴
29.4	22.606 ¹²³	56.71 ¹⁰¹	19.988 ⁵⁹	43.93 ¹¹⁷	30.196 ⁶⁹	27.33 ¹⁴⁸	8.774 ⁷¹	27.01 ¹⁵⁶
July 9.4	22.483 ¹⁵³	58.62 ¹⁵⁶	19.929 ⁸⁶	45.10 ¹⁰⁴	30.127 ⁹⁶	28.81 ¹²⁶	8.703 ¹⁰⁰	28.57 ¹³⁵
19.3	22.330 ¹⁸⁰	60.18 ¹²⁰	19.843 ¹¹³	46.14 ⁸⁹	30.031 ¹²⁴	30.07 ¹⁰⁴	8.603 ¹²⁷	29.92 ¹⁰⁹
29.3	22.150 ²⁰³	61.38 ⁸⁰	19.730 ¹³³	47.03 ⁷¹	29.907 ¹⁴⁴	31.11 ⁷⁹	8.476 ¹⁴⁹	31.01 ⁸²
Aug. 8.3	21.947 ²¹⁸	62.18 ³⁸	19.597 ¹⁵¹	47.74 ⁵³	29.763 ¹⁶¹	31.90 ⁵⁴	8.327 ¹⁶⁶	31.83 ⁵⁵
18.3	21.729 ²²⁷	62.56 ⁵	19.446 ¹⁶⁰	48.27 ³²	29.602 ¹⁷²	32.44 ²⁵	8.161 ¹⁷⁶	32.38 ²⁴
28.2	21.502 ²²⁷	62.51 ⁴⁶	19.286 ¹⁶³	48.59 ¹²	29.430 ¹⁷⁴	32.69 ³	7.985 ¹⁸⁰	32.62 ⁷
Sept. 7.2	21.275 ²²⁰	62.05 ⁹⁰	19.123 ¹⁵⁹	48.71 ¹¹	29.256 ¹⁶⁸	32.66 ³⁴	7.805 ¹⁷⁵	32.55 ³⁹
17.2	21.055 ²⁰¹	61.15 ¹³²	18.964 ¹⁴⁴	48.60 ³⁴	29.088 ¹⁵⁶	32.32 ⁶³	7.630 ¹⁶⁰	32.16 ⁷⁰
27.1	20.854 ¹⁷⁵	59.83 ¹⁷²	18.820 ¹²¹	48.26 ⁵⁷	28.932 ¹³³	31.69 ⁹²	7.470 ¹³⁹	31.46 ¹⁰³
Oct. 7.1	20.679 ¹⁴⁰	58.11 ²¹⁰	18.699 ⁹¹	47.69 ⁸²	28.799 ¹⁰¹	30.77 ¹²³	7.331 ¹⁰⁷	30.43 ¹³²
17.1	20.539 ⁹⁵	56.01 ²⁴⁵	18.608 ⁵²	46.87 ¹⁰⁸	28.698 ⁶²	29.54 ¹⁵¹	7.224 ⁶⁹	29.11 ¹⁶³
27.1	20.444 ⁴³	53.56 ²⁷³	18.556 ⁷	45.79 ¹³⁰	28.636 ¹⁸	28.03 ¹⁷⁸	7.155 ²³	27.48 ¹⁹⁰
Nov. 6.0	20.401 ¹¹	50.83 ²⁹⁹	18.549 ⁴¹	44.49 ¹⁵⁴	28.618 ³¹	26.25 ²⁰²	7.132 ²⁶	25.58 ²¹⁶
16.0	20.412 ⁷⁰	47.84 ³¹⁵	18.590 ⁹¹	42.95 ¹⁷⁴	28.649 ⁸²	24.23 ²²²	7.158 ⁷⁶	23.42 ²³⁴
26.0	20.482 ¹²⁸	44.69 ³²⁴	18.681 ¹⁴⁰	41.21 ¹⁹¹	28.731 ¹³²	22.01 ²³⁷	7.234 ¹²⁸	21.08 ²⁵⁰
Dec. 6.0	20.610 ¹⁸³	41.45 ³²⁴	18.821 ¹⁸⁶	39.30 ²⁰³	28.863 ¹⁸⁰	19.64 ²⁴⁶	7.362 ¹⁷⁵	18.58 ²⁵⁹
15.9	20.793 ²³⁴	38.21 ³¹⁵	19.007 ²²⁶	37.27 ²⁰⁹	29.043 ²²¹	17.18 ²⁴⁸	7.537 ²¹⁸	15.99 ²⁵⁷
25.9	21.027 ²⁷⁷	35.06 ²⁹⁴	19.233 ²⁵⁹	35.18 ²⁰⁸	29.264 ²⁵⁶	14.70 ²⁴¹	7.755 ²⁵⁵	13.42 ²⁵⁰
35.9	21.304	32.12	19.492	33.10	29.520	12.29	8.010	10.92
Mean Place	19.671	53.18	16.608	46.62	26.951	27.91	5.563	26.88
Sec δ , Tan δ	1.250	+0.751	1.007	+0.117	1.039	+0.281	1.054	+0.332
$D\mu\alpha$, $D\omega\alpha$	+0.04	+0.03	+0.06	0.00	+0.05	+0.01	+0.05	+0.01
$D\mu\delta$, $D\omega\delta$	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8

APPARENT PLACES OF STARS, 1919.

441

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	μ Serpentis. Mag. 3.6		12 H. Draconis. Mag. 5.1		ϵ Serpentis. Mag. 3.8		ζ Ursæ Minoris. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 15 45	° ' / — 3 10	h m 15 45	° ' / +62 50	h m 15 46	° ' / + 4 43	h m 15 46	° ' / +78 2
	s "	"	s "	"	s "	"	s "	"
Jan. 0.9	23.530	61.28	23.57	44.35	46.593	11.51	49.14	24.67
10.9	23.810 ²⁸⁰	62.95 ¹⁶⁷	23.98 ⁴¹	41.41 ²⁹⁴	46.867 ²⁷⁴	9.55 ¹⁹⁶	49.89 ⁷⁵	21.87 ²⁸⁰
20.8	24.108 ²⁹⁸	64.57 ¹⁶²	24.44 ⁴⁶	38.93 ²⁴⁸	47.161 ²⁹⁴	7.70 ¹⁸⁵	50.78 ⁸⁹	19.56 ²³¹
30.8	24.418 ³¹⁰	66.10 ¹⁵³	24.95 ⁵¹	37.02 ¹⁹¹	47.468 ³⁰⁷	6.03 ¹⁶⁷	51.77 ⁹⁹	17.82 ¹⁷⁴
Feb. 9.8	24.730 ³¹²	67.47 ¹³⁷	25.48 ⁵³	35.73 ¹²⁹	47.776 ³⁰⁸	4.60 ¹⁴³	52.84 ¹⁰⁷	16.71 ¹¹¹
	305	115	54	63	304	114	109	42
19.7	25.035	68.62	26.02	35.10	48.080	3.46	53.93	16.29
Mar. 1.7	25.331 ²⁹⁶	69.53 ⁹¹	26.55 ⁵³	35.16 ⁶	48.374 ²⁹⁴	2.66 ⁸⁰	55.01 ¹⁰⁸	16.53 ²⁴
11.7	25.611 ²⁸⁰	70.16 ⁶³	27.06 ⁵¹	35.88 ⁷²	48.652 ²⁷⁸	2.19 ⁴⁷	56.04 ¹⁰³	17.44 ⁹¹
21.7	25.871 ²⁶⁰	70.51 ³⁵	27.52 ⁴⁶	37.23 ¹³⁵	48.910 ²⁵⁸	2.09 ¹⁰	56.99 ⁹⁵	18.97 ¹⁵³
31.6	26.110 ²³⁹	70.60 ⁹	27.93 ⁴¹	39.16 ¹⁹³	49.148 ²³⁸	2.31 ²²	57.81 ⁸²	21.04 ²⁰⁷
	214	17	33	240	212	52	69	253
Apr. 10.6	26.324	70.43	28.26	41.56	49.360	2.83	58.50	23.57
20.6	26.514 ¹⁹⁰	70.05 ³⁸	28.54 ²⁸	44.33 ²⁷⁷	49.547 ¹⁸⁷	3.62 ⁷⁹	59.03 ⁵³	26.45 ²⁸⁸
30.6	26.676 ¹⁶²	69.48 ⁵⁷	28.74 ²⁰	47.40 ³⁰⁷	49.706 ¹⁵⁹	4.62 ¹⁰⁰	59.38 ³⁵	29.59 ³¹⁴
May 10.5	26.812 ¹³⁶	68.76 ⁷²	28.87 ¹³	50.62 ³²²	49.838 ¹³²	5.79 ¹¹⁷	59.54 ¹⁶	32.86 ³²⁷
20.5	26.917 ¹⁰⁵	67.94 ⁸²	28.91 ⁴	53.90 ³²⁸	49.940 ¹⁰²	7.05 ¹²⁶	59.52 ²	36.15 ³²⁹
	76	88	3	322	72	133	20	321
30.5	26.993	67.06	28.88	57.12	50.012	8.38	59.32	39.36
June 9.4	27.039 ⁴⁶	66.15 ⁹¹	28.78 ¹⁰	60.19 ³⁰⁷	50.053 ⁴¹	9.71 ¹³³	58.95 ³⁷	42.38 ³⁰²
19.4	27.052 ¹³	65.24 ⁹¹	28.59 ¹⁹	63.04 ²⁸⁵	50.062 ⁹	11.03 ¹³²	58.43 ⁵²	45.16 ²⁷⁸
29.4	27.034 ¹⁸	64.35 ⁸⁹	28.35 ²⁴	65.56 ²⁵²	50.039 ²³	12.26 ¹²³	57.75 ⁶⁸	47.58 ²⁴²
July 9.4	26.986 ⁴⁸	63.51 ⁸⁴	28.05 ³⁰	67.70 ²¹⁴	49.987 ⁵²	13.39 ¹¹³	56.95 ⁸⁰	49.60 ²⁰²
	79	77	36	171	82	102	91	158
19.3	26.907	62.74	27.69	69.41	49.905	14.41	56.04	51.18
29.3	26.803 ¹⁰⁴	62.05 ⁶⁹	27.30 ³⁹	70.66 ¹²⁵	49.796 ¹⁰⁹	15.28 ⁸⁷	55.05 ⁹⁹	52.28 ¹¹⁰
Aug. 8.3	26.674 ¹²⁹	61.45 ⁶⁰	26.87 ⁴³	71.41 ⁷⁵	49.665 ¹³¹	15.99 ⁷¹	54.00 ¹⁰⁵	52.87 ⁵⁹
18.3	26.529 ¹⁴⁵	60.94 ⁵¹	26.42 ⁴⁵	71.65 ²⁴	49.517 ¹⁴⁸	16.53 ⁵⁴	52.90 ¹¹⁰	52.93 ⁶
28.2	26.373 ¹⁵⁶	60.54 ⁴⁰	25.95 ⁴⁷	71.37 ²⁸	49.357 ¹⁶⁰	16.89 ³⁶	51.79 ¹¹¹	52.48 ⁴⁵
	161	28	46	80	164	16	110	98
Sept. 7.2	26.212	60.26	25.49	70.57	49.193	17.05	50.69	51.50
17.2	26.056 ¹⁵⁶	60.12 ¹⁴	25.04 ⁴⁵	69.27 ¹³⁰	49.034 ¹⁵⁹	17.01 ⁴	49.63 ¹⁰⁶	50.03 ¹⁴⁷
27.1	25.913 ¹⁴³	60.12 ⁰	24.63 ⁴¹	67.48 ¹⁷⁹	48.887 ¹⁴⁷	16.75 ²⁶	48.63 ¹⁰⁰	48.09 ¹⁹⁴
Oct. 7.1	25.793 ¹²⁰	60.29 ¹⁷	24.25 ³⁸	65.23 ²²⁵	48.763 ¹²⁴	16.28 ⁴⁷	47.72 ⁹¹	45.72 ²³⁷
17.1	25.703 ⁹⁰	60.64 ³⁵	23.93 ³²	62.57 ²⁶⁶	48.668 ⁹⁵	15.56 ⁷²	46.93 ⁷⁹	42.95 ²⁷⁷
	51	53	26	303	55	94	65	312
27.1	25.652	61.17	23.67	59.54	48.613	14.62	46.28	39.83
Nov. 6.0	25.646 ⁶	61.92 ⁷⁵	23.50 ¹⁷	56.22 ³³²	48.601 ¹²	13.43 ¹¹⁹	45.78 ⁵⁰	36.45 ³³⁸
16.0	25.689 ⁴³	62.87 ⁹⁵	23.42 ⁸	52.66 ³⁵⁶	48.637 ³⁶	12.03 ¹⁴⁰	45.47 ³¹	32.87 ³⁵⁸
26.0	25.782 ⁹³	64.04 ¹¹⁷	23.43 ¹	48.97 ³⁶⁹	48.723 ⁸⁶	10.41 ¹⁶²	45.35 ¹²	29.19 ³⁶⁸
Dec. 6.0	25.925 ¹⁴³	65.37 ¹³³	23.53 ¹⁰	45.24 ³⁷³	48.858 ¹³⁵	8.62 ¹⁷⁹	45.43 ⁸	25.49 ³⁷⁰
	187	150	19	366	181	191	29	358
15.9	26.112	66.87	23.72	41.58	49.039	6.71	45.72	21.91
25.9	26.340 ²²⁸	68.48 ¹⁶¹	24.00 ²⁸	38.10 ³⁴⁸	49.261 ²²²	4.72 ¹⁹⁹	46.19 ⁴⁷	18.52 ³³⁹
35.9	26.601 ²⁶¹	70.15 ¹⁶⁷	24.37 ³⁷	34.90 ³²⁰	49.516 ²⁵⁵	2.73 ¹⁹⁹	46.85 ⁶⁶	15.47 ³⁰⁵
Mean Place	23.463	59.66	25.684	58.31	46.602	14.98	55.296	39.38
Sec δ , Tan δ	1.002	-0.056	2.191	+1.950	1.003	+0.083	4.827	+4.722
$D\delta_a$, $D\omega_a$	+0.06	0.00	+0.02	+0.07	+0.06	0.00	-0.04	+0.17
$D\delta_s$, $D\omega_s$	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Triang. Aust. Mag. 3.0		λ Libræ. Mag. 5.1		γ Serpentis. Mag. 3.9		τ Scorpil. Mag. 3.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 15 47	° ' -63 10	h m 15 48	° ' -19 55	h m 15 52	° ' +15 55	h m 15 53	° ' -25 52
	s "	"	s "	"	s "	"	s "	"
Jan. 0.9	59.31	44.83 ⁹¹	37.851 ³⁰¹	31.39 ⁹⁵	42.477 ²⁶⁸	24.75 ²³⁷	57.028 ³¹⁰	51.29 ⁶⁴
10.9	59.87 ⁵⁶	43.92 ⁴⁸	38.152 ³¹⁹	32.34 ¹⁰⁷	42.745 ²⁹²	22.38 ²¹⁶	57.338 ³³⁰	51.95 ⁵¹
20.8	60.47 ⁶⁰	43.44 ⁵	38.471 ³³¹	33.41 ¹¹³	43.037 ³⁰⁶	20.22 ¹⁸⁹	57.668 ³⁴³	52.76 ⁶³
30.8	61.10 ⁶³	43.39 ³⁷	38.802 ³³⁴	34.54 ¹¹⁴	43.343 ³¹¹	18.33 ¹⁸⁵	58.011 ³⁴³	53.69 ¹⁰⁰
Feb. 9.8	61.73 ⁶⁴	43.76 ⁷⁷	39.136 ³²⁸	35.68 ¹¹²	43.654 ³⁰⁸	16.78 ¹¹⁴	58.357 ³⁴³	54.69 ¹⁰⁴
19.7	62.37 ⁶¹	44.53 ¹¹⁴	39.464 ³¹⁷	36.80 ¹⁰⁵	43.962 ²⁹⁹	15.64 ⁷¹	58.700 ³³²	55.73 ¹⁰⁵
Mar. 1.7	62.98 ⁵⁹	45.67 ¹⁴⁵	39.781 ³⁰⁰	37.85 ⁹⁵	44.261 ²⁸⁵	14.93 ²⁷	59.032 ³¹⁶	56.78 ¹⁰¹
11.7	63.57 ⁵⁶	47.12 ¹⁷⁵	40.081 ²⁸²	38.80 ⁸³	44.546 ²⁶⁴	14.66 ¹⁷	59.348 ²⁹⁷	57.79 ⁹⁵
21.7	64.13 ⁵¹	48.87 ¹⁹⁸	40.363 ²³⁹	39.63 ⁷⁰	44.810 ²⁴³	14.83 ⁵⁰	59.645 ²⁷⁵	58.74 ⁸⁹
31.6	64.64 ⁴⁶	50.85 ²¹⁸	40.622 ²³⁶	40.33 ⁵⁸	45.053 ²¹⁷	15.42 ⁹⁵	59.920 ²⁵⁰	59.63 ⁸⁸
Apr. 10.6	65.10 ⁴⁰	53.03 ²³³	40.858 ²⁰⁹	40.91 ⁴⁶	45.270 ¹⁹¹	16.37 ¹²⁸	60.170 ²²⁴	60.43 ⁷¹
20.6	65.50 ³⁵	55.36 ²⁴⁴	41.067 ¹⁸²	41.37 ³⁴	45.461 ¹⁶¹	17.65 ¹⁵³	60.394 ¹⁹⁶	61.14 ⁶⁴
30.6	65.85 ²⁸	57.80 ²⁴⁹	41.249 ¹⁵³	41.71 ²⁵	45.622 ¹³²	19.18 ¹⁷⁴	60.590 ¹⁶⁵	61.78 ⁵⁷
May 10.5	66.13 ²¹	60.29 ²⁴⁹	41.402 ¹²³	41.96 ¹⁵	45.754 ¹⁰⁰	20.90 ¹⁸²	60.755 ¹³⁵	62.35 ⁴⁹
20.5	66.34 ¹³	62.78 ²⁴⁵	41.525 ⁹²	42.11 ⁸	45.854 ⁶⁸	22.72 ¹⁸⁸	60.890 ¹⁰¹	62.84 ⁴³
30.5	66.47 ⁶	65.23 ²³⁵	41.617 ⁵⁷	42.19 ³	45.922 ³⁷	24.60 ¹⁸⁶	60.991 ⁶⁶	63.27 ³⁶
June 9.4	66.53 ¹	67.58 ²¹⁹	41.674 ²⁴	42.22 ³	45.959 ³	26.46 ¹⁷⁹	61.057 ³⁰	63.63 ²⁹
19.4	66.52 ⁸	69.77 ¹⁹⁸	41.698 ¹¹	42.19 ⁹	45.962 ³¹	28.25 ¹⁶⁶	61.087 ⁷	63.92 ²⁰
29.4	66.44 ¹⁶	71.75 ¹⁷¹	41.687 ⁴³	42.10 ¹⁵	45.931 ⁶²	29.91 ¹⁵⁰	61.080 ⁴²	64.12 ¹⁴
July 9.4	66.28 ²³	73.46 ¹³⁸	41.644 ⁷⁷	41.95 ²¹	45.869 ⁹¹	31.41 ¹³⁰	61.038 ⁷⁷	64.26 ³
19.3	66.05 ²⁹	74.84 ¹⁰³	41.567 ¹⁰⁷	41.74 ²⁶	45.778 ¹¹⁸	32.71 ¹⁰⁶	60.961 ¹¹⁰	64.29 ⁷
29.3	65.76 ³³	75.87 ⁶²	41.460 ¹³¹	41.48 ³¹	45.660 ¹⁴²	33.77 ⁸¹	60.851 ¹³⁶	64.22 ¹⁸
Aug. 8.3	65.43 ³⁷	76.49 ¹⁹	41.329 ¹⁵¹	41.17 ³⁸	45.518 ¹⁶¹	34.58 ⁵⁶	60.715 ¹⁵⁹	64.04 ²⁹
18.3	65.06 ³⁸	76.68 ²⁵	41.178 ¹⁶⁵	40.79 ⁴³	45.357 ¹⁷²	35.14 ²⁶	60.556 ¹⁷²	63.75 ⁴⁰
28.2	64.68 ⁴⁰	76.43 ⁶⁹	41.013 ¹⁶⁹	40.36 ⁴⁸	45.185 ¹⁷⁷	35.40 ²	60.384 ¹⁷⁸	63.35 ⁵¹
Sept. 7.2	64.28 ³⁷	75.74 ¹¹²	40.844 ¹⁶⁴	39.88 ⁵¹	45.008 ¹⁷⁴	35.38 ³²	60.206 ¹⁷⁵	62.84 ⁶⁰
17.2	63.91 ³⁵	74.62 ¹⁵¹	40.680 ¹⁵²	39.37 ⁵²	44.834 ¹⁶⁰	35.06 ⁶²	60.031 ¹⁵⁹	62.24 ⁶⁷
27.1	63.56 ²⁹	73.11 ¹⁸⁵	40.528 ¹²⁵	38.85 ⁵⁰	44.674 ¹⁴⁰	34.44 ⁹²	59.872 ¹³⁶	61.57 ⁷²
Oct. 7.1	63.27 ²¹	71.26 ²¹⁴	40.403 ⁹⁴	38.35 ⁴⁵	44.534 ¹⁰⁹	33.52 ¹⁵¹	59.736 ⁵⁸	60.85 ⁷⁰
17.1	63.06 ¹⁴	69.12 ²³²	40.309 ⁵¹	37.90 ³⁶	44.425 ⁷²	32.29 ¹²³	59.635 ¹⁰¹	60.15 ⁶⁶
27.1	62.92 ⁴	66.80 ²⁴²	40.258 ³	37.54 ²²	44.353 ²⁸	30.78 ¹⁷⁸	59.577 ⁸	59.49 ⁵³
Nov. 6.0	62.88 ⁶	64.38 ²⁴³	40.255 ⁵⁰	37.32 ⁸	44.325 ²¹	29.00 ²⁰⁴	59.569 ⁴⁷	58.91 ⁴⁴
16.0	62.94 ¹⁷	61.95 ²³⁴	40.305 ¹⁰²	37.24 ¹²	44.346 ⁷¹	26.96 ²²³	59.616 ¹⁰¹	58.47 ²⁷
26.0	63.11 ²⁷	59.61 ²¹⁵	40.407 ²⁰⁴	37.36 ³⁰	44.417 ¹²²	24.73 ²⁴⁹	59.717 ¹⁵⁶	58.20 ⁹
Dec. 6.0	63.38 ³⁶	57.46 ¹⁸⁹	40.562 ²⁰⁴	37.66 ⁵⁰	44.539 ¹⁷¹	22.34 ²⁴⁵	59.873 ²⁰⁸	58.11 ¹³
15.9	63.74 ⁴⁵	55.57 ¹⁵⁵	40.766 ²⁴⁵	38.16 ⁷¹	44.710 ²¹²	19.85 ²⁵¹	60.081 ²⁵³	58.24 ³⁴
25.9	64.19 ⁵¹	54.02 ¹¹⁶	41.011 ²⁸⁰	38.87 ⁸⁷	44.922 ²⁴⁸	17.34 ²⁴⁵	60.333 ²⁸⁷	58.58 ⁵³
35.9	64.70	52.86	41.291	39.74	45.170	14.89	60.620	59.11
Mean Place	59.525	55.58	37.706	33.86	42.646	30.52	56.891	55.16
Sec δ , Tan δ	2.217	-1.978	1.064	-0.363	1.040	+0.285	1.111	-0.485
$D\mu\alpha$, $D\omega\alpha$	+0.10	-0.07	+0.07	-0.01	+0.05	+0.01	+0.07	-0.02
$D\mu\delta$, $D\omega\delta$	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8	-0.2	-0.9

APPARENT PLACES OF STARS, 1919.

443

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ϵ Coronæ Borealis. Mag. 4.2		δ Scorpii. Mag. 2.5		θ Draconis. Mag. 4.1		β Scorpii. Mag. 2.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 15 54	° ' +27 6	h m 15 55	° ' -22 23	h m 16 0	° ' +58 46	h m 16 0	° ' -19 35
	s 13.595	" 33.84	s 32.540	" 28.89	s 20.398	" 40.23	s 43.503	" 2.48
Jan. 0.9	13.595	33.84	32.540	28.89	20.398	40.23	43.503	2.48
10.9	13.868 ²⁷³	31.20 ²⁶⁴	32.841 ³⁰¹	29.69 ⁸⁰	20.749 ³⁵¹	37.18 ³⁰⁵	43.795 ²⁹²	3.38 ⁹⁰
20.8	14.167 ²⁹⁹	28.83 ²³⁷	33.162 ³²¹	30.62 ⁹³	21.156 ⁴⁰⁷	34.57 ²⁶¹	44.109 ³¹⁴	4.38 ¹⁰⁰
30.8	14.482 ³¹⁵	26.84 ¹⁹⁹	33.496 ³³⁴	31.63 ¹⁰¹	21.603 ⁴⁴⁷	32.47 ²¹⁰	44.434 ³²⁵	5.43 ¹⁰⁶
Feb. 9.8	14.805 ³²³	25.28 ¹⁵⁶	33.833 ³³⁷	32.68 ¹⁰⁶	22.074 ⁴⁷¹	30.98 ¹⁴⁹	44.765 ³³¹	6.50 ¹⁰⁷
	14.805 ³²²	25.28 ¹⁰⁶	33.833 ³³⁴	32.68 ¹⁰⁶	22.074 ⁴⁸²	30.98 ⁸³	44.765 ³²⁸	6.50 ¹⁰⁴
19.8	15.127	24.22	34.167	33.74	22.556	30.15	45.093	7.54
Mar. 1.7	15.441 ³¹⁴	23.68 ⁵⁴	34.491 ³²⁴	34.75 ¹⁰¹	23.032 ⁴⁷⁶	29.98 ¹⁷	45.412 ³¹⁹	8.50 ⁹⁶
11.7	15.738 ²⁹⁷	23.68 ⁰	34.799 ³⁰⁸	35.70 ⁹⁵	23.489 ⁴⁵⁷	30.50 ⁵²	45.716 ³⁰⁴	9.37 ⁸⁷
21.7	16.017 ²⁷⁹	24.19 ⁵¹	35.090 ²⁹¹	36.55 ⁸⁵	23.916 ⁴²⁷	31.64 ¹¹⁴	46.003 ²⁸⁷	10.11 ⁷⁴
31.6	16.269 ²⁵²	25.18 ⁹⁹	35.359 ²⁶⁹	37.30 ⁷⁵	24.299 ³⁸³	33.38 ¹⁷⁴	46.270 ²⁶⁷	10.74 ⁶³
	16.269 ²²⁶	25.18 ¹⁴¹	35.359 ²⁴⁵	37.30 ⁶⁴	24.299 ³³³	33.38 ²²⁴	46.270 ²⁴⁵	10.74 ⁵⁰
Apr. 10.6	16.495	26.59	35.604	37.94	24.632	35.62	46.515	11.24
20.6	16.690 ¹⁹⁵	28.37 ¹⁷⁸	35.823 ²¹⁹	38.48 ⁵⁴	24.905 ²⁷³	38.28 ²⁶⁶	46.734 ²¹⁹	11.61 ³⁷
30.6	16.853 ¹⁶³	30.44 ²⁰⁷	36.016 ¹⁹³	38.93 ⁴⁵	25.117 ²¹²	41.25 ²⁹⁷	46.928 ¹⁹⁴	11.88 ²⁷
May 10.5	16.981 ¹²⁸	32.69 ²²⁵	36.179 ¹⁶³	39.29 ³⁶	25.261 ¹⁴⁴	44.42 ³¹⁷	47.092 ¹⁶⁴	12.06 ¹⁸
20.5	17.076 ⁹⁵	35.06 ²³⁷	36.312 ¹³³	39.58 ²⁹	25.339 ⁷⁸	47.68 ³²⁶	47.227 ¹³⁵	12.15 ⁹
	17.076 ⁵⁸	35.06 ²⁴⁰	36.312 ¹⁰⁰	39.58 ²⁰	25.339 ¹⁰	47.68 ³²⁶	47.227 ¹⁰³	12.15 ⁴
30.5	17.134 ²³	37.46 ²³⁶	36.412 ⁶⁵	39.78 ¹⁶	25.349 ⁵⁷	50.94 ³¹⁵	47.330 ⁶⁹	12.19 ²
June 9.5	17.157 ¹⁴	39.82 ²²⁵	36.477 ³⁰	39.94 ¹⁰	25.292 ¹²¹	54.09 ²⁹⁴	47.399 ³⁵	12.17 ⁶
19.4	17.143 ⁴⁸	42.07 ²⁰⁷	36.507 ⁴	40.04 ³	25.171 ¹⁸¹	57.03 ²⁶⁶	47.434 ⁰	12.11 ¹¹
29.4	17.095 ⁸³	44.14 ¹⁸⁵	36.503 ⁴¹	40.07 ⁸	24.990 ²³⁷	59.69 ²³³	47.434 ³⁷	12.00 ¹⁵
July 9.4	17.012 ¹¹⁴	45.99 ¹⁵⁸	36.462 ⁷⁴	40.04 ⁹	24.753 ²⁸⁷	62.02 ¹⁹²	47.397 ⁷⁰	11.85 ¹⁹
19.3	16.898	47.57 ¹²⁷	36.388	39.95	24.466	63.94 ¹⁴⁸	47.327	11.66
29.3	16.756 ¹⁴²	48.84 ⁹⁵	36.282 ¹⁰⁶	39.78 ¹⁷	24.137 ³²⁹	65.42 ¹⁰⁰	47.228 ⁹⁹	11.41 ²⁵
Aug. 8.3	16.589 ¹⁶⁷	49.79 ⁵⁹	36.151 ¹³¹	39.52 ²⁶	23.773 ³⁶⁴	66.42 ⁵¹	47.099 ¹²⁹	11.11 ³⁰
18.3	16.405 ¹⁸⁴	50.38 ²³	35.998 ¹⁵³	39.20 ³²	23.384 ³⁸⁹	66.93 ¹⁴⁹	46.950 ¹⁴⁹	10.77 ²⁴
28.2	16.208 ¹⁹⁷	50.61 ¹⁵	35.829 ¹⁶⁹	38.79 ⁴¹	22.980 ⁴⁰⁴	66.91 ²	46.785 ¹⁶⁵	10.38 ³⁹
	16.208 ²⁰¹	50.61 ¹⁵	35.829 ¹⁷³	38.79 ⁴⁸	22.980 ⁴⁰⁸	66.91 ⁵²	46.785 ¹⁷¹	10.38 ⁴⁴
Sept. 7.2	16.007	50.46	35.656	38.31	22.572	66.39	46.614	9.94
17.2	15.810 ¹⁹⁷	49.93 ⁵³	35.486 ¹⁷⁰	37.78 ⁵³	22.174 ³⁹⁸	65.35 ¹⁰⁴	46.446 ¹⁶⁸	9.48 ⁴⁶
27.2	15.625 ¹⁸⁵	49.04 ⁸⁹	35.330 ¹⁵⁶	37.21 ⁵⁷	21.796 ³⁷⁸	63.83 ¹⁶²	46.290 ¹⁵⁶	9.00 ⁴⁸
Oct. 7.1	15.464 ¹⁶¹	47.77 ¹²⁷	35.198 ¹³²	36.64 ⁵⁷	21.453 ³⁴³	61.84 ¹⁹⁹	46.156 ¹³⁴	8.54 ⁴⁶
17.1	15.333 ¹³¹	46.14 ¹⁶³	35.098 ¹⁰⁰	36.09 ⁵⁵	21.156 ²⁹⁷	59.41 ²⁴³	46.054 ¹⁰²	8.13 ⁴¹
	15.333 ⁹¹	46.14 ¹⁹⁶	35.098 ⁵⁸	36.09 ⁴⁸	21.156 ²³⁷	59.41 ²⁸¹	46.054 ⁶¹	8.13 ³³
27.1	15.242 ⁴⁵	44.18 ²²⁶	35.040 ⁹	35.61 ³⁸	20.919 ¹⁷¹	56.60 ³¹⁶	45.993 ¹⁵	7.80 ²¹
Nov. 6.0	15.197 ⁵	41.92 ²⁵²	35.031 ⁴³	35.23 ²²	20.748 ⁹²	53.44 ³⁴¹	45.978 ³⁶	7.59 ⁷
16.0	15.202 ⁵⁹	39.40 ²⁷³	35.074 ⁹⁸	35.01 ⁷	20.656 ¹⁰	50.03 ³⁶⁰	46.014 ⁹⁰	7.52 ¹⁰
26.0	15.261 ¹¹²	36.67 ²⁸⁶	35.172 ¹⁵⁰	34.94 ¹³	20.646 ⁷⁴	46.43 ³⁶⁸	46.104 ¹⁴³	7.62 ²⁹
Dec. 6.0	15.373 ¹⁶⁴	33.81 ²⁹³	35.322 ²⁰⁰	35.07 ³⁴	20.720 ¹⁵⁹	42.75 ³⁶⁵	46.247 ¹⁹¹	7.91 ⁴⁷
15.9	15.537	30.88	35.522	35.41	20.879	39.10	46.438	8.38
25.9	15.747 ²¹⁰	27.99 ²⁸⁹	35.766 ²⁴⁴	35.93 ⁵²	21.119 ²⁴⁰	35.59 ³⁵¹	46.672 ²³⁴	9.05 ⁶⁷
35.9	15.996 ²⁴⁹	25.21 ²⁷⁸	36.045 ²⁷⁹	36.64 ⁷¹	21.430 ³¹¹	32.32 ³²⁷	46.942 ²⁷⁰	9.87 ⁸²
Mean Place	13.973	41.85	32.417	31.98	22.222	52.48	43.408	5.00
Sec δ , Tan δ	1.123	+0.512	1.082	-0.412	1.929	+1.650	1.061	-0.356
$D_{\delta a}$, $D_{\delta \alpha}$	+0.06	+0.02	+0.07	-0.01	+0.02	+0.06	+0.07	-0.01
$D_{\delta \delta}$, $D_{\delta \delta}$	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	κ Herculis. Mag. 5.3		Groombridge 2320. Mag. 5.4		ϕ Herculis. Mag. 4.3		δ^1 Apodis. Mag. 4.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 16 4	° ' +17 15	h m 16 6	° ' +68 1	h m 16 6	° ' +45 8	h m 16 8	° ' -78 29
	s "	"	s "	"	s "	"	s "	"
Jan. 0.9	24.810	36.57	2.70	11.56	12.054	37.96	9.52	27.72
10.9	25.070	34.19	3.13	8.50	12.343	34.96	10.62	26.00
20.8	25.356	32.00	3.64	5.88	12.670	32.33	11.82	24.74
30.8	25.658	30.11	4.21	3.80	13.026	30.16	13.11	23.97
Feb. 9.8	25.965	28.56	4.82	2.33	13.398	28.52	14.45	23.71
19.8	26.273	27.43	5.46	1.53	13.775	27.49	15.81	23.94
Mar. 1.7	26.574	26.73	6.09	1.40	14.147	27.09	17.16	24.65
11.7	26.862	26.49	6.70	1.95	14.505	27.31	18.47	25.80
21.7	27.133	26.71	7.27	3.16	14.841	28.15	19.71	27.36
31.6	27.383	27.35	7.79	4.95	15.147	29.57	20.87	29.28
Apr. 10.6	27.610	28.40	8.23	7.26	15.419	31.48	21.92	31.53
20.6	27.809	29.76	8.60	9.99	15.651	33.80	22.85	34.03
30.6	27.981	31.40	8.87	13.03	15.840	36.45	23.64	36.74
May 10.5	28.123	33.23	9.04	16.27	15.984	39.32	24.28	39.61
20.5	28.233	35.18	9.13	19.59	16.080	42.32	24.77	42.56
30.5	28.311	37.19	9.11	22.92	16.129	45.35	25.08	45.54
June 9.5	28.355	39.19	9.00	26.12	16.131	48.31	25.20	48.47
19.4	28.365	41.11	8.80	29.10	16.086	51.12	25.16	51.28
29.4	28.342	42.92	8.51	31.82	15.995	53.69	24.94	53.89
July 9.4	28.285	44.55	8.15	34.18	15.861	55.98	24.55	56.25
19.3	28.197	45.98	7.71	36.12	15.688	57.91	24.00	58.27
29.3	28.079	47.17	7.22	37.60	15.480	59.45	23.31	59.89
Aug. 8.3	27.937	48.10	6.69	38.60	15.244	60.56	22.51	61.07
18.3	27.774	48.75	6.12	39.08	14.984	61.22	21.61	61.75
28.2	27.598	49.12	5.53	39.05	14.709	61.41	20.66	61.90
Sept. 7.2	27.416	49.17	4.93	38.49	14.429	61.13	19.69	61.51
17.2	27.235	48.93	4.35	37.40	14.152	60.38	18.75	60.58
27.2	27.065	48.37	3.80	35.83	13.890	59.16	17.88	59.14
Oct. 7.1	26.916	47.48	3.29	33.77	13.652	57.49	17.11	57.22
17.1	26.795	46.30	2.84	31.28	13.450	55.40	16.47	54.91
27.1	26.710	44.81	2.47	28.39	13.292	52.91	16.02	52.27
Nov. 6.0	26.669	43.05	2.19	25.17	13.187	50.10	15.76	49.41
16.0	26.676	41.02	2.00	21.69	13.142	47.00	15.71	46.42
26.0	26.734	38.79	1.93	18.06	13.160	43.68	15.90	43.43
Dec. 6.0	26.842	36.39	1.98	14.34	13.242	40.25	16.30	40.55
15.9	26.999	33.89	2.14	10.63	13.390	36.79	16.93	37.88
25.9	27.199	31.37	2.40	7.09	13.596	33.41	17.75	35.50
35.9	27.438	28.91	2.78	3.80	13.856	30.22	18.74	33.52
Mean Place	25.048	42.02	5.780	23.98	13.044	48.10	11.449	39.35
Sec δ , Tan δ	1.047	+0.310	2.672	+2.478	1.418	+1.005	5.014	-4.913
$D\psi\alpha$, $D\omega\alpha$	+0.05	+0.01	0.00	+0.08	+0.04	+0.03	+0.18	-0.16
$D\psi\delta$, $D\omega\delta$	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

APPARENT PLACES OF STARS, 1919.

445

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	δ Ophiuchi. Mag. 3.0		σ Cor. Bor. <i>seq.</i> Mag. 5.8		19 Ursæ Minoris. Mag. 5.5		γ^2 Normæ. Mag. 4.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 16 10	° ' - 3 29	h m 16 11	° ' +34 3	h m 16 12	° ' +76 4	h m 16 13	° ' -49 57
	s "	s "	s "	s "	s "	s "	s "	s "
Jan. 0.9	5.916 ²⁶⁴	12.82 ¹⁵⁹	38.055 ²⁶⁵	39.93 ²⁸⁵	61.36 ⁵⁸	43.03 ³⁰³	46.061 ³⁹¹	21.12 ⁶⁵
10.9	6.180 ²⁸⁷	14.41 ¹⁵⁵	38.320 ²⁹⁶	37.08 ²⁵⁴	61.94 ⁷¹	40.00 ²⁶⁰	46.452 ⁴²⁶	20.47 ³²
20.8	6.467 ³⁰⁰	15.96 ¹⁴⁵	38.616 ³¹⁸	34.54 ²¹⁵	62.65 ⁸²	37.40 ²⁰⁶	46.878 ⁴⁴⁹	20.15 ³
30.8	6.767 ³⁰⁸	17.41 ¹³¹	38.934 ³³¹	32.39 ¹⁶⁷	63.47 ⁸⁹	35.34 ¹⁴⁶	47.327 ⁴⁶¹	20.12 ²⁹
Feb. 9.8	7.075 ³⁰⁵	18.72 ¹⁰⁹	39.265 ³³⁵	30.72 ¹¹⁴	64.36 ⁹⁴	33.88 ⁸¹	47.788 ⁴⁶²	20.41 ⁵⁶
19.8	7.380 ³⁰⁰	19.81 ⁸⁶	39.600 ³³¹	29.58 ⁵⁸	65.30 ⁹⁵	33.07 ¹³	48.250 ⁴⁵⁴	20.97 ⁸²
Mar. 1.7	7.680 ²⁸⁸	20.67 ⁵⁸	39.931 ³¹⁹	29.00 ²	66.25 ⁹²	32.94 ⁵⁶	48.704 ⁴³⁹	21.79 ¹⁰⁴
11.7	7.968 ²⁷²	21.25 ³¹	40.250 ²⁹⁹	29.02 ⁵⁷	67.17 ⁸⁷	33.50 ¹¹⁹	49.143 ⁴¹⁹	22.83 ¹²³
21.7	8.240 ²⁵³	21.56 ⁵	40.549 ²⁷⁷	29.59 ¹¹¹	68.04 ⁷⁸	34.69 ¹⁷⁸	49.562 ³⁹³	24.06 ¹³⁸
31.7	8.493 ²³³	21.61 ²²	40.826 ²⁴⁸	30.70 ¹⁵⁸	68.82 ⁶⁸	36.47 ²²⁹	49.955 ³⁶²	25.44 ¹⁵¹
Apr. 10.6	8.726 ²⁰⁹	21.39 ⁴³	41.074 ²¹⁷	32.28 ¹⁹⁸	69.50 ⁵⁴	38.76 ²⁷²	50.317 ³²⁹	26.95 ¹⁶²
20.6	8.935 ¹⁸⁶	20.96 ⁶¹	41.291 ¹⁸³	34.26 ²³⁰	70.04 ⁴¹	41.48 ³⁰³	50.646 ²⁹¹	28.57 ¹⁷⁰
30.6	9.121 ¹⁵⁷	20.35 ⁷⁷	41.474 ¹⁴⁶	36.56 ²⁵³	70.45 ²⁵	44.51 ³²²	50.937 ²⁴⁸	30.27 ¹⁷³
May 10.5	9.278 ¹²⁹	19.58 ⁸⁷	41.620 ¹⁰⁸	39.09 ²⁶⁶	70.70 ⁹	47.73 ³³³	51.185 ²⁰³	32.00 ¹⁷⁶
20.5	9.407 ¹⁰⁰	18.71 ⁹³	41.728 ⁶⁹	41.75 ²⁷²	70.79 ⁵	51.06 ³³¹	51.388 ¹⁵⁵	33.76 ¹⁷³
30.5	9.507 ⁶⁷	17.78 ⁹⁶	41.797 ²⁹	44.47 ²⁶⁸	70.74 ²¹	54.37 ³²⁰	51.543 ¹⁰²	35.49 ¹⁶⁹
June 9.5	9.574 ³⁵	16.82 ⁹⁶	41.826 ¹¹	47.15 ²⁵⁵	70.53 ³⁶	57.57 ²⁹⁹	51.645 ⁵⁰	37.18 ¹⁵⁸
19.4	9.609 ²	15.86 ⁹²	41.815 ⁵⁰	49.70 ²³⁸	70.17 ⁴⁹	60.56 ²⁷⁰	51.695 ⁶	38.76 ¹⁴⁷
29.4	9.611 ³³	14.94 ⁸⁶	41.765 ⁸⁸	52.08 ²¹³	69.68 ⁶¹	63.26 ²³⁷	51.689 ⁵⁹	40.23 ¹²⁹
July 9.4	9.578 ⁶⁵	14.08 ⁸⁰	41.677 ¹²³	54.21 ¹⁸⁴	69.07 ⁷²	65.63 ¹⁹⁴	51.630 ¹¹¹	41.52 ¹⁰⁷
19.4	9.513 ⁹⁴	13.28 ⁷¹	41.554 ¹⁵⁷	56.05 ¹⁵⁰	68.35 ⁸¹	67.57 ¹⁴⁹	51.519 ¹⁵⁹	42.59 ⁸¹
29.3	9.419 ¹²¹	12.57 ⁶²	41.397 ¹⁸³	57.55 ¹¹³	67.54 ⁸⁸	69.06 ¹⁰¹	51.360 ²⁰⁰	43.40 ⁵⁵
Aug. 8.3	9.298 ¹⁴²	11.95 ⁵²	41.214 ²⁰⁶	58.68 ⁷⁴	66.66 ⁹³	70.07 ⁵⁰	51.160 ²³²	43.95 ²²
18.3	9.156 ¹⁵⁸	11.43 ⁴¹	41.008 ²²¹	59.42 ³³	65.73 ⁹⁶	70.57 ³	50.928 ²⁵⁷	44.17 ¹¹
28.2	8.998 ¹⁶⁶	11.02 ²⁸	40.787 ²²⁸	59.75 ⁹	64.77 ⁹⁶	70.54 ⁵⁴	50.671 ²⁶⁷	44.06 ⁴³
Sept. 7.2	8.832 ¹⁶³	10.74 ¹⁷	40.559 ²²⁶	59.66 ⁵¹	63.81 ⁹⁵	70.00 ¹⁰⁵	50.404 ²⁶³	43.63 ⁷⁷
17.2	8.669 ¹⁵⁶	10.57 ²	40.333 ²¹⁵	59.15 ⁹²	62.86 ⁹¹	68.95 ¹⁵⁶	50.141 ²⁴⁸	42.86 ¹⁰⁷
27.2	8.513 ¹³⁶	10.55 ¹³	40.118 ¹⁹⁵	58.23 ¹³⁴	61.95 ⁸⁴	67.39 ²⁰²	49.893 ²¹⁶	41.79 ¹³³
Oct. 7.1	8.377 ¹⁰⁷	10.68 ³²	39.923 ¹⁶⁴	56.89 ¹⁷⁴	61.11 ⁷⁵	65.37 ²⁴⁵	49.677 ¹⁷³	40.46 ¹⁵⁵
17.1	8.270 ⁷¹	11.00 ⁴⁸	39.759 ¹²⁵	55.15 ²¹¹	60.36 ⁶⁵	62.92 ²⁸⁴	49.504 ¹¹⁶	38.91 ¹⁷²
27.1	8.199 ²⁸	11.48 ⁶⁸	39.634 ⁷⁸	53.04 ²⁴⁴	59.71 ⁵²	60.08 ³¹⁷	49.388 ⁴⁹	37.19 ¹⁸⁰
Nov. 6.1	8.171 ¹⁹	12.16 ⁸⁷	39.556 ²⁶	50.60 ²⁷¹	59.19 ³⁵	56.91 ³⁴³	49.339 ²²	35.39 ¹⁸⁰
16.0	8.190 ⁶⁹	13.03 ¹⁰⁷	39.530 ³⁰	47.89 ²⁹³	58.84 ²⁰	53.48 ³⁶⁰	49.361 ⁹⁴	33.59 ¹⁷⁴
26.0	8.259 ¹¹⁹	14.10 ¹²⁶	39.560 ⁸⁶	44.96 ³¹¹	58.64 ³	49.88 ³⁶⁷	49.459 ¹⁷⁰	31.85 ¹⁵⁹
Dec. 6.0	8.378 ¹⁶⁵	15.36 ¹⁴⁰	39.646 ¹⁴²	41.85 ³¹⁶	58.61 ¹⁶	46.21 ³⁶⁶	49.629 ²⁴³	30.26 ¹³⁹
15.9	8.543 ²⁰⁸	16.76 ¹⁵²	39.788 ¹⁹³	38.69 ³¹²	58.77 ³²	42.55 ³⁵⁰	49.872 ³⁰⁶	28.87 ¹¹²
25.9	8.751 ²⁴²	18.28 ¹⁵⁷	39.981 ²³⁸	35.57 ²⁹⁸	59.09 ⁴⁹	39.05 ³²⁵	50.178 ³⁵⁰	27.75 ⁸⁴
35.9	8.993	19.85	40.219	32.59	59.58	35.80	50.537	26.91
Mean Place	5.940	12.00	38.680	47.99	66.928	55.08	46.140	29.34
Sec δ , Tan δ	1.002	-0.061	1.207	+0.676	4.158	+4.035	1.554	-1.190
$D\psi_a$, $D\omega_a$	+0.06	0.00	+0.05	+0.02	-0.03	+0.12	+0.09	-0.04
$\gamma_{\psi\delta}$, $D_{\omega\delta}$	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Ophiuchi. Mag. 3.3			σ Scorpï. Mag. 3.1			τ Herculis. Mag. 3.9			γ Herculis. Mag. 3.8		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h m 16 14	s 263	° ' " - 4 29	h m 16 16	s 293	° ' " -25 23	h m 16 17	s 281	° ' " +46 29	h m 16 18	s 250	° ' " +19 20
Jan. 0.9	1.983	263	46.15	15.752	293	54.62	17.249	281	70.75	20.442	250	27.66
10.9	2.246	285	47.68	16.045	317	55.13	17.530	323	67.68	20.692	277	25.21
20.8	2.531	300	49.17	16.362	333	55.80	17.853	354	64.96	20.969	295	22.95
30.8	2.831	308	50.58	16.695	340	56.56	18.207	373	62.70	21.264	307	20.99
Feb. 9.8	3.139	307	51.85	17.035	341	57.40	18.580	382	60.97	21.571	308	19.40
19.8	3.446	300	52.92	17.376	334	58.26	18.962	390	59.84	21.879	304	18.21
Mar. 1.7	3.746	289	53.77	17.710	322	59.12	19.342	370	59.50	22.183	294	17.49
11.7	4.035	275	54.35	18.032	306	59.95	19.712	348	59.50	22.477	279	17.24
21.7	4.310	257	54.67	18.338	289	60.73	20.060	321	60.27	22.756	259	17.47
31.7	4.567	236	54.74	18.627	266	61.43	20.381	287	61.63	23.015	237	18.15
Apr. 10.6	4.803	213	54.55	18.893	243	62.07	20.668	267	63.50	23.252	212	19.24
20.6	5.016	191	54.15	19.136	215	62.63	20.915	247	65.82	23.464	184	20.67
30.6	5.207	161	53.57	19.351	189	63.13	21.120	208	68.48	23.648	154	22.40
May 10.5	5.368	134	52.84	19.540	157	63.57	21.279	181	71.37	23.802	123	24.34
20.5	5.502	104	52.01	19.697	123	63.95	21.390	151	74.42	23.925	90	26.42
30.5	5.606	72	51.12	19.820	90	64.28	21.452	13	77.51	24.015	55	28.56
June 9.5	5.678	39	50.21	19.910	51	64.57	21.465	38	80.54	24.070	20	30.70
19.4	5.717	5	49.29	19.961	13	64.82	21.427	84	83.44	24.090	16	32.77
29.4	5.722	29	48.40	19.974	24	65.00	21.343	131	86.11	24.074	50	34.72
July 9.4	5.693	61	47.57	19.950	63	65.14	21.212	172	88.51	24.024	84	36.50
19.4	5.632	92	46.79	19.887	96	65.21	21.040	209	90.56	23.940	115	38.06
29.3	5.540	120	46.10	19.791	128	65.20	20.831	242	92.23	23.825	141	39.38
Aug. 8.3	5.420	141	45.49	19.663	152	65.10	20.589	268	93.47	23.684	165	40.43
18.3	5.279	156	44.97	19.511	172	64.89	20.321	284	94.25	23.519	180	41.18
28.2	5.123	167	44.56	19.339	181	64.59	20.037	292	94.57	23.339	188	41.62
Sept. 7.2	4.956	165	44.26	19.158	181	64.19	19.745	291	94.41	23.151	180	41.75
17.2	4.791	156	44.08	18.977	170	63.71	19.454	278	93.76	22.962	180	41.54
27.2	4.635	138	44.03	18.807	150	63.15	19.176	255	92.64	22.782	161	41.01
Oct. 7.1	4.497	109	44.12	18.657	118	62.54	18.921	220	91.06	22.621	136	40.14
17.1	4.388	74	44.38	18.539	78	61.92	18.701	177	89.04	22.485	99	38.95
27.1	4.314	31	44.80	18.461	31	61.32	18.524	125	86.62	22.386	57	37.44
Nov. 6.1	4.283	17	45.41	18.430	22	60.78	18.399	64	83.85	22.329	9	35.64
16.0	4.300	66	46.22	18.452	78	60.34	18.335	0	80.77	22.320	41	33.57
26.0	4.366	115	47.21	18.530	132	60.05	18.335	65	77.47	22.361	93	31.29
Dec. 6.0	4.481	163	48.39	18.662	184	59.92	18.400	130	74.03	22.454	143	28.83
15.9	4.644	206	49.72	18.846	231	59.97	18.530	194	70.54	22.597	186	26.25
25.9	4.850	240	51.16	19.077	269	60.21	18.724	249	67.11	22.783	227	23.66
35.9	5.090		52.66	19.346		60.63	18.973		63.86	23.010		21.13
Mean Place	2.014		45.65	15.705		58.44	18.362		80.14	20.767		32.74
Sec δ, Tan δ	1.003		-0.079	1.107		-0.475	1.453		+1.054	1.060		+0.351
<i>D_{pa}, D_{wa}</i>	+0.06		0.00	+0.07		-0.01	+0.04		+0.03	+0.05		+0.01
<i>D_{sa}, D_{sd}</i>	-0.2		-0.9	-0.2		-0.9	-0.2		-0.9	-0.2		-0.9

APPARENT PLACES OF STARS, 1919.

447

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	η Ursæ Minoris. Mag. 5.0		γ Apodis. Mag. 3.9		ω Herculis. Mag. 4.5		η Draconis. Mag. 2.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 16 19	° ' " +75 56	h m 16 20	° ' " -78 42	h m 16 21	° ' " +14 12	h m 16 22	° ' " +61 41
	s	"	s	"	s	"	s	"
Jan. 0.9	45.58	21.76	56.64	53.25	40.115	64.04	51.22	39.74
10.9	46.13	18.69 307	57.71 107	51.36 180	40.363 248	61.77 227	51.56 34	36.55 319
20.9	46.81	16.05 264	58.90 119	49.92 144	40.636 273	59.66 211	51.96 40	33.75 280
30.8	47.60	13.91 214	60.19 129	48.95 97	40.927 291	57.79 187	52.41 45	31.45 230
Feb. 9.8	48.48	12.37 154	61.54 135	48.47 48	41.227 300	56.24 155	52.91 50	29.73 172
		88	139	3	304	118	51	108
19.8	49.41	11.49	62.93	48.50	41.531	55.06	53.42	28.65
Mar. 1.7	50.34	11.27 22	64.31 138	48.99 49	41.831 300	54.29 77	53.94 52	28.25 40
11.7	51.26	11.74 47	65.66 135	49.92 98	42.122 291	53.96 33	54.43 49	28.53 28
21.7	52.12	12.85 111	66.95 129	51.28 136	42.398 276	54.06 10	54.91 48	29.48 95
31.7	52.91	14.55 170	68.17 122	53.02 174	42.654 266	54.58 52	55.35 44	31.02 154
		223	111	208	237	89	39	210
Apr. 10.6	53.60	16.78	69.28	55.10	42.891	55.47	55.74	33.12
20.6	54.17	19.45 267	70.28 100	57.46 236	43.104 213	56.70 123	56.07 33	35.67 255
30.6	54.58	22.45 300	71.15 87	60.06 260	43.291 187	58.19 149	56.34 27	38.57 290
May 10.6	54.86	25.66 321	71.86 74	62.84 278	43.449 158	59.90 171	56.53 19	41.73 316
20.5	54.99	28.99 333	72.40 54	65.73 289	43.578 129	61.74 184	56.65 12	45.03 330
		334	38	295	97	191	5	333
30.5	54.95	32.33	72.78	68.68	43.675	63.65	56.70	48.36
June 9.5	54.77	35.57 324	72.97 19	71.60 292	43.737 62	65.56 191	56.66 4	51.63 327
19.4	54.44	38.61 304	72.98 1	74.45 285	43.766 29	67.43 187	56.56 10	54.73 310
29.4	53.98	41.40 279	72.81 17	77.12 267	43.762 4	69.19 176	56.38 18	57.59 286
July 9.4	53.38	43.82 242	72.45 36	79.57 245	43.722 40	70.81 162	56.14 24	60.14 255
		204	51	212	74	144	30	217
19.4	52.69	45.86 159	71.94	81.69 176	43.648	72.25	55.84	62.31
29.3	51.90	47.45 111	71.27 67	83.45 132	43.544 104	73.46 121	55.49 35	64.05 174
Aug. 8.3	51.04	48.56 61	70.47 80	84.77 84	43.412 132	74.45 99	55.10 39	65.33 128
18.3	50.12	49.17 9	69.57 90	85.61 32	43.258 154	75.17 72	54.67 43	66.12 79
28.3	49.16	49.26 43	68.62 95	85.93 23	43.086 172	75.63 46	54.22 45	66.39 27
			99		180	18	46	24
Sept. 7.2	48.20	48.83	67.63	85.70	42.906	75.81	53.76	66.15
17.2	47.26	47.88 95	66.65 98	84.94 76	42.725 181	75.70 11	53.31 45	65.38 77
27.2	46.35	46.44 144	65.72 93	83.65 129	42.551 174	75.31 39	52.86 45	64.11 127
Oct. 7.1	45.50	44.52 192	64.89 83	81.87 178	42.395 156	74.61 70	52.46 40	62.35 176
17.1	44.73	42.16 236	64.21 68	79.66 221	42.266 129	73.63 98	52.09 37	60.12 223
		276	53	256	96	128	31	265
27.1	44.07	39.40	63.68	77.10	42.170	72.35	51.78	57.47
Nov. 6.1	43.54	36.30 310	63.36 32	74.29 281	42.117 53	70.79 156	51.55 23	54.46 301
16.0	43.16	32.94 336	63.25 11	71.32 297	42.111 6	68.99 180	51.39 16	51.16 330
26.0	42.93	29.37 357	63.38 13	68.32 300	42.154 43	66.96 203	51.33 6	47.61 355
Dec. 6.0	42.88	25.72 365	63.73 35	65.38 294	42.247 93	64.76 220	51.35 2	43.95 366
		365	58	276	142	232	12	368
15.9	43.00	22.07	64.31	62.62	42.389	62.44	51.47	40.27
25.9	43.29	18.56 351	65.09 78	60.13 249	42.575 186	60.08 236	51.67 20	36.68 359
35.9	43.76	15.27 329	66.04 95	58.00 213	42.800 225	57.73 235	51.96 29	33.29 339
Mean Place	51.167	33.09	58.848	64.41	40.369	67.98	53.507	50.09
Sec δ , Tan δ	4.117	+3.993	5.112	-5.014	1.032	+0.253	2.109	+1.857
$D_{\delta a}$, $D_{\delta s}$	-0.03	+0.11	+0.18	-0.14	+0.05	+0.01	+0.02	+0.05
$D_{\delta \delta}$, $D_{\delta \delta}$	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Scorpii. (Antares.) Mag. 1.2		β Herculis. Mag. 2.8		λ Ophiuchi. Mag. 3.8		Δ Draconis Mag.
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.
	h m 16 24	° ' " -26 15	h m 16 26	° ' " +21 39	h m 16 26	° ' " + 2 9	h m 16 28
	s	"	s	"	s	"	s
Jan. 0.9	26.287	8.08	43.791	49.58	49.476	35.48	4.60
10.9	26.575 ²⁸⁸	8.49 ⁴¹	44.035 ²⁴⁴	47.05 ²⁵³	49.723 ²⁴⁷	33.70 ¹⁷⁸	4.99 ³⁹
20.9	26.890 ³¹⁵	9.05 ⁵⁶	44.306 ²⁷¹	44.72 ²³³	49.995 ²⁷²	31.99 ¹⁷¹	5.48 ⁴⁹
30.8	27.221 ³³¹	9.73 ⁶⁸	44.599 ²⁹³	42.69 ²⁰³	50.285 ²⁹⁰	30.43 ¹⁵⁶	6.03 ⁵⁵
Feb. 9.8	27.562 ³⁴¹	10.48 ⁷⁵	44.905 ³⁰⁶	41.04 ¹⁶⁵	50.584 ²⁹⁹	29.06 ¹³⁷	6.64 ⁶¹
	342	79	309	122	301	110	65
19.8	27.904	11.27	45.214	39.82	50.885	27.96	7.29
Mar. 1.7	28.241 ³³⁷	12.06 ⁷⁹	45.520 ³⁰⁶	39.07 ⁷⁵	51.183 ²⁹⁸	27.16 ⁸⁰	7.95 ⁶⁶
11.7	28.568 ³²⁷	12.82 ⁷⁶	45.818 ²⁹⁸	38.82 ²⁵	51.472 ²⁸⁹	26.67 ⁴⁹	8.59 ⁶⁴
21.7	28.881 ³¹³	13.54 ⁷²	46.103 ²⁸⁵	39.07 ²⁵	51.748 ²⁷⁶	26.51 ¹⁶	9.21 ⁶²
31.7	29.176 ²⁹⁵	14.21 ⁶⁷	46.368 ²⁶⁵	39.78 ⁷¹	52.007 ²⁵⁹	26.68 ¹⁷	9.78 ⁵⁷
	275	61	245	115	240	46	50
Apr. 10.6	29.451	14.82	46.613	40.93	52.247	27.14	10.28
20.6	29.702 ²⁵¹	15.37 ⁵⁵	46.832 ²¹⁹	42.44 ¹⁵¹	52.465 ²¹⁸	27.87 ⁷³	10.70 ⁴²
30.6	29.928 ²²⁶	15.87 ⁵⁰	47.024 ¹⁹²	44.26 ¹⁸²	52.660 ¹⁹⁵	28.81 ⁹⁴	11.02 ³²
May 10.6	30.125 ¹⁹⁷	16.31 ⁴⁴	47.186 ¹⁶²	46.30 ²⁰⁴	52.829 ¹⁶⁹	29.92 ¹¹¹	11.26 ²⁴
20.5	30.291 ¹⁶⁶	16.71 ⁴⁰	47.315 ¹²⁹	48.49 ²¹⁹	52.970 ¹⁴¹	31.15 ¹²³	11.40 ¹⁴
	133	36	97	227	110	130	4
30.5	30.424 ⁹⁸	17.07 ³³	47.412 ⁶¹	50.76 ²²⁷	53.080 ⁷⁸	32.45 ¹³²	11.44 ⁷
June 9.5	30.522 ⁶⁰	17.40 ²⁸	47.473 ²⁴	53.03 ²²⁰	53.158 ⁴⁶	33.77 ¹³⁰	11.37 ¹⁶
19.4	30.582 ²¹	17.68 ²⁴	47.497 ¹³	55.23 ²⁰⁷	53.204 ¹⁰	35.07 ¹²⁴	11.21 ²⁷
29.4	30.603 ¹⁹	17.92 ¹⁸	47.484 ⁴⁷	57.30 ¹⁹⁰	53.214 ²⁴	36.31 ¹¹⁵	10.94 ³⁴
July 9.4	30.584 ⁵⁸	18.10 ¹²	47.437 ⁸³	59.20 ¹⁶⁷	53.190 ⁵⁷	37.46 ¹⁰⁴	10.60 ⁴³
19.4	30.526	18.22	47.354	60.87	53.133	38.50	10.17
29.3	30.433 ⁹³	18.27 ⁵	47.238 ¹¹⁶	62.29 ¹⁴²	53.044 ⁸⁹	39.42 ⁹²	9.68 ⁴⁹
Aug. 8.3	30.308 ¹²⁵	18.22 ⁵	47.095 ¹⁴³	63.42 ¹¹³	52.926 ¹¹⁸	40.18 ⁷⁶	9.14 ⁵⁴
18.3	30.156 ¹⁵²	18.07 ¹⁵	46.928 ¹⁶⁷	64.24 ⁸²	52.786 ¹⁴⁰	40.79 ⁶¹	8.55 ⁵⁹
28.3	29.983 ¹⁷³	17.81 ²⁶	46.743 ¹⁸⁵	64.74 ⁵⁰	52.627 ¹⁵⁹	41.24 ⁴⁵	7.93 ⁶²
	182	36	194	16	169	27	63
Sept. 7.2	29.801	17.45	46.549	64.90	52.458	41.51	7.30
17.2	29.616 ¹⁸⁵	16.99 ⁴⁶	46.353 ¹⁹⁶	64.71 ¹⁹	52.287 ¹⁷¹	41.60 ⁹	6.67 ⁶³
27.2	29.441 ¹⁷⁵	16.45 ⁵⁴	46.165 ¹⁸⁸	64.17 ⁵⁴	52.124 ¹⁶³	41.51 ⁹	6.07 ⁶⁰
Oct. 7.1	29.286 ¹⁵⁵	15.85 ⁶⁰	45.994 ¹⁷¹	63.29 ⁸⁸	51.976 ¹⁴⁸	41.22 ²⁹	5.50 ⁵⁷
17.1	29.161 ¹²⁵	15.21 ⁶⁴	45.849 ¹⁴⁵	62.06 ¹²³	51.855 ¹²¹	40.71 ⁵¹	4.98 ⁵²
	86	62	110	155	88	73	44
27.1	29.075	14.59	45.739	60.51	51.767	39.98	4.54
Nov. 6.1	29.037 ³⁸	14.01 ⁵⁸	45.670 ⁶⁰	58.65 ¹⁸⁶	51.719 ⁴⁵	39.04 ⁹⁴	4.19 ³⁵
16.0	29.051 ¹⁴	13.52 ⁴⁹	45.649 ²¹	56.51 ²¹⁴	51.720 ¹	37.89 ¹¹⁵	3.95 ²⁴
26.0	29.120 ⁶⁹	13.16 ³⁶	45.679 ³⁰	54.14 ²³⁷	51.768 ⁴⁸	36.54 ¹³⁵	3.80 ¹⁵
Dec. 6.0	29.244 ¹²⁴	12.96 ²⁰	45.760 ⁸¹	51.58 ²⁵⁶	51.866 ⁹⁸	35.01 ¹⁵³	3.78 ²
	177	4	132	265	146	168	10
16.0	29.421	12.92	45.892	48.93	52.012	33.33	3.88
25.9	29.645 ²²⁴	13.06 ¹⁴	46.071 ¹⁷⁹	46.25 ²⁶⁸	52.199 ¹⁸⁷	31.57 ¹⁷⁶	4.09 ²¹
35.9	29.909 ²⁶⁴	13.39 ³³	46.290 ²¹⁹	43.63 ²⁶²	52.425 ²²⁶	29.77 ¹⁸⁰	4.43 ³⁴
Mean Place	26.272	12.06	44.186	54.58	49.602	36.92	8.068
Sec δ , Tan δ	1.115	-0.493	1.076	+0.397	1.001	+0.038	2.783
$D\psi\alpha$, $D\omega\alpha$	+0.07	-0.01	+0.05	+0.01	+0.06	0.00	0.00
$D\psi\delta$, $D\omega\delta$	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2

APPARENT PLACES OF STARS, 1919.

449

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	τ Scorpii. Mag. 2.9		σ Herculis. Mag. 4.2		ζ Ophiuchi. Mag. 2.7		η Scorpii. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 16 30	° ' -28 2	h m 16 31	° ' +42 35	h m 16 32	° ' -10 24	h m 16 36	° ' -17 35
	s	"	s	"	s	"	s	"
Jan. 0.9	50.195	52.63	28.482	64.03	41.742	13.44	53.116	8.58
10.9	50.482 287	52.91 28	28.739 257	60.96 307	41.997 255	14.62 118	53.378 262	9.36 78
20.9	50.797 315	53.34 43	29.037 298	58.21 275	42.277 280	15.81 119	53.665 287	10.21 85
30.8	51.130 333	53.89 55	29.364 327	55.87 234	42.575 298	16.96 115	53.972 307	11.10 89
Feb. 9.8	51.474 344	54.54 65	29.714 350	54.04 183	42.883 308	18.03 107	54.289 317	11.98 88
19.8	51.820 346	55.25 71	30.074 360	52.77 127	43.193 310	18.98 95	54.609 320	12.80 82
Mar. 1.7	52.162 342	55.98 73	30.435 361	52.11 66	43.499 306	19.76 78	54.926 317	13.53 73
11.7	52.496 334	56.71 73	30.787 352	52.09 2	43.798 299	20.35 59	55.236 310	14.15 62
21.7	52.816 330	57.41 70	31.125 338	52.67 58	44.085 287	20.74 39	55.534 298	14.64 49
31.7	53.118 302	58.08 67	31.439 314	53.84 117	44.357 272	20.91 17	55.817 283	15.00 36
Apr. 10.6	53.402 284	58.71 63	31.726 287	55.54 170	44.609 252	20.89 2	56.082 265	15.21 21
20.6	53.662 260	59.29 56	31.978 252	57.68 214	44.842 233	20.69 20	56.327 245	15.31 10
30.6	53.897 235	59.84 55	32.192 214	60.20 252	45.052 210	20.34 35	56.548 221	15.30 1
May 10.6	54.103 206	60.35 51	32.365 173	62.97 277	45.236 184	19.88 46	56.744 196	15.21 9
20.5	54.278 175	60.82 47	32.495 130	65.92 265	45.392 156	19.34 54	56.911 167	15.06 15
30.5	54.421 143	61.26 44	32.579 84	68.94 302	45.518 126	18.73 61	57.048 137	14.86 20
June 9.5	54.526 106	61.68 42	32.617 38	71.93 299	45.612 94	18.10 63	57.151 103	14.63 23
19.4	54.593 67	62.05 37	32.608 9	74.82 299	45.671 59	17.46 64	57.219 68	14.39 24
29.4	54.620 27	62.39 34	32.553 55	77.54 272	45.694 23	16.84 62	57.249 30	14.15 24
July 9.4	54.606 14	62.68 29	32.453 100	79.99 245	45.681 13	16.25 59	57.241 8	13.91 24
19.4	54.553 53	62.89 21	32.313 140	82.13 214	45.634 47	15.69 56	57.198 43	13.66 25
29.3	54.463 90	63.02 13	32.133 180	83.91 178	45.552 82	15.17 52	57.118 80	13.41 25
Aug. 8.3	54.338 125	63.05 3	31.919 214	85.30 139	45.440 112	14.70 47	57.006 112	13.15 26
18.3	54.186 152	62.96 9	31.679 240	86.26 96	45.303 137	14.28 42	56.867 139	12.88 27
28.3	54.011 175	62.76 20	31.419 260	86.77 51	45.147 156	13.91 37	56.707 160	12.58 30
Sept. 7.2	53.824 187	62.44 32	31.149 270	86.81 4	44.978 169	13.59 32	56.534 173	12.27 31
17.2	53.635 190	62.00 44	30.877 272	86.38 43	44.807 171	13.34 25	56.358 176	11.95 32
27.2	53.454 181	61.45 55	30.615 262	85.49 89	44.644 163	13.15 19	56.189 169	11.63 32
Oct. 7.1	53.292 162	60.82 63	30.370 245	84.14 135	44.496 148	13.05 10	56.035 154	11.33 30
17.1	53.161 131	60.15 67	30.157 213	82.35 179	44.374 122	13.05 0	55.909 126	11.06 27
27.1	53.067 94	59.46 69	29.983 174	80.15 220	44.287 87	13.18 13	55.816 93	10.87 19
Nov. 6.1	53.022 45	58.79 67	29.857 126	77.58 257	44.242 45	13.46 28	55.767 49	10.76 11
16.0	53.029 7	58.19 60	29.787 70	74.70 288	44.244 2	13.89 43	55.768 1	10.77 1
26.0	53.092 63	57.71 48	29.776 11	71.56 314	44.296 52	14.48 59	55.820 52	10.91 14
Dec. 6.0	53.211 119	57.36 35	29.829 53	68.26 330	44.398 102	15.24 76	55.923 103	11.21 30
16.0	53.385 174	57.19 17	29.942 113	64.88 338	44.548 150	16.16 92	56.077 154	11.66 45
25.9	53.606 221	57.19 0	30.114 172	61.52 336	44.743 195	17.19 103	56.276 199	12.26 60
35.9	53.868 262	57.37 18	30.340 226	58.30 322	44.974 231	18.34 115	56.514 238	13.00 74
Mean Place	50.202	56.93	29.483	71.75	41.797	14.54	53.153	11.04
Sec δ , Tan δ	1.133	-0.533	1.259	+0.920	1.017	-0.184	1.049	-0.317
$D_{\delta a}$, $D_{\delta s}$	+0.07	-0.01	+0.04	+0.02	+0.07	0.00	+0.07	-0.01
D_{α} , $D_{\alpha s}$	-0.2	-0.9	-0.2	-0.9	-0.1	-0.9	-0.1	-0.9

5934°—1919—29

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Herculis. Mag. 3.0		α Triang. Aust. Mag. 1.9		η Herculis. Mag. 3.6		Groombrid Mag.
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.
	h m 16 38	° ' " +31 44	h m 16 40	° ' " -68 52	h m 16 40	° ' " +39 4	h m 16 43
	s	"	s	"	s	"	s
Jan. 0.9	13.280	49.89	3.44	41.63	6.199	25.30	43.699
10.9	13.516 ²³⁶	47.05 ²⁸⁴	4.03 ⁵⁹	39.88 ¹⁷⁵	6.442 ²⁴³	22.27 ³⁰³	43.978 ²⁷⁹
20.9	13.788 ²⁷²	44.47 ²⁵⁸	4.69 ⁶⁶	38.50 ¹³⁸	6.723 ²⁸¹	19.53 ²⁷⁴	44.316 ³³⁸
30.8	14.085 ²⁹⁷	42.23 ²²⁴	5.41 ⁷²	37.53 ⁹⁷	7.035 ³¹²	17.16 ²³⁷	44.704 ³⁸⁸
Feb. 9.8	14.999 ³¹⁴	40.43 ¹⁸⁰	6.17 ⁷⁶	36.98 ⁵⁵	7.367 ³³²	15.28 ¹⁸⁸	45.127 ⁴²³
	323	130	77	14	344	134	448
19.8	14.722	39.13	6.94	36.84	7.711	13.94	45.575
Mar. 1.8	15.046 ³²⁴	38.37 ⁷⁶	7.72 ⁷⁸	37.12 ²⁸	8.058 ³⁴⁷	13.19 ⁷⁵	46.031 ⁴⁵⁶
11.7	15.364 ³¹⁸	38.18 ¹⁹	8.49 ⁷⁷	37.79 ⁶⁷	8.399 ³⁴¹	13.04 ¹⁵	46.483 ⁴⁵²
21.7	15.668 ³⁰⁴	38.55 ³⁷	9.23 ⁷⁴	38.82 ¹⁰³	8.726 ³²⁷	13.51 ⁴⁷	46.919 ⁴³⁶
31.7	15.955 ²⁸⁷	39.46 ⁹¹	9.94 ⁷¹	40.17 ¹³⁵	9.033 ³⁰⁷	14.55 ¹⁰⁴	47.326 ⁴⁰⁷
	263	141	66	166	283	156	371
Apr. 10.6	16.218	40.87	10.60	41.83	9.316	16.11	47.697
20.6	16.455 ²³⁷	42.70 ¹⁸³	11.21 ⁶¹	43.74 ¹⁹¹	9.568 ²³²	18.12 ²⁰¹	48.023 ³²⁶
30.6	16.661 ²⁰⁶	44.88 ²¹⁸	11.74 ⁵³	45.89 ²¹⁵	9.786 ²¹⁸	20.50 ²³⁸	48.295 ²⁷²
May 10.6	16.834 ¹⁷³	47.32 ²⁴⁴	12.21 ⁴⁷	48.20 ²³¹	9.966 ¹⁸⁰	23.16 ²⁶⁶	48.510 ²¹⁵
20.5	16.972 ¹³⁸	49.94 ²⁶²	12.59 ³⁸	50.64 ²⁴⁴	10.107 ¹⁴¹	26.00 ²⁸⁴	48.663 ¹⁵³
	100	271	29	251	98	294	88
30.5	17.072	52.65	12.88	53.15	10.205	28.94	48.751
June 9.5	17.132 ⁶⁰	55.36 ²⁷¹	13.08 ²⁰	55.67 ²⁵²	10.259 ⁵⁴	31.87 ²⁹³	48.775 ²⁴
19.5	17.152 ²⁰	58.00 ²⁶⁴	13.16 ⁸	58.15 ²⁴⁸	10.268 ⁹	34.72 ²⁸⁵	48.732 ⁴³
29.4	17.131 ²¹	60.48 ²⁴⁸	13.16 ⁰	60.53 ²³⁸	10.233 ³⁵	37.41 ²⁶⁹	48.627 ¹⁰⁵
July 9.4	17.070 ⁶¹	62.76 ²²⁸	13.05 ¹¹	62.71 ²¹⁸	10.154 ⁷⁹	39.85 ²⁴⁴	48.462 ¹⁶⁵
	98	201	20	195	121	216	223
19.4	16.972	64.77	12.85	64.66	10.033	42.01	48.239
29.3	16.837 ¹³⁵	66.48 ¹⁷¹	12.56 ²⁹	66.31 ¹⁶⁵	9.875 ¹⁵⁸	43.83 ¹⁸²	47.966 ²⁷³
Aug. 8.3	16.671 ¹⁶⁶	67.85 ¹³⁷	12.18 ³⁸	67.59 ¹²⁸	9.683 ¹⁹²	45.28 ¹⁴⁵	47.649 ³¹⁷
18.3	16.479 ¹⁹²	68.84 ⁹⁹	11.74 ⁴⁴	68.46 ⁸⁷	9.464 ²¹⁹	46.31 ¹⁰³	47.296 ³⁵³
28.3	16.266 ²¹³	69.44 ⁶⁰	11.26 ⁴⁸	68.88 ⁴²	9.223 ²⁴¹	46.92 ⁶¹	46.918 ³⁷⁸
	223	19	51	5	252	16	393
Sept. 7.2	16.043	69.63	10.75	68.83	8.971	47.08	46.525
17.2	15.816 ²²⁷	69.41 ²²	10.23 ⁵²	68.30 ⁵³	8.715 ²⁵⁶	46.79 ²⁹	46.128 ³⁹⁷
27.2	15.595 ²²¹	68.78 ⁶³	9.73 ⁵⁰	67.29 ¹⁰¹	8.466 ²⁴⁹	46.04 ⁷⁵	45.740 ³⁸⁸
Oct. 7.2	15.391 ²⁰⁴	67.73 ¹⁰⁵	9.27 ⁴⁶	65.84 ¹⁴⁵	8.233 ²³³	44.85 ¹¹⁹	45.375 ³⁶⁵
17.1	15.213 ¹⁷⁸	66.30 ¹⁴³	8.89 ³⁸	64.00 ¹⁸⁴	8.029 ²⁰⁴	43.22 ¹⁶³	45.045 ³³⁰
	144	182	30	218	168	204	282
27.1	15.069 ¹⁰⁰	64.48 ²¹⁷	8.59 ¹⁹	61.82 ²⁴³	7.861 ¹²²	41.18 ²³⁹	44.763 ²²⁴
Nov. 6.1	14.969 ⁵¹	62.31 ²⁴⁸	8.40 ⁸	59.39 ²⁶⁰	7.739 ⁷⁰	38.79 ²⁷³	44.539 ¹⁵⁶
16.0	14.918 ³	59.83 ²⁷³	8.32 ⁵	56.79 ²⁶⁵	7.669 ¹³	36.06 ³⁰⁰	44.383 ⁷⁸
26.0	14.921 ⁵⁸	57.10 ²⁹¹	8.37 ¹⁹	54.14 ²⁶⁰	7.656 ⁴⁷	33.06 ³¹⁸	44.305 ¹
Dec. 6.0	14.979 ¹¹²	54.19 ³⁰³	8.56 ³¹	51.54 ²⁴⁷	7.703 ¹⁰⁵	29.88 ³²⁷	44.306 ⁸⁰
16.0	15.091 ¹⁶³	51.16 ³⁰³	8.87 ⁴¹	49.07 ²²⁶	7.808 ¹⁶¹	26.61 ³²⁸	44.386 ¹⁶⁰
25.9	15.254 ²¹⁰	48.13 ²⁹⁶	9.28 ⁵⁴	46.81 ¹⁹⁶	7.969 ²¹²	23.33 ³¹⁵	44.546 ²³⁵
35.9	15.464	45.17	9.82	44.85	8.181	20.18	44.781
Mean Place	13.941	55.66	4.408	51.28	7.096	31.88	45.621
Sec δ, Tan δ	1.176	+0.619	2.776	-2.589	1.288	+0.812	1.832
$D\psi_a, D\omega_a$	+0.05	+0.01	+0.13	-0.06	+0.04	+0.02	+0.02
$\gamma\psi_\delta, D\omega_\delta$	-0.1	-0.9	-0.1	-0.9	-0.1	-0.9	-0.1

APPARENT PLACES OF STARS, 1919.

451

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Scorpii. Mag. 2.4		49 Herculis. Mag. 6.4		ε¹ Aræ. Mag. 4.2		κ Ophiuchi. Mag. 3.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 16 44	° ' -34 8	h m 16 48	° ' +15 6	h m 16 53	° ' -53 2	h m 16 53	° ' + 9 29
	s 16 44	" "	s 16 48	" "	s 16 53	" "	s 16 53	" "
Jan. 0.9	54.713	45.94	23.193	30.01	6.959	7.97	49.704	58.36
10.9	55.003 ²⁹⁰	45.81 ¹³	23.419 ²²⁶	27.72 ²²⁹	7.326 ³⁶⁷	6.79 ¹¹⁸	49.926 ²²²	56.31 ²⁰⁵
20.9	55.325 ³²²	45.85 ⁴	23.675 ²⁵⁶	25.58 ²¹⁴	7.740 ⁴¹⁴	5.88 ⁹¹	50.178 ²⁵²	54.36 ¹⁹⁵
30.8	55.669 ³⁴⁴	46.07 ²²	23.951 ²⁷⁶	23.66 ¹⁹²	8.188 ⁴⁴⁸	5.28 ⁶⁰	50.450 ²⁷²	52.61 ¹⁷⁵
Feb. 9.8	56.027 ³⁵⁸	46.42 ³⁵	24.242 ²⁹¹	22.05 ¹⁶¹	8.659 ⁴⁷¹	4.98 ³⁰	50.737 ²⁸⁷	51.11 ¹⁵⁰
19.8	56.390 ³⁶³	46.89 ⁴⁷	24.541 ²⁹⁹	20.81 ¹²⁴	9.141 ⁴⁸²	4.95 ³	51.032 ²⁹⁵	49.94 ¹¹⁷
Mar. 1.8	56.752 ³⁶²	47.45 ⁵⁶	24.841 ³⁰⁰	19.99 ⁸²	9.628 ⁴⁸⁷	5.21 ²⁶	51.327 ²⁹⁵	49.13 ⁸¹
11.7	57.108 ³⁵⁶	48.07 ⁶²	25.136 ²⁹⁵	19.61 ³⁸	10.108 ⁴⁸⁰	5.72 ⁵¹	51.619 ²⁹²	48.69 ⁴⁴
21.7	57.452 ³⁴⁴	48.74 ⁶⁷	25.421 ²⁸⁵	19.67 ⁶	10.576 ⁴⁶⁸	6.47 ⁷⁵	51.903 ²⁸⁴	48.67 ²
31.7	57.781 ³²⁹	49.44 ⁷⁰	25.691 ²⁷⁰	20.16 ⁴⁹	11.024 ⁴⁴⁸	7.42 ⁹⁵	52.173 ²⁷⁰	49.03 ³⁶
Apr. 10.7	58.090 ³⁰⁹	50.16 ⁷²	25.945 ²⁵⁴	21.06 ⁹⁰	11.449 ⁴²⁵	8.57 ¹¹⁵	52.427 ²⁵⁴	49.76 ⁷³
20.6	58.378 ²⁸⁸	50.89 ⁷³	26.178 ²³³	22.31 ¹²⁵	11.842 ³⁹³	9.89 ¹³²	52.663 ²³⁶	50.81 ¹⁰⁵
30.6	58.639 ²⁶¹	51.64 ⁷⁵	26.387 ²⁰⁹	23.85 ¹⁵⁴	12.200 ³⁵⁸	11.34 ¹⁴⁵	52.875 ²¹²	52.12 ¹³¹
May 10.6	58.872 ²³³	52.39 ⁷⁵	26.570 ¹⁸³	25.62 ¹⁷⁷	12.518 ³¹⁸	12.92 ¹⁵⁸	53.064 ¹⁸⁹	53.64 ¹⁵²
20.5	59.072 ²⁰⁰	53.14 ⁷⁵	26.723 ¹⁵³	27.54 ¹⁹²	12.791 ²⁷³	14.60 ¹⁶⁸	53.224 ¹⁶⁰	55.31 ¹⁶⁷
30.5	59.236 ¹⁶⁴	53.90 ⁷⁶	26.844 ¹²¹	29.56 ²⁰²	13.013 ²²²	16.33 ¹⁷³	53.353 ¹²⁹	57.07 ¹⁷⁶
June 9.5	59.361 ¹²⁵	54.64 ⁷⁴	26.933 ⁸⁹	31.60 ²⁰⁴	13.180 ¹⁶⁷	18.08 ¹⁷⁵	53.450 ⁹⁷	58.85 ¹⁷⁸
19.5	59.445 ⁸⁴	55.36 ⁷²	26.985 ⁵²	33.61 ²⁰¹	13.288 ¹⁰⁸	19.81 ¹⁷³	53.512 ⁶²	60.61 ¹⁷⁶
29.4	59.484 ³⁹	56.03 ⁶⁷	27.000 ¹⁵	35.52 ¹⁹¹	13.335 ⁴⁷	21.47 ¹⁶⁶	53.538 ²⁶	62.28 ¹⁶⁷
July 9.4	59.479 ⁵	56.65 ⁶²	26.978 ²²	37.30 ¹⁷⁸	13.322 ¹³	23.03 ¹⁵⁶	53.527 ¹¹	63.85 ¹⁵⁷
19.4	59.431 ⁴⁸	57.18 ⁵³	26.921 ⁵⁷	38.89 ¹⁵⁹	13.247 ⁷⁵	24.43 ¹⁴⁰	53.480 ⁴⁷	65.27 ¹⁴²
29.4	59.340 ⁹¹	57.60 ⁴²	26.830 ⁹¹	40.27 ¹³⁸	13.113 ¹³⁴	25.62 ¹¹⁹	53.398 ⁸²	66.50 ¹²³
Aug. 8.3	59.211 ¹²⁹	57.88 ²⁸	26.706 ¹²⁴	41.41 ¹¹⁴	12.927 ¹⁸⁶	26.57 ⁹⁵	53.284 ¹¹⁴	67.54 ¹⁰⁴
18.3	59.050 ¹⁶¹	58.01 ¹³	26.558 ¹⁴⁸	42.30 ⁸⁹	12.696 ²³¹	27.21 ⁶⁴	53.144 ¹⁴⁰	68.36 ⁸²
28.3	58.865 ¹⁸⁵	57.98 ³	26.388 ¹⁷⁰	42.90 ⁶⁰	12.429 ²⁶⁷	27.53 ³²	52.982 ¹⁶²	68.94 ⁵⁸
Sept. 7.2	58.663 ²⁰²	57.76 ²²	26.205 ¹⁸³	43.22 ³²	12.143 ²⁸⁶	27.52 ¹	52.806 ¹⁷⁶	69.28 ³⁴
17.2	58.456 ²⁰⁷	57.36 ⁴⁰	26.016 ¹⁸⁹	43.25 ³	11.848 ²⁹⁵	27.14 ³⁸	52.624 ¹⁸²	69.38 ¹⁰
27.2	58.255 ²⁰¹	56.80 ⁵⁶	25.832 ¹⁸⁴	42.96 ²⁹	11.557 ²⁹¹	26.41 ⁷³	52.445 ¹⁷⁹	69.22 ¹⁶
Oct. 7.2	58.072 ¹⁸³	56.08 ⁷²	25.662 ¹⁷⁰	42.37 ⁵⁹	11.291 ²⁶⁶	25.34 ¹⁰⁷	52.279 ¹⁶⁶	68.80 ⁴²
17.1	57.918 ¹⁵⁴	55.26 ⁸²	25.514 ¹⁴⁸	41.49 ⁸⁸	11.063 ²²⁸	24.00 ¹³⁴	52.134 ¹⁴⁵	68.11 ⁶⁹
27.1	57.805 ¹¹³	54.35 ⁹¹	25.398 ¹¹⁶	40.30 ¹¹⁹	10.886 ¹⁷⁷	22.39 ¹⁶¹	52.020 ¹¹⁴	67.16 ⁹⁵
Nov. 6.1	57.740 ⁶⁵	53.41 ⁹⁴	25.321 ⁷⁷	38.83 ¹⁴⁷	10.773 ¹¹³	20.62 ¹⁷⁷	51.945 ⁷⁵	65.96 ¹²⁰
16.1	57.730 ¹⁰	52.49 ⁹²	25.288 ³³	37.08 ¹⁷⁵	10.734 ³⁹	18.74 ¹⁸⁸	51.913 ³²	64.51 ¹⁴⁵
26.0	57.779 ⁴⁹	51.63 ⁸⁶	25.304 ¹⁶	35.11 ¹⁹⁷	10.772 ³⁸	16.82 ¹⁹²	51.929 ¹⁶	62.83 ¹⁶⁸
Dec. 6.0	57.887 ¹⁰⁸	50.89 ⁷⁴	25.370 ⁶⁶	32.94 ²¹⁷	10.889 ¹¹⁷	14.95 ¹⁸⁷	51.994 ⁶⁵	60.98 ¹⁸⁵
16.0	58.051 ¹⁶⁴	50.29 ⁶⁰	25.485 ¹¹⁵	30.64 ²³⁰	11.084 ¹⁹⁵	13.20 ¹⁷⁵	52.107 ¹¹³	58.99 ¹⁹⁹
25.9	58.269 ²¹⁸	49.85 ⁴⁴	25.645 ¹⁶⁰	28.28 ²³⁶	11.350 ²⁶⁶	11.63 ¹⁵⁷	52.265 ¹⁵⁸	56.91 ²⁰⁸
35.9	58.531 ²⁶²	49.61 ²⁴	25.846 ²⁰¹	25.93 ²³⁵	11.679 ³²⁹	10.29 ¹³⁴	52.463 ¹⁹⁸	54.82 ²⁰⁹
Mean Place	54.788	51.15	23.544	32.73	7.292	15.54	49.991	59.96
Sec δ, Tan δ	1.208	-0.678	1.036	+0.270	1.663	-1.329	1.014	+0.167
Dδa, Dωa	+0.08	-0.01	+0.05	+0.01	+0.09	-0.03	+0.06	0.00
Dδδ, Dωδ	-0.1	-0.9	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	30 Ophiuchi. Mag. 5.0		ε Herculis. Mag. 3.9		δ Herculis. Mag. 5.3		γ Ophiuchi. Mag. 2.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 16 56	° ' " - 4 6	h m 16 57	° ' " +31 2	h m 16 58	° ' " +33 40	h m 17 5	° ' " -15 37
	s "	"	s "	"	s "	"	s "	"
Jan. 0.9	47.162	7.08	10.695	37.21	36.064	60.37	43.698	30.05
10.9	47.392	8.47	10.913	34.35	36.283	57.48	43.982	30.79
20.9	47.650	9.84	11.169	31.72	36.540	54.73	44.198	31.57
30.8	47.927	11.13	11.452	29.40	36.828	52.36	44.484	32.37
Feb. 9.8	48.219	12.27	11.757	27.50	37.135	50.48	44.786	33.12
19.8	48.517	13.24	12.073	26.09	37.456	48.97	45.096	33.80
Mar. 1.8	48.816	13.97	12.393	25.20	37.783	48.08	45.406	34.37
11.7	49.112	14.45	12.712	24.88	38.108	47.75	45.717	34.82
21.7	49.399	14.65	13.020	25.11	38.434	48.01	46.019	35.10
31.7	49.674	14.60	13.316	25.90	38.725	48.53	46.311	35.24
Apr. 10.7	49.934	14.28	13.592	27.18	39.007	50.16	46.589	35.24
20.6	50.178	13.75	13.843	28.91	39.284	51.95	46.850	35.10
30.6	50.400	13.02	14.067	31.01	39.492	54.12	47.092	34.85
May 10.6	50.598	12.15	14.260	33.39	39.687	56.50	47.310	34.58
20.5	50.770	11.18	14.418	35.99	39.848	59.26	47.502	34.14
30.5	50.913	10.14	14.539	38.68	39.968	62.05	47.663	33.73
June 9.5	51.024	9.07	14.621	41.41	40.049	64.88	47.792	33.30
19.5	51.100	8.02	14.663	44.09	40.088	67.65	47.886	32.88
29.4	51.140	7.01	14.663	46.64	40.084	70.29	47.941	32.49
July 9.4	51.144	6.06	14.621	49.02	40.039	72.75	47.957	32.11
19.4	51.110	5.20	14.539	51.14	39.951	74.94	47.934	31.77
29.4	51.041	4.44	14.419	52.98	39.825	76.85	47.872	31.46
Aug. 8.3	50.940	3.79	14.265	54.49	39.663	78.41	47.776	31.17
18.3	50.810	3.24	14.083	55.63	39.472	79.59	47.649	30.91
28.3	50.658	2.80	13.877	56.39	39.257	80.37	47.497	30.65
Sept. 7.2	50.490	2.49	13.656	56.76	39.028	80.74	47.328	30.41
17.2	50.316	2.31	13.429	56.71	38.792	80.69	47.148	30.18
27.2	50.145	2.25	13.205	56.26	38.558	80.22	46.972	29.97
Oct. 7.2	49.987	2.33	12.995	55.39	38.338	79.31	46.806	29.78
17.1	49.849	2.57	12.807	54.11	38.140	77.98	46.604	29.63
27.1	49.743	2.96	12.651	52.44	37.975	76.25	46.552	29.54
Nov. 6.1	49.676	3.52	12.536	50.41	37.852	74.15	46.479	29.53
16.1	49.653	4.26	12.468	48.07	37.776	71.71	46.452	29.63
26.0	49.678	5.17	12.452	45.44	37.753	69.00	46.475	29.86
Dec. 6.0	49.752	6.24	12.490	42.61	37.785	66.08	46.548	30.20
16.0	49.873	7.46	12.581	39.64	37.872	63.02	46.671	30.68
25.9	50.039	8.78	12.726	36.63	38.014	59.92	46.840	31.27
35.9	50.244	10.17	12.915	33.67	38.202	56.89	47.050	31.96
Mean Place	47.325	7.65	11.394	41.50	36.841	64.85	43.825	32.47
Sec δ, Tan δ	1.003	-0.072	1.167	+0.602	1.202	+0.667	1.038	-0.290
$D\alpha$, $D\alpha\alpha$	+0.06	0.00	+0.05	+0.01	+0.04	+0.01	+0.07	0.00
$D\alpha\delta$	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

APPARENT PLACES OF STARS, 1919.

453

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	η Scorpii. Mag. 3.4		ζ Draconis. Mag. 3.2		α Herculis. Var. 3.1-3.9		δ Herculis. Mag. 3.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 17 6	° ' -43 7	h m 17 8	° ' +65 48	h m 17 10	° ' +14 28	h m 17 11	° ' +24 55
	s	"	s	"	s	"	s	"
Jan. 0.9	20.685	56.03	29.85	45.50	56.804	52.56	41.636	59.32
10.9	20.966	55.25	30.13	42.10	57.010	50.31	41.840	56.64
20.9	21.326	54.67	30.50	39.01	57.247	48.20	42.078	54.15
30.9	21.696	54.31	30.94	36.32	57.510	46.28	42.345	51.94
Feb. 9.8	22.085	54.17	31.44	34.15	57.790	44.66	42.631	50.07
19.8	22.488	54.21	31.98	32.56	58.081	43.39	42.931	48.64
Mar. 1.8	22.893	54.43	32.55	31.64	58.376	42.53	43.239	47.68
11.7	23.297	54.80	33.13	31.39	58.671	42.09	43.544	47.26
21.7	23.691	55.32	33.70	31.84	58.961	42.09	43.845	47.35
31.7	24.073	55.97	34.25	32.92	59.240	42.53	44.135	47.96
Apr. 10.7	24.438	56.73	34.75	34.61	59.504	43.37	44.410	49.04
20.6	24.779	57.59	35.20	36.83	59.752	44.58	44.663	50.54
30.6	25.094	58.54	35.57	39.50	59.978	46.09	44.895	52.40
May 10.6	25.378	59.57	35.87	42.52	60.179	47.84	45.098	54.56
20.6	25.627	60.67	36.10	45.76	60.353	49.77	45.270	56.91
30.5	25.835	61.84	36.23	49.15	60.496	51.81	45.410	59.39
June 9.5	26.000	63.02	36.28	52.57	60.606	53.88	45.512	61.92
19.5	26.117	64.21	36.24	55.93	60.679	55.93	45.575	64.42
29.4	26.183	65.36	36.10	59.13	60.715	57.91	45.599	66.83
July 9.4	26.198	66.48	35.88	62.08	60.713	59.76	45.582	69.09
19.4	26.160	67.49	35.58	64.74	60.673	61.44	45.526	71.13
29.4	26.072	68.37	35.22	67.02	60.596	62.92	45.432	72.92
Aug. 8.3	25.938	69.07	34.79	68.89	60.485	64.16	45.301	74.41
18.3	25.764	69.58	34.31	70.28	60.345	65.16	45.142	75.59
28.3	25.557	69.85	33.79	71.19	60.181	65.87	44.957	76.43
Sept. 7.3	25.329	69.88	33.24	71.59	60.000	66.32	44.756	76.91
17.2	25.090	69.63	32.68	71.47	59.811	66.47	44.546	77.02
27.2	24.853	69.13	32.13	70.82	59.622	66.31	44.336	76.75
Oct. 7.2	24.632	68.37	31.59	69.65	59.442	65.86	44.136	76.10
17.1	24.439	67.41	31.10	67.98	59.284	65.11	43.956	75.08
27.1	24.287	66.25	30.65	65.83	59.153	64.05	43.806	73.71
Nov. 6.1	24.187	64.96	30.28	63.25	59.058	62.72	43.693	71.97
16.1	24.147	63.61	29.98	60.28	59.006	61.10	43.624	69.92
26.0	24.170	62.23	29.79	57.01	59.001	59.25	43.604	67.61
Dec. 6.0	24.261	60.91	29.69	53.51	59.045	57.19	43.634	65.07
16.0	24.415	59.69	29.69	49.88	59.137	54.99	43.716	62.38
26.0	24.629	58.61	29.80	46.24	59.276	52.71	43.848	59.62
35.9	24.897	57.71	30.01	42.71	59.456	50.42	44.023	56.88
Mean Place	20.906	62.07	32.982	51.38	57.199	54.00	42.222	61.90
Sec δ , Tan δ	1.370	-0.937	2.441	+2.227	1.033	+0.258	1.103	+0.465
D_{α} , D_{ω}	+0.09	-0.01	0.00	+0.03	+0.05	0.00	+0.05	+0.01
D_{δ} , D_{ω}	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	π Herculis. Mag. 3.4			θ Ophiuchi. Mag. 3.4			ω Herculis. Mag. 5.4			β Aree. Mag. 2.8		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h m 17 12	s 17 12	° ' " +36 53	h m 17 17	s 17 17	° ' " -24 55	h m 17 17	s 17 17	° ' " +32 33	h m 17 18	s 17 18	° ' " -55 27
Jan. 0.9	12.580	206	55.11	1.838	239	8.00	36.863	199	72.90	33.267	350	10.13
10.9	12.786	247	52.07	2.077	274	8.16	37.062	237	69.95	33.617	404	8.61
20.9	13.033	280	49.25	2.351	298	8.42	37.299	271	67.20	34.021	446	7.33
30.9	13.313	308	46.77	2.649	314	8.74	37.570	294	64.75	34.467	477	6.33
Feb. 9.8	13.621	324	44.70	2.963	325	9.11	37.864	312	62.70	34.944	498	5.62
19.8	13.945	333	43.14	3.288	330	9.49	38.176	320	61.12	35.442	507	5.20
Mar. 1.8	14.278	334	42.14	3.618	329	9.86	38.496	322	60.07	35.949	509	5.06
11.8	14.612	328	41.74	3.947	323	10.20	38.818	317	59.59	36.458	502	5.21
21.7	14.940	317	41.93	4.270	314	10.49	39.135	306	59.68	36.960	498	5.60
31.7	15.257	297	42.71	4.584	301	10.71	39.441	290	60.33	37.448	468	6.26
Apr. 10.7	15.554	274	44.02	4.885	286	10.90	39.731	270	61.51	37.916	441	7.14
20.6	15.828	245	45.82	5.171	266	11.03	40.001	243	63.16	38.357	409	8.23
30.6	16.073	212	48.03	5.437	243	11.13	40.244	213	65.21	38.766	368	9.51
May 10.6	16.285	175	50.57	5.680	215	11.21	40.457	180	67.57	39.134	323	10.95
20.6	16.460	136	53.33	5.895	185	11.28	40.637	144	70.17	39.457	271	12.56
30.5	16.596	94	56.24	6.080	149	11.35	40.781	103	72.91	39.728	214	14.26
June 9.5	16.690	49	59.19	6.229	111	11.44	40.884	61	75.71	39.942	151	16.04
19.5	16.739	4	62.11	6.340	71	11.55	40.945	18	78.49	40.093	85	17.85
29.5	16.743	42	64.93	6.411	28	11.67	40.963	26	81.17	40.178	19	19.65
July 9.4	16.701	96	67.54	6.439	15	11.80	40.937	68	83.67	40.197	51	21.38
19.4	16.615	127	69.92	6.424	56	11.92	40.869	109	85.96	40.146	115	22.98
29.4	16.488	165	71.99	6.368	95	12.03	40.760	146	87.95	40.031	175	24.42
Aug. 8.3	16.323	199	73.72	6.273	129	12.11	40.614	179	89.62	39.856	229	25.63
18.3	16.124	223	75.07	6.144	159	12.14	40.435	206	90.93	39.627	272	26.56
28.3	15.901	242	76.02	5.985	177	12.10	40.229	223	91.87	39.355	302	27.18
Sept. 7.3	15.659	251	76.53	5.808	189	11.99	40.006	233	92.40	39.053	318	27.44
17.2	15.408	260	76.60	5.619	190	11.80	39.773	234	92.51	38.735	319	27.33
27.2	15.158	240	76.22	5.429	179	11.52	39.539	225	92.19	38.416	301	26.86
Oct. 7.2	14.918	217	75.39	5.250	157	11.18	39.314	204	91.45	38.115	268	26.01
17.2	14.701	187	74.12	5.093	125	10.78	39.110	175	90.28	37.847	220	24.82
27.1	14.514	146	72.43	4.968	85	10.36	38.935	136	88.71	37.627	158	23.34
Nov. 6.1	14.368	98	70.34	4.883	38	9.93	38.799	91	86.77	37.469	84	21.60
16.1	14.270	45	67.90	4.845	14	9.53	38.708	41	84.48	37.385	5	19.71
26.0	14.225	11	65.16	4.859	67	9.20	38.667	13	81.88	37.380	159	17.71
Dec. 6.0	14.236	68	62.18	4.926	119	8.96	38.680	67	79.05	37.456	237	15.70
16.0	14.304	122	59.05	5.045	169	8.82	38.747	120	76.07	37.615	306	13.74
26.0	14.426	175	55.87	5.214	213	8.80	38.867	169	73.00	37.852	380	11.90
35.9	14.601		52.74	5.427		8.89	39.036		69.98	38.158		10.25
Mean Place	13.493		58.84	1.984		11.69	37.652		75.81	33.787		17.07
Sec δ , Tan δ	1.250		+0.751	1.103		-0.465	1.187		+0.639	1.763		-1.453
$D\psi_a, D\omega_a$	+0.04		+0.01	+0.07		-0.01	+0.04		+0.01	+0.10		-0.02
$D\psi_\delta, D\omega_\delta$	-0.1		-1.0	-0.1		-1.0	-0.1		-1.0	-0.1		-1.0

APPARENT PLACES OF STARS, 1919.

455

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	δ Ophiuchi. Mag. 4.3		σ Ophiuchi. Mag. 4.4		δ Aras. Mag. 3.8		α Aras. Mag. 3.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 17 21	° ' -24 6	h m 17 22	° ' + 4 12	h m 17 23	° ' -60 36	h m 17 25	° ' -49 48
	s "	"	s "	"	s "	"	s "	"
Jan. 0.9	25.114	4.10	29.414	35.66	46.11	58.45	34.238	42.20
10.9	25.348 ²⁹⁴	4.28 ¹⁸	29.616 ²⁰²	33.92 ¹⁷⁴	46.49 ³⁸	56.63 ¹⁸²	34.545 ³⁰⁷	40.91 ¹²⁹
20.9	25.616 ²⁶⁸	4.56 ²⁸	29.847 ²³¹	32.25 ¹⁶⁷	46.94 ⁴⁵	55.08 ¹⁵⁵	34.900 ³⁵⁵	39.83 ¹⁰⁸
30.9	25.908 ²⁹²	4.89 ³³	30.104 ²⁵⁷	30.71 ¹⁵⁴	47.44 ⁵⁰	53.82 ¹²⁶	35.294 ³⁰⁴	38.98 ⁸⁵
Feb. 9.8	26.219 ³¹¹	5.26 ³⁷	30.378 ²⁷⁴	29.37 ¹³⁴	47.97 ⁵³	52.87 ⁹⁵	35.714 ⁴²⁰	38.38 ⁶⁰
	321	37	285	107	57	61	438	37
19.8	26.540	5.63	30.663	28.30	48.54	52.26	36.152	38.01
Mar. 1.8	26.867 ³²⁷	5.99 ³⁶	30.954 ²⁹¹	27.53 ⁷⁷	49.12 ⁵⁸	51.97 ²⁹	36.602 ⁴⁵⁰	37.88 ¹³
11.8	27.193 ³²⁶	6.30 ³¹	31.246 ²⁹²	27.09 ⁴⁴	49.69 ⁵⁷	51.99 ²	37.053 ⁴⁵¹	37.96 ⁸
21.7	27.515 ³²²	6.54 ²⁴	31.534 ²⁸⁸	27.00 ⁹	50.27 ⁵⁸	52.33 ³⁴	37.499 ⁴⁴⁶	38.26 ³⁰
31.7	27.829 ³¹⁴	6.74 ²⁰	31.814 ²⁸⁰	27.26 ²⁶	50.83 ⁵⁶	52.96 ⁶³	37.935 ⁴³⁶	38.75 ⁴⁹
	301	13	269	89	54	92	421	68
Apr. 10.7	28.130	6.87	32.083	27.85	51.37	53.88	38.356	39.43
20.6	28.416 ²⁸⁶	6.95 ⁸	32.336 ²⁵³	28.72 ⁸⁷	51.88 ⁵¹	55.05 ¹¹⁷	38.753 ³⁹⁷	40.28 ⁸⁵
30.6	28.682 ²⁶⁶	6.99 ⁴	32.571 ²³⁵	29.86 ¹¹⁴	52.35 ⁴⁷	56.44 ¹³⁹	39.125 ³⁷²	41.29 ¹⁰¹
May 10.6	28.927 ²⁴⁵	7.00 ¹	32.784 ²¹³	31.18 ¹³²	52.78 ⁴³	58.05 ¹⁶¹	39.463 ³³⁸	42.45 ¹¹⁶
20.6	29.144 ²¹⁷	7.00 ⁰	32.973 ¹⁸⁹	32.65 ¹⁴⁷	53.14 ³⁶	59.82 ¹⁷⁷	39.762 ²⁹⁹	43.74 ¹²⁹
	186	1	159	156	31	191	255	138
30.5	29.332	7.01	33.132	34.21	53.45	61.73	40.017	45.12
June 9.5	29.485 ¹⁸³	7.04 ³	33.259 ¹²⁷	35.80 ¹⁵⁹	53.70 ²⁵	63.73 ²⁰⁰	40.222 ²⁰⁵	46.59 ¹⁴⁷
19.5	29.600 ¹¹⁵	7.08 ⁴	33.353 ⁹⁴	37.38 ¹⁵⁸	53.87 ¹⁷	65.78 ²⁰⁵	40.373 ¹⁵¹	48.09 ¹⁵⁰
29.5	29.674 ⁷⁴	7.14 ⁶	33.409 ⁵⁶	38.90 ¹⁵²	53.97 ¹⁰	67.83 ²⁰⁵	40.465 ⁹²	49.59 ¹⁵⁰
July 9.4	29.706 ³²	7.22 ⁸	33.427 ¹⁸	40.33 ¹⁴³	53.99 ²	69.81 ¹⁹⁸	40.498 ³³	51.05 ¹⁴⁶
	10	9	20	131	6	185	27	138
19.4	29.696	7.31	33.407	41.64	53.93	71.66	40.471	52.43
29.4	29.644 ⁵²	7.39 ⁸	33.349 ⁵⁸	42.78 ¹¹⁴	53.79 ¹⁴	73.33 ¹⁶⁷	40.385 ⁸⁶	53.66 ¹²³
Aug. 8.3	29.553 ⁹¹	7.45 ⁶	33.257 ⁹²	43.76 ⁹⁸	53.58 ²¹	74.75 ¹⁴²	40.243 ¹⁴²	54.73 ¹⁰⁷
18.3	29.426 ¹²⁷	7.48 ³	33.133 ¹²⁴	44.57 ⁸¹	53.32 ²⁶	75.87 ¹¹²	40.055 ¹⁸⁸	55.55 ⁸²
28.3	29.271 ¹⁵⁵	7.45 ³	32.984 ¹⁴⁹	45.17 ⁶⁰	53.00 ³²	76.64 ⁷⁷	39.825 ²³⁰	56.12 ⁵⁷
	176	10	168	42	35	38	260	26
Sept. 7.3	29.095	7.35	32.816	45.59	52.65	77.02	39.565	56.38
17.2	28.907 ¹⁸³	7.18 ¹⁷	32.638 ¹⁷⁸	45.79 ²⁰	52.27 ³⁸	77.01 ¹	39.290 ²⁷⁵	56.33 ⁵
27.2	28.718 ¹⁸⁹	6.94 ²⁴	32.458 ¹⁸⁰	45.79 ⁰	51.90 ³⁷	76.56 ⁴⁵	39.013 ²⁷⁷	55.95 ³⁸
Oct. 7.2	28.538 ¹⁸⁰	6.63 ³¹	32.286 ¹⁷²	45.57 ²²	51.54 ³⁶	75.70 ⁸⁶	38.749 ²⁶⁴	55.25 ⁷⁰
17.2	28.380 ¹⁵⁸	6.28 ³⁵	32.133 ¹⁵³	45.14 ⁴³	51.22 ³²	74.46 ¹²⁴	38.512 ²³⁷	54.26 ⁹⁹
	128	38	127	66	27	159	195	126
27.1	28.252	5.90	32.006	44.48	50.95	72.87	38.317	53.00
Nov. 6.1	28.164 ⁸⁸	5.52 ³³	31.913 ⁹³	43.61 ⁸⁷	50.74 ²¹	71.00 ¹⁸⁷	38.177 ¹⁴⁰	51.54 ¹⁴⁶
16.1	28.123 ⁴¹	5.18 ³⁴	31.863 ⁵⁰	42.51 ¹¹⁰	50.64 ¹⁰	68.91 ²⁰⁹	38.099 ⁷⁸	49.92 ¹⁶²
26.0	28.132 ⁹	4.89 ²⁹	31.858 ⁵	41.22 ¹²⁹	50.61 ³	66.69 ²²²	38.092 ⁷	48.22 ¹⁷⁰
Dec. 6.0	28.194 ⁶²	4.69 ²⁰	31.901 ⁴³	39.75 ¹⁴⁷	50.67 ⁶	64.42 ²²⁷	38.156 ⁶⁴	46.50 ¹⁷²
	114	10	90	163	16	224	138	166
16.0	28.308	4.59	31.991	38.12	50.83	62.18	38.294	44.84
26.0	28.471 ¹⁶³	4.61 ²	32.126 ¹³⁵	36.41 ¹⁷¹	51.08 ²⁵	60.05 ²¹³	38.500 ²⁰⁶	43.28 ¹⁵⁶
35.9	28.679 ²⁰⁸	4.73 ¹²	32.302 ¹⁷⁶	34.66 ¹⁷⁵	51.41 ³³	58.10 ¹⁹⁵	38.768 ²⁶⁸	41.87 ¹⁴¹
Mean Place	25.270	7.68	29.704	35.37	46.851	65.61	34.640	48.39
Sec δ , Tan δ	1.096	-0.447	1.003	+0.074	2.038	-1.776	1.550	-1.184
$D_{\delta a}$, $D_{\delta s}$	+0.07	-0.01	+0.06	0.00	+0.11	-0.02	+0.09	-0.01
$D_{\delta 3}$, $D_{\delta 5}$	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	λ Herculis. Mag. 4.5		λ Scorpii. Mag. 1.7		β Draconis. Mag. 3.0		α Ophiuchi. Mag. 2.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 17 27	° ' " +26 10	h m 17 28	° ' " -37 2	h m 17 28	° ' " +52 21	h m 17 31	° ' " +12 36
	s	"	s	"	s	"	s	"
Jan. 1.0	27.227 ¹⁸⁸	13.48 ²⁷¹	6.145 ²⁵⁷	40.34 ⁶¹	34.391 ¹⁹⁹	35.73 ³³⁸	10.020 ¹⁸⁸	64.42 ²¹³
10.9	27.415 ²²⁵	10.77 ²⁵³	6.402 ²⁹⁶	39.73 ⁴⁶	34.590 ²⁵⁸	32.35 ³¹⁴	10.208 ²²²	62.29 ²⁶⁵
20.9	27.640 ²⁵⁶	8.24 ²²⁹	6.698 ³²⁴	39.27 ³²	34.848 ³⁰⁹	29.21 ²⁷⁹	10.430 ²⁴⁹	60.24 ¹⁸⁵
30.9	27.896 ²⁷⁸	5.95 ¹⁹⁴	7.022 ³⁴⁸	38.95 ¹⁷	35.157 ³⁵¹	26.42 ²³³	10.679 ²⁶⁹	58.39 ¹⁸⁹
Feb. 9.8	28.174 ²⁹⁵	4.01 ¹⁵¹	7.370 ³⁶¹	38.78 ⁵	35.508 ³⁸¹	24.09 ¹⁷⁸	10.948 ²⁸²	56.80 ¹³⁷
19.8	28.469 ³⁰⁵	2.50 ¹⁰³	7.731 ³⁶⁹	38.73 ⁶	35.889 ⁴⁰⁸	22.31 ¹¹⁸	11.230 ²⁹⁰	55.53 ⁸⁹
Mar. 1.8	28.774 ³⁰⁷	1.47 ⁵¹	8.100 ³⁷¹	38.79 ¹⁵	36.292 ⁴¹⁰	21.13 ⁵²	11.520 ²⁹³	54.64 ⁴⁹
11.8	29.081 ³⁰⁴	0.96 ³	8.471 ³⁶⁷	38.94 ²⁴	36.702 ⁴⁰⁹	20.61 ¹³	11.813 ²⁹⁰	54.15 ⁶
21.7	29.385 ²⁹⁷	0.99 ⁵⁵	8.838 ³⁵⁹	39.18 ³⁹	37.111 ³⁹⁶	20.74 ⁷⁸	12.103 ²⁸⁴	54.09 ³⁷
31.7	29.682 ²⁸³	1.54 ¹⁰⁴	9.197 ³⁴⁶	39.48 ³⁸	37.507 ³⁷⁶	21.52 ¹⁴⁰	12.387 ²⁷³	54.46 ⁷⁷
Apr. 10.7	29.965 ²⁶⁵	2.58 ¹⁴⁸	9.543 ³³⁰	39.86 ⁴⁴	37.883 ³⁴⁵	22.92 ¹⁹⁴	12.660 ²⁵⁸	55.23 ¹¹³
20.7	30.230 ²⁴⁵	4.06 ¹⁸⁶	9.873 ³⁰⁸	40.30 ⁵¹	38.228 ³⁰⁷	24.86 ²⁴¹	12.918 ²⁴¹	56.36 ¹⁶⁷
30.6	30.475 ²¹⁷	5.92 ²¹⁸	10.181 ²⁸⁴	40.81 ⁵⁷	38.535 ²⁶³	27.27 ²⁷⁸	13.159 ²¹⁷	57.78 ¹⁶⁹
May 10.6	30.692 ¹⁸⁸	8.10 ²⁴⁰	10.465 ²⁵²	41.38 ⁶⁴	38.798 ²¹⁴	30.05 ³⁰⁷	13.376 ¹⁹³	59.47 ¹⁸⁶
20.6	30.880 ¹⁵⁴	10.50 ²⁵⁶	10.717 ²¹⁸	42.02 ⁷¹	39.012 ¹⁵⁹	33.12 ³²⁵	13.569 ¹⁶²	61.33 ¹⁸⁷
30.5	31.034 ¹¹⁷	13.06 ²⁶²	10.935 ¹⁷⁹	42.73 ⁷⁵	39.171 ¹⁰²	36.37 ³³³	13.731 ¹³⁰	63.30 ²⁰⁴
June 9.5	31.151 ⁷⁸	15.68 ²⁶¹	11.114 ¹³⁵	43.48 ⁷⁸	39.273 ⁴²	39.70 ³³²	13.861 ⁹⁵	65.34 ²⁰¹
19.5	31.229 ³⁷	18.29 ²⁵²	11.249 ⁸⁹	44.26 ⁸⁰	39.315 ¹⁸	43.02 ³²²	13.956 ⁵⁶	67.35 ¹⁹⁶
29.5	31.266 ⁴	20.81 ²³⁸	11.338 ⁴¹	45.06 ⁷⁰	39.297 ⁷⁷	46.24 ³⁰³	14.012 ¹⁷	69.31 ¹⁸⁸
July 9.4	31.262 ⁴⁵	23.19 ²¹⁸	11.379 ¹⁰	45.85 ⁷⁶	39.220 ¹³⁵	49.27 ²⁷⁷	14.029 ²²	71.16 ¹⁶⁶
19.4	31.217 ⁸⁶	25.37 ¹⁹⁴	11.369 ⁵⁷	46.61 ⁶⁸	39.085 ¹⁹⁰	52.04 ²⁴⁵	14.007 ⁶¹	72.84 ¹⁸⁰
29.4	31.131 ¹²³	27.31 ¹⁶³	11.312 ¹⁰³	47.29 ⁵⁸	38.895 ²³⁸	54.49 ²⁰⁸	13.946 ⁹⁵	74.34 ¹²⁷
Aug. 8.4	31.008 ¹⁵⁶	28.94 ¹³²	11.209 ¹⁴⁴	47.87 ⁴⁶	38.657 ²⁸⁰	56.57 ¹⁶⁵	13.851 ¹²⁹	75.61 ¹⁰⁵
18.3	30.852 ¹⁸²	30.26 ⁹⁹	11.065 ¹⁷⁷	48.33 ²⁰	38.377 ³¹⁵	58.22 ¹²⁰	13.722 ¹⁵⁵	76.66 ⁷⁹
28.3	30.670 ²⁰²	31.25 ⁶¹	10.888 ²⁰²	48.62 ¹¹	38.062 ³³⁸	59.42 ⁷²	13.567 ¹⁷⁵	77.45 ⁵³
Sept. 7.3	30.468 ²¹⁴	31.86 ²³	10.686 ²¹⁸	48.73 ⁹	37.724 ³⁵⁴	60.14 ²²	13.392 ¹⁸⁶	77.97 ²⁴
17.2	30.254 ²¹⁶	32.09 ¹⁵	10.468 ²¹⁸	48.64 ²⁰	37.370 ³⁵⁶	60.36 ²⁹	13.206 ¹⁸⁹	78.21 ³
27.2	30.038 ²⁰⁷	31.94 ⁵⁴	10.250 ²⁰⁹	48.35 ⁴⁹	37.014 ³⁴⁴	60.07 ⁸¹	13.017 ¹⁸³	78.18 ³³
Oct. 7.2	29.831 ¹⁹¹	31.40 ⁹²	10.041 ¹⁸⁸	47.86 ⁶⁷	36.670 ³²⁴	59.26 ¹³⁰	12.834 ¹⁶⁵	77.85 ⁶²
17.2	29.640 ¹⁶⁴	30.48 ¹³⁰	9.853 ¹⁵³	47.19 ⁸²	36.346 ²⁸⁸	57.96 ¹⁷⁸	12.669 ¹⁴¹	77.23 ⁹⁰
27.1	29.476 ¹²⁸	29.18 ¹⁶⁶	9.700 ¹⁰⁹	46.37 ⁹³	36.058 ²⁴³	56.18 ²²⁴	12.528 ¹⁰⁶	76.33 ¹¹⁸
Nov. 6.1	29.348 ⁸⁵	27.52 ¹⁹⁹	9.591 ⁵⁷	45.44 ⁹⁹	35.815 ¹⁸⁶	53.94 ²⁶⁵	12.422 ⁶⁶	75.15 ¹⁴⁴
16.1	29.263 ³⁸	25.53 ²²⁷	9.534 ⁰	44.45 ¹⁰²	35.629 ¹²⁵	51.29 ²⁹⁹	12.356 ²¹	73.71 ¹⁷⁰
26.1	29.225 ¹³	23.26 ²⁵²	9.534 ⁶⁰	43.43 ¹⁰⁰	35.504 ⁵⁵	48.30 ³²⁶	12.335 ²⁶	72.01 ²⁰⁴
Dec. 6.0	29.238 ⁶⁴	20.74 ²⁶⁸	9.594 ¹¹⁹	42.43 ⁹²	35.449 ¹⁵	45.04 ³⁴⁴	12.361 ⁷⁵	70.12 ²⁰⁴
16.0	29.302 ¹¹⁴	18.06 ²⁷⁶	9.713 ¹⁷⁴	41.51 ⁸²	35.464 ⁸⁸	41.60 ³⁵¹	12.436 ¹³⁰	68.08 ²¹⁶
26.0	29.416 ¹⁶⁰	15.30 ²⁷⁷	9.887 ²²⁵	40.69 ⁶⁸	35.552 ¹⁵⁶	38.09 ³⁴⁸	12.556 ¹⁶²	65.92 ²¹⁷
35.9	29.576	12.53	10.112	40.01	35.708	34.61	12.718	63.75
Mean Place	27.870	15.12	6.375	45.23	36.101	39.00	10.425	64.63
Sec δ , Tan δ	1.114	+0.491	1.253	-0.755	1.638	+1.297	1.025	+0.224
$D\alpha$, $D\omega$	+0.05	0.00	+0.08	-0.01	+0.03	+0.01	+0.06	0.00
$D\delta$, $D\omega\delta$	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

APPARENT PLACES OF STARS, 1919.

457

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ξ Serpentis. Mag. 3.6			ι Herculis. Mag. 3.8			ω Draconis. Mag. 4.9			η Pavonis. Mag. 3.6		
	Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.	
	h m 17 32	° ' " -15 20		h m 17 37	° ' " +46 2		h m 17 37	° ' " +68 47		h m 17 37	° ' " -64 40	
	s	"		s	"		s	"		s	"	
Jan. 1.0	56.621	52.20		9.371	53.66		21.62	40.91		45.64	66.30	
10.9	56.831 ²¹⁰	52.83 ⁶³		9.551 ¹⁸⁰	50.37 ³²⁹		21.84 ²²	37.45 ³⁴⁶		46.04 ⁴⁰	64.18 ²¹²	
20.9	57.073 ²⁴²	53.49 ⁶⁶		9.784 ²³³	47.30 ³⁰⁷		22.18 ³⁴	34.20 ³²⁵		46.51 ⁴⁷	62.30 ¹⁸⁸	
30.9	57.342 ²⁶⁹	54.16 ⁶⁷		10.062 ²⁷⁸	44.54 ²⁷⁶		22.60 ⁴²	31.32 ²⁸⁸		47.05 ⁵⁴	60.73 ¹⁵⁷	
Feb. 9.8	57.628 ²⁸⁶	54.78 ⁶²		10.377 ³¹⁵	42.21 ²³³		23.11 ⁵¹	28.89 ²⁴³		47.65 ⁶⁰	59.47 ¹²⁶	
19.8	57.926 ²⁹⁸	55.32 ⁵⁴		10.719 ³⁴²	40.39 ¹⁸²		23.68 ⁵⁷	27.02 ¹⁸⁷		48.27 ⁶²	58.55 ⁹²	
Mar. 1.8	58.233 ³⁰⁷	55.74 ⁴²		11.079 ³⁶⁰	39.14 ¹²⁵		24.30 ⁶²	25.76 ¹²⁶		48.92 ⁶⁵	57.99 ⁵⁶	
11.8	58.540 ³⁰⁷	56.02 ²⁸		11.448 ³⁶⁹	38.53 ⁶¹		24.94 ⁶⁴	25.17 ⁵⁹		49.58 ⁶⁶	57.77 ²²	
21.7	58.844 ³⁰⁴	56.17 ¹⁵		11.817 ³⁶⁹	38.56 ³		25.58 ⁶⁴	25.27 ¹⁰		50.24 ⁶⁶	57.91 ¹⁴	
31.7	59.143 ²⁹⁹	56.16 ¹		12.179 ³⁶²	39.22 ⁶⁶		26.21 ⁶³	26.02 ⁷⁵		50.88 ⁶⁴	58.36 ⁴⁵	
Apr. 10.7	59.433 ²⁹⁰	56.00 ¹⁶		12.523 ³⁴⁴	40.47 ¹²⁵		26.80 ⁵⁹	27.42 ¹⁴⁰		51.50 ⁶²	59.13 ⁷⁷	
20.7	59.709 ²⁷⁶	55.71 ²⁹		12.844 ³²¹	42.27 ¹⁸⁰		27.35 ⁵⁵	29.38 ¹⁹⁶		52.08 ⁵⁸	60.20 ¹⁰⁷	
30.6	59.968 ²⁵⁹	55.32 ³⁹		13.135 ²⁹¹	44.54 ²²⁷		27.83 ⁴⁸	31.84 ²⁴⁶		52.64 ⁵⁶	61.55 ¹³⁵	
May 10.6	60.207 ²³⁹	54.86 ⁴⁶		13.389 ²⁵⁴	47.19 ²⁶⁵		28.22 ³⁹	34.69 ²⁸⁵		53.14 ⁵⁰	63.15 ¹⁶⁰	
20.6	60.421 ²¹⁴	54.34 ⁵²		13.602 ²¹³	50.12 ²⁹³		28.52 ³⁰	37.85 ³¹⁶		53.58 ⁴⁴	64.95 ¹⁸⁰	
30.5	60.608 ¹⁸⁷	53.80 ⁵⁴		13.769 ¹⁶⁷	53.25 ³¹³		28.73 ²¹	41.20 ³³⁵		53.96 ³⁸	66.93 ¹⁹⁸	
June 9.5	60.761 ¹⁵³	53.28 ⁵²		13.886 ¹¹⁷	56.48 ³²³		28.84 ¹¹	44.66 ³⁴⁶		54.26 ³⁰	66.96 ²¹³	
19.5	60.879 ¹¹⁸	52.77 ⁵¹		13.952 ⁶⁶	59.71 ³²³		28.85 ¹	48.12 ³⁴⁶		54.48 ²²	71.25 ²¹⁹	
29.5	60.959 ⁸⁰	52.30 ⁴⁷		13.964 ¹²	62.86 ³¹⁵		28.76 ⁹	51.48 ³³⁶		54.60 ¹²	73.46 ²²¹	
July 9.4	60.998 ³⁹	51.88 ⁴²		13.923 ⁴¹	65.84 ²⁹⁸		28.55 ²¹	54.67 ³¹⁹		54.63 ³	75.64 ²¹⁸	
19.4	60.998 ⁰	51.51 ³⁷		13.829 ⁹⁴	68.59 ²⁷⁵		28.26 ²⁹	57.60 ²⁹³		54.58 ⁵	77.70 ²⁰⁶	
29.4	60.955 ⁴³	51.19 ³²		13.685 ¹⁴⁴	71.04 ²⁴⁵		27.88 ³⁸	60.20 ²⁶⁰		54.44 ¹⁴	79.60 ¹⁹⁰	
Aug. 8.4	60.875 ⁸⁰	50.92 ²⁷		13.497 ¹⁸⁸	73.14 ²¹⁰		27.42 ⁴⁶	62.42 ²²²		54.22 ²²	81.25 ¹⁶⁵	
18.3	60.760 ¹¹⁵	50.70 ²²		13.268 ²²⁹	74.84 ¹⁷⁰		26.90 ⁵²	64.21 ¹⁷⁹		53.92 ³⁰	82.62 ¹³⁷	
28.3	60.617 ¹⁴³	50.50 ²⁰		13.006 ²⁶²	76.11 ¹²⁷		26.32 ⁵⁸	65.54 ¹³³		53.55 ³⁷	83.62 ¹⁰⁰	
Sept. 7.3	60.451 ¹⁶⁶	50.32 ¹⁸		12.720 ²⁸⁶	76.92 ⁸¹		25.70 ⁶²	66.37 ⁸³		53.15 ⁴⁰	84.21 ⁵⁹	
17.2	60.273 ¹⁷⁸	50.16 ¹⁶		12.419 ³⁰¹	77.26 ³⁴		25.06 ⁶⁴	66.69 ³²		52.72 ⁴³	84.37 ¹⁶	
27.2	60.092 ¹⁸¹	50.01 ¹⁵		12.114 ³⁰⁶	77.10 ¹⁶		24.41 ⁶⁵	66.48 ²¹		52.28 ⁴⁴	84.08 ²⁹	
Oct. 7.2	59.918 ¹⁷⁴	49.89 ¹²		11.816 ²⁹⁸	76.46 ⁶⁴		23.78 ⁶³	65.74 ⁷⁴		51.85 ⁴³	83.34 ⁷⁴	
17.2	59.762 ¹⁵⁶	49.81 ⁸		11.536 ²⁸⁰	75.33 ¹¹³		23.18 ⁶⁰	64.48 ¹²⁶		51.46 ³⁹	82.16 ¹¹⁸	
27.1	59.634 ¹²⁸	49.77 ⁴		11.287 ²⁴⁹	73.72 ¹⁶¹		22.62 ⁵⁶	62.72 ¹⁷⁶		51.13 ³³	80.60 ¹⁵⁶	
Nov. 6.1	59.539 ⁹⁵	49.80 ³		11.079 ²⁰⁸	71.68 ²⁰⁴		22.13 ⁴⁹	60.49 ²²³		50.87 ²⁶	78.70 ¹⁹⁰	
16.1	59.489 ⁵⁰	49.91 ¹¹		10.918 ¹⁶¹	69.22 ²⁴⁶		21.72 ⁴¹	57.82 ²⁶⁷		50.70 ¹⁷	76.52 ²¹⁸	
26.1	59.486 ³	50.12 ²¹		10.814 ¹⁰⁴	66.41 ²⁸¹		21.41 ³¹	54.79 ³⁰³		50.62 ⁸	74.17 ²³⁵	
Dec. 6.0	59.532 ⁴⁶	50.43 ³¹		10.771 ⁴³	63.32 ³⁰⁹		21.22 ¹⁹	51.48 ³³¹		50.66 ⁴	71.72 ²⁴⁵	
16.0	59.628 ⁹⁶	50.85 ⁴²		10.791 ²⁰	60.04 ³²⁸		21.13 ⁹	47.97 ³⁵¹		50.81 ¹⁵	69.25 ²⁴⁷	
26.0	59.769 ¹⁴¹	51.37 ⁵²		10.873 ⁸²	56.66 ³³⁸		21.16 ⁸	44.37 ³⁶⁰		51.05 ²⁴	66.86 ²³⁹	
35.9	59.953 ¹⁸⁴	51.97 ⁶⁰		11.017 ¹⁴⁴	53.29 ³³⁷		21.31 ¹⁵	40.82 ³⁵⁵		51.39 ³⁴	64.62 ²²⁴	
Mean Place	56.808	54.85		10.714	55.83		25.432	43.71		46.683	73.12	
Sec δ, Tan δ	1.037	-0.274		1.441	+1.037		2.765	+2.578		2.339	-2.114	
D ₁ α, D ₂ α	+0.07	0.00		+0.03	+0.01		-0.01	+0.02		+0.11	-0.01	
D ₁ δ, D ₂ δ	0.0	-1.0		0.0	-1.0		0.0	-1.0		0.0	-1.0	

458

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Ophiuchi. Mag. 2.9		ι^1 Scorpii. Mag. 3.1		μ Herculis. Mag. 3.5		ψ Draconis. Mag. 4.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 17 39 s	° ' " + 4 35 "	h m 17 41 s	° ' " -40 5 "	h m 17 43 s	° ' " +27 45 "	h m 17 43 s	° ' " +72 11 "
Jan. 1.0	27.917	61.41	54.848	44.04	16.565	61.34	17.78	18.10
10.9	28.102 ¹⁸⁵	59.69 ¹⁷²	55.098 ²⁵⁰	43.16 ⁸⁸	16.736 ¹⁷¹	58.56 ²⁷⁸	18.00 ²³	14.62 ³⁶
20.9	28.320 ²¹⁸	58.05 ¹⁶⁴	55.390 ²⁹²	42.43 ⁷³	16.946 ²¹⁰	55.93 ²⁶³	18.35 ³⁵	11.35 ²⁵
30.9	28.564 ²⁴⁴	56.53 ¹⁵²	55.714 ³²⁴	41.86 ⁵⁷	17.188 ²⁴²	53.54 ²³⁹	18.82 ⁴⁷	8.42 ²⁸
Feb. 9.9	28.829 ²⁶⁵	55.20 ¹³³	56.065 ³⁵¹	41.43 ⁴³	17.458 ²⁷⁰	51.49 ²⁰⁵	19.39 ⁵⁷	5.94 ²⁶
19.8	29.106 ²⁷⁷	54.14 ¹⁰⁶	56.433 ³⁶⁸	41.15 ²⁸	17.745 ²⁸⁷	49.87 ¹⁶²	20.04 ⁶⁵	4.00 ⁵⁴
Mar. 1.8	29.393 ²⁸⁷	53.38 ⁷⁶	56.812 ³⁷⁹	41.00 ¹⁵	18.047 ³⁰²	48.72 ¹¹⁵	20.75 ⁷¹	2.67 ¹²
11.8	29.683 ²⁹⁰	52.94 ⁴⁴	57.195 ³⁸³	40.97 ³	18.354 ³⁰⁷	48.10 ⁶²	21.50 ⁷⁵	1.99 ⁸
21.7	29.972 ²⁹⁰	52.87 ⁷	57.577 ³⁸²	41.05 ⁸	18.662 ³⁰⁸	48.02 ⁸	22.25 ⁷⁵	2.01 ¹
31.7	30.255 ²⁸³	53.16 ²⁹	57.955 ³⁷⁸	41.25 ²⁰	18.964 ³⁰²	48.50 ⁴⁸	22.98 ⁷³	2.68 ⁵
Apr. 10.7	30.530 ²⁷⁵	53.77 ⁶¹	58.321 ³⁶⁶	41.54 ²⁹	19.256 ²⁹²	49.47 ⁹⁷	23.68 ⁷⁰	3.96 ¹²⁹
20.7	30.792 ²⁶²	54.68 ⁹¹	58.671 ³⁵⁰	41.93 ³⁹	19.533 ²⁷⁷	50.90 ¹⁴³	24.31 ⁶³	5.86 ¹²⁸
30.6	31.038 ²⁴⁶	55.85 ¹¹⁷	59.002 ³³¹	42.42 ⁴⁹	19.789 ²⁵⁶	52.74 ¹⁸⁴	24.87 ⁵⁶	8.25 ²⁹
May 10.6	31.265 ²²⁷	57.23 ¹³⁸	59.308 ³⁰⁶	43.01 ⁵⁹	20.021 ²³²	54.92 ²¹⁸	25.34 ⁴⁷	11.04 ²⁷
20.6	31.466 ²⁰¹	58.75 ¹⁵²	59.584 ²⁷⁶	43.71 ⁷⁰	20.222 ²⁰¹	57.34 ²⁴²	25.70 ³⁶	14.15 ²¹
30.6	31.640 ¹⁷⁴	60.38 ¹⁶³	59.825 ²⁴¹	44.48 ⁷⁷	20.391 ¹⁶⁹	59.94 ²⁶⁰	25.94 ²⁴	17.46 ³⁵
June 9.5	31.783 ¹⁴³	62.04 ¹⁶⁶	60.025 ²⁰⁰	45.34 ⁸⁶	20.523 ¹³²	62.62 ²⁶⁸	26.07 ¹³	20.89 ³⁴
19.5	31.891 ¹⁰⁸	63.69 ¹⁶⁵	60.182 ¹⁵⁷	46.25 ⁹¹	20.616 ⁹³	65.31 ²⁶⁹	26.07 ⁰	24.34 ³⁴
29.5	31.962 ⁷¹	65.28 ¹⁵⁹	60.288 ¹⁰⁶	47.19 ⁹⁴	20.667 ⁵¹	67.93 ²⁶²	25.95 ¹²	27.70 ³³
July 9.4	31.993 ³¹	66.79 ¹⁵¹	60.344 ⁵⁶	48.16 ⁹⁷	20.674 ⁷	70.43 ²⁵⁰	25.72 ²³	30.90 ³³
19.4	31.986 ⁷	68.17 ¹³⁸	60.347 ³	49.09 ⁹³	20.638 ³⁶	72.73 ²³⁰	25.36 ³⁶	33.94 ²⁴
29.4	31.940 ⁴⁶	69.38 ¹²¹	60.298 ⁴⁹	49.96 ⁸⁷	20.560 ⁷⁸	74.79 ²⁰⁶	24.91 ⁴⁵	36.47 ²³
Aug. 8.4	31.857 ⁸³	70.44 ¹⁰⁶	60.201 ⁹⁷	50.73 ⁷⁷	20.442 ¹¹⁸	76.56 ¹⁷⁷	24.36 ⁵⁵	38.74 ²⁷
18.3	31.741 ¹¹⁶	71.31 ⁸⁷	60.061 ¹⁴⁰	51.36 ⁶³	20.290 ¹⁵²	78.02 ¹⁴⁶	23.76 ⁶⁰	40.58 ¹⁴
28.3	31.597 ¹⁴⁴	71.98 ⁶⁷	59.881 ¹⁸⁰	51.82 ⁴⁶	20.109 ¹⁸¹	79.13 ¹¹¹	23.05 ⁷¹	41.97 ¹³
Sept. 7.3	31.432 ¹⁶⁵	72.45 ⁴⁷	59.672 ²⁰⁹	52.07 ²⁵	19.905 ²⁰⁴	79.86 ⁷³	22.30 ⁷⁵	42.86 ⁹
17.3	31.254 ¹⁷⁸	72.71 ²⁶	59.447 ²²⁵	52.12 ⁵	19.687 ²¹⁸	80.21 ³⁵	21.53 ⁷⁷	43.25 ²
27.2	31.072 ¹⁸²	72.76 ⁵	59.216 ²³¹	51.92 ²⁰	19.465 ²²²	80.17 ⁴	20.75 ⁷⁸	43.11 ¹⁴
Oct. 7.2	30.895 ¹⁷⁷	72.58 ¹⁸	58.992 ²²⁴	51.50 ⁴²	19.248 ²¹⁷	79.73 ⁴⁴	19.99 ⁷⁶	42.45 ⁶⁶
17.2	30.735 ¹⁶⁰	72.19 ³⁹	58.788 ²⁰⁴	50.85 ⁶⁵	19.046 ²⁰²	78.88 ⁸⁵	19.27 ⁷²	41.26 ¹¹⁹
27.1	30.598 ¹³⁷	71.57 ⁶²	58.617 ¹⁷¹	50.02 ⁸³	18.869 ¹⁷⁷	77.64 ¹²⁴	18.59 ⁶⁸	39.57 ¹⁰⁰
Nov. 6.1	30.494 ¹⁰⁴	70.74 ⁸³	58.489 ¹²⁸	49.03 ⁹⁹	18.724 ¹⁴⁵	76.03 ¹⁶¹	17.98 ⁶¹	37.40 ²¹
16.1	30.430 ⁶⁴	69.69 ¹⁰⁵	58.412 ⁷⁷	47.93 ¹¹⁰	18.621 ¹⁰³	74.06 ¹⁹⁷	17.47 ⁵¹	34.80 ²⁹
26.1	30.410 ²⁰	68.42 ¹²⁷	58.394 ¹⁸	46.75 ¹¹⁸	18.565 ⁵⁶	71.80 ²²⁶	17.06 ⁴¹	31.81 ²⁹
Dec. 6.0	30.436 ²⁶	66.99 ¹⁴³	58.437 ⁴³	45.57 ¹¹⁸	18.558 ⁷	69.28 ²⁵²	16.79 ²⁷	28.54 ²⁷
16.0	30.509 ⁷³	65.40 ¹⁵⁹	58.542 ¹⁰⁵	44.43 ¹¹⁴	18.602 ⁴⁴	66.57 ²⁷¹	16.65 ¹⁴	25.05 ³⁴⁶
26.0	30.628 ¹¹⁹	63.71 ¹⁶⁹	58.705 ¹⁶³	43.38 ¹⁰⁵	18.697 ⁹⁵	63.75 ²⁸²	16.64 ¹	21.47 ³⁵¹
36.0	30.787 ¹⁵⁹	61.99 ¹⁷²	58.921 ²¹⁶	42.43 ⁹⁵	18.839 ¹⁴²	60.92 ²⁸³	16.77 ¹³	17.90 ³⁵
Mean Place	28.239	60.53	55.142	48.91	17.267	62.00	22.511	20.25
Sec δ , Tan δ	1.003	+0.080	1.307	-0.842	1.130	+0.527	3.269	+3.113
$D\psi a$, $D\omega a$	+0.06	0.00	+0.08	0.00	+0.05	0.00	-0.02	+0.01
$D\psi \delta$, $D\omega \delta$	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

APPARENT PLACES OF STARS, 1919.

459

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Ophiuchi. Mag. 3.7		ξ Draconis. Mag. 3.9		δ Herculis. Mag. 5.5		δ Draconis. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 17 43	° ' + 2 44	h m 17 52	° ' +56 52	h m 17 52	° ' +26 3	h m 17 52	° ' +76 58
	s	"	s	"	s	"	s	"
Jan. 1.0	49.520	13.59	5.655	64.97	8.481	43.44	57.56	26.97
10.9	49.702 ¹⁸²	12.00 ¹⁶⁹	5.819 ¹⁶⁴	61.52 ³⁴⁵	8.644 ¹⁶³	40.75 ²⁰⁹	57.78 ²²	23.53 ³⁴⁴
20.9	49.918 ²¹⁶	10.44 ¹⁶⁶	6.056 ²³⁷	58.24 ³²⁸	8.846 ²⁰²	38.20 ²⁵⁵	58.18 ⁴⁰	20.27 ³²⁶
30.9	50.159 ²⁴¹	9.00 ¹⁴⁴	6.355 ²⁹⁹	55.28 ²⁹⁶	9.080 ²³⁴	35.87 ²³³	58.75 ⁵⁷	17.32 ²⁹⁵
Feb. 9.9	50.422 ²⁶³	7.75 ¹²⁶	6.708 ³⁵³	52.74 ²⁸⁴	9.342 ²⁶²	33.86 ²⁰¹	59.46 ⁷¹	14.80 ²⁵²
19.8	50.698 ²⁷⁶	6.73 ¹⁰³	7.103 ³⁶⁵	50.72 ²⁰²	9.623 ²⁸¹	32.25 ¹⁶¹	60.29 ⁸³	12.79 ²⁰¹
Mar. 1.8	50.984 ²⁸⁶	6.00 ⁷³	7.528 ⁴²⁵	49.31 ¹⁴¹	9.918 ²⁹⁵	31.11 ¹¹⁴	61.21 ⁹²	11.38 ¹⁴¹
11.8	51.273 ²⁸⁹	5.58 ⁴³	7.972 ⁴⁴⁴	48.52 ⁷⁹	10.222 ³⁰⁴	30.47 ⁶⁴	62.19 ⁹⁶	10.61 ⁷⁷
21.7	51.562 ²⁸⁹	5.50 ⁸	8.422 ⁴⁵⁰	48.41 ¹¹	10.527 ³⁰⁵	30.36 ¹¹	63.19 ¹⁰⁰	10.51 ¹⁰
31.7	51.846 ²⁸⁴	5.76 ²⁶	8.865 ⁴⁴³	48.97 ⁵⁶	10.828 ³⁰¹	30.78 ⁴²	64.17 ⁹⁸	11.08 ⁵⁷
Apr. 10.7	52.123 ²⁷⁷	6.33 ⁵⁷	9.293 ⁴²⁶	50.15 ¹¹⁸	11.121 ²⁹³	31.71 ⁹³	65.11 ⁹⁴	12.27 ¹¹⁹
20.7	52.388 ²⁶⁵	7.18 ⁸⁵	9.691 ³⁶⁸	51.92 ¹⁷⁷	11.400 ²⁷⁹	33.10 ¹³⁹	65.98 ⁸⁷	14.04 ¹⁷⁷
30.6	52.636 ²⁴⁸	8.29 ¹¹¹	10.052 ³⁶¹	54.20 ²²⁸	11.660 ²⁶⁰	34.90 ¹⁸⁰	66.74 ⁷⁶	16.32 ²²⁸
May 10.6	52.866 ²³⁰	9.58 ¹²⁹	10.367 ³¹⁵	56.91 ²⁷¹	11.898 ²³⁸	37.02 ²¹²	67.36 ⁶²	19.03 ²⁷¹
20.6	53.071 ²⁰⁶	11.03 ¹⁴⁵	10.628 ²⁶¹	59.95 ³⁰⁴	12.108 ²¹⁰	39.39 ²³⁷	67.85 ⁴⁹	22.09 ³⁰⁶
30.6	53.251 ¹⁸⁰	12.56 ¹⁵³	10.831 ²⁰⁸	63.22 ³²⁷	12.286 ¹⁷⁸	41.96 ²⁵⁷	68.19 ³⁴	25.34 ³²⁵
June 9.5	53.399 ¹⁴⁸	14.13 ¹⁵⁷	10.968 ¹³⁷	66.61 ³³⁹	12.430 ¹⁴⁴	44.61 ²⁶⁵	68.35 ¹⁶	28.74 ³⁴⁰
19.5	53.512 ¹¹³	15.69 ¹⁵⁶	11.041 ⁷³	70.05 ³⁴⁴	12.534 ¹⁰⁴	47.28 ²⁶⁷	68.36 ¹	32.18 ³⁴⁴
29.5	53.588 ⁷⁶	17.20 ¹⁵¹	11.044 ³	73.43 ³³⁸	12.596 ⁶²	49.89 ²⁶¹	68.20 ¹⁶	35.56 ³³⁸
July 9.4	53.626 ³⁸	18.62 ¹⁴²	10.978 ⁶⁶	76.66 ³²³	12.615 ¹⁹	52.38 ²⁴⁹	67.87 ³³	38.79 ³²³
19.4	53.625 ¹	19.92 ¹³⁰	10.847 ¹³¹	79.67 ³⁰¹	12.591 ²⁴	54.70 ²³²	67.39 ⁴⁸	41.79 ³⁰⁰
29.4	53.584 ⁴¹	21.06 ¹¹⁴	10.652 ¹⁹⁵	82.38 ²⁷¹	12.525 ⁶⁶	56.78 ²⁰⁸	66.77 ⁶²	44.50 ²⁷¹
Aug. 8.4	53.505 ⁷⁹	22.06 ¹⁰⁰	10.399 ²⁵³	84.75 ²³⁷	12.419 ¹⁰⁶	58.60 ¹⁸²	66.01 ⁷⁶	46.87 ²³⁷
18.3	53.393 ¹¹²	22.88 ⁸²	10.095 ³⁰⁴	86.71 ¹⁹⁶	12.278 ¹⁴¹	60.10 ¹⁵⁰	65.16 ⁸⁵	48.83 ¹⁹⁶
28.3	53.252 ¹⁴¹	23.50 ⁶²	9.749 ³⁴⁶	88.23 ¹⁵²	12.105 ¹⁷³	61.26 ¹¹⁶	64.21 ⁹⁵	50.35 ¹⁵²
Sept. 7.3	53.089 ¹⁶³	23.95 ⁴⁵	9.371 ³⁷⁸	89.27 ¹⁰⁴	11.910 ¹⁹⁵	62.06 ⁸⁰	63.20 ¹⁰¹	51.40 ¹⁰⁵
17.3	52.913 ¹⁷⁶	24.20 ²⁶	8.972 ³⁹⁹	89.81 ⁵⁴	11.698 ²¹²	62.51 ⁴⁵	62.14 ¹⁰⁶	51.94 ⁵⁴
27.2	52.732 ¹⁸¹	24.26 ⁶	8.564 ⁴⁰⁸	89.82 ¹	11.481 ²¹⁷	62.56 ⁵	61.06 ¹⁰⁸	51.97 ³
Oct. 7.2	52.556 ¹⁷⁶	24.11 ¹⁵	8.163 ⁴⁰¹	89.32 ⁸⁰	11.268 ²¹³	62.22 ³⁴	60.00 ¹⁰⁶	51.46 ⁵¹
17.2	52.395 ¹⁶¹	23.77 ⁸⁴	7.778 ³⁸⁵	88.30 ¹⁰²	11.067 ²⁰¹	61.49 ⁷³	58.97 ¹⁰³	50.44 ¹⁰²
27.1	52.257 ¹³⁸	23.22 ⁵⁵	7.425 ³⁵³	86.77 ¹⁵³	10.889 ¹⁷⁸	60.38 ¹¹¹	58.00 ⁹⁷	48.92 ¹⁵²
Nov. 6.1	52.152 ¹⁰⁵	22.45 ⁷⁷	7.117 ³⁰⁸	84.76 ²⁰¹	10.744 ¹⁴⁵	58.90 ¹⁴⁸	57.12 ⁸⁸	46.92 ²⁰⁰
16.1	52.086 ⁶⁶	21.49 ⁹⁶	6.864 ²⁵³	82.30 ²⁴⁶	10.639 ¹⁰⁵	57.08 ¹⁸²	56.37 ⁷⁵	44.47 ²⁴⁵
26.1	52.063 ²³	20.33 ¹¹⁶	6.677 ¹⁸⁷	79.46 ²⁸⁴	10.579 ⁶⁰	54.95 ²¹³	55.75 ⁶²	41.64 ²⁸³
Dec. 6.0	52.087 ²⁴	19.01 ¹³²	6.561 ¹¹⁶	76.30 ³¹⁶	10.567 ¹²	52.57 ²³⁸	55.30 ⁴⁵	38.49 ³¹⁵
16.0	52.158 ⁷¹	17.54 ¹⁴⁷	6.523 ³⁸	72.91 ³³⁹	10.605 ³⁸	49.98 ²⁵⁹	55.03 ²⁷	35.12 ³³⁷
26.0	52.274 ¹¹⁶	15.97 ¹⁵⁷	6.563 ⁴⁰	69.38 ³⁵³	10.692 ⁸⁷	47.28 ²⁷⁰	54.94 ⁹	31.61 ³⁵¹
36.0	52.430 ¹⁶⁶	14.34 ¹⁶³	6.681 ¹¹⁸	65.86 ³⁵²	10.826 ¹³⁴	44.55 ²⁷³	55.04 ¹⁰	28.10 ³⁵¹
Mean Place	49.827	12.40	7.760	66.02	9.152	43.38	64.420	27.99
Sec δ , Tan δ	1.001	+0.048	1.830	+1.533	1.113	+0.489	4.437	+4.323
D_{α} , D_{ω}	+0.06	0.00	+0.02	0.00	+0.05	0.00	-0.05	+0.01
D_{δ} , D_{ω}	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON

Washington Mean Time.	θ Herculis. Mag. 4.0		ν Ophiuchi. Mag. 3.5		ξ Herculis. Mag. 3.8		γ Draconis. Mag. 2.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m	° '	h m	° '	h m	° '	h m	° '
	17 53	+37 15	17 54	- 9 45	17 54	+29 15	17 54	+51
	s	"	s	"	s	"	s	"
Jan. 1.0	27.503	37.42	33.758	50.72	36.294	20.99	41.819	51.70
10.9	27.662 ¹⁵⁹	34.36 ³⁰⁶	33.941 ¹⁸³	51.59 ⁸⁷	36.453 ¹⁵⁹	18.19 ²⁸⁰	41.978 ¹⁵⁹	48.31 ¹
20.9	27.867 ²⁰⁵	31.44 ²⁹²	34.159 ²¹⁸	52.46 ⁸⁷	36.653 ²⁰⁰	15.53 ²⁶⁶	42.197 ²¹⁹	45.09 ¹
30.9	28.111 ²⁴⁴	28.79 ²⁶⁵	34.403 ²⁴⁴	53.29 ⁸³	36.887 ²³⁴	13.09 ²⁴⁴	42.470 ²⁷³	42.17 ¹
Feb. 9.9	28.386 ²⁷⁵	26.51 ²²⁸	34.669 ²⁶⁶	54.02 ⁷³	37.150 ²⁶³	10.99 ²¹⁰	42.789 ³¹⁹	39.66 ¹
	302	182	281	61	284	168	356	1
19.8	28.688	24.69	34.950	54.63	37.434	9.31	43.145	37.65 ¹
Mar. 1.8	29.007 ³¹⁹	23.39 ¹³⁰	35.241 ²⁹¹	55.07 ⁴⁴	37.735 ³⁰¹	8.11 ¹²⁰	43.526 ³⁸¹	36.23 ¹
11.8	29.336 ³²⁹	22.67 ⁷²	35.537 ²⁹⁶	55.31 ²⁴	38.043 ³⁰⁸	7.43 ⁶⁸	43.925 ³⁹⁹	35.43 ¹
21.8	29.669 ³³³	22.54 ¹³	35.834 ²⁹⁷	55.35 ⁴	38.354 ³¹¹	7.30 ¹³	44.328 ⁴⁰³	35.28 ¹
31.7	29.998 ³²⁹	23.02 ⁴⁸	36.129 ²⁹⁵	55.17 ¹⁸	38.662 ³⁰⁸	7.73 ⁴³	44.726 ³⁹⁸	35.80 ¹
	319	104	288	37	298	96	385	1
Apr. 10.7	30.317	24.06	36.417	54.80	38.960	8.69	45.111	36.93 ¹
20.7	30.618 ³⁰¹	25.63 ¹⁵⁷	36.696 ²⁷⁹	54.25 ⁵⁵	39.246 ²⁸⁶	10.12 ¹⁴³	45.472 ³⁶¹	38.64 ¹
30.6	30.899 ²⁸¹	27.65 ²⁰²	36.961 ²⁶⁵	53.55 ⁷⁰	39.512 ²⁶⁶	11.96 ¹⁸⁴	45.803 ³³¹	40.85 ¹
May 10.6	31.150 ²⁵¹	30.05 ²⁴⁰	37.208 ²⁴⁷	52.74 ⁸¹	39.755 ²⁴³	14.17 ²²¹	46.095 ²⁹²	43.49 ¹
20.6	31.369 ²¹⁹	32.75 ²⁷⁰	37.433 ²²⁵	51.86 ⁸⁸	39.968 ²¹³	16.65 ²⁴⁸	46.341 ²⁴⁶	46.44 ¹
	182	290	198	93	181	266	196	1
30.6	31.551	35.65	37.631	50.93	40.149	19.31	46.537	49.65 ¹
June 9.5	31.692 ¹⁴¹	38.68 ³⁰³	37.799 ¹⁶⁸	50.01 ⁹²	40.293 ¹⁴⁴	22.08 ²⁷⁷	46.677 ¹⁴⁰	52.98 ¹
19.5	31.788 ⁹⁶	41.72 ³⁰⁴	37.932 ¹³³	49.11 ⁹⁰	40.397 ¹⁰⁴	24.87 ²⁷⁹	46.760 ⁸³	56.34 ¹
29.5	31.837 ⁴⁹	44.72 ³⁰⁰	38.029 ⁹⁷	48.26 ⁸⁵	40.458 ⁶¹	27.61 ²⁷⁴	46.783 ²³	59.66 ¹
July 9.4	31.837 ⁰	47.59 ²⁸⁷	38.084 ⁵⁵	47.49 ⁷⁷	40.475 ¹⁷	30.23 ²⁶²	46.746 ³⁷	62.84 ¹
	47	266	14	68	27	244	98	1
19.4	31.790 ⁹³	50.25 ²⁴¹	38.098 ²⁶	46.81 ⁶⁰	40.448 ⁷⁰	32.67 ²¹⁹	46.648 ¹⁵⁴	65.80 ¹
29.4	31.697 ¹³⁷	52.66 ²¹⁰	38.072 ⁶⁷	46.21 ⁵⁰	40.378 ¹¹²	34.86 ¹⁹²	46.494 ²⁰⁶	68.48 ¹
Aug. 8.4	31.560 ¹⁷⁵	54.76 ¹⁷⁴	38.005 ¹⁰²	45.71 ⁴¹	40.266 ¹⁴⁸	36.78 ¹⁵⁹	46.288 ²⁵²	70.83 ¹
18.3	31.385 ²⁰⁹	56.50 ¹³⁷	37.903 ¹³²	45.30 ³³	40.118 ¹⁷⁹	38.37 ¹²⁴	46.036 ²⁹²	72.77 ¹
28.3	31.176 ²³²	57.87 ⁹⁵	37.771 ¹⁵⁷	44.97 ²³	39.939 ²⁰⁴	39.61 ⁸⁶	45.744 ³²¹	74.29 ¹
Sept. 7.3	30.944	58.82	37.614	44.74	39.735	40.47	45.423	75.35 ¹
17.3	30.694 ²⁸⁰	59.31 ⁴⁹	37.441 ¹⁷³	44.58 ¹⁶	39.515 ²²⁰	40.95 ⁴⁸	45.082 ³⁴¹	75.91 ¹
27.2	30.437 ²⁵⁷	59.36 ⁵	37.262 ¹⁷⁹	44.49 ⁹	39.289 ²²⁶	41.02 ⁷	44.732 ³⁵⁰	75.97 ¹
Oct. 7.2	30.183 ²⁵⁴	58.96 ⁴⁰	37.086 ¹⁷⁶	44.48 ¹	39.065 ²²⁴	40.68 ³⁴	44.386 ³⁴⁶	75.52 ¹
17.2	29.944 ²³⁹	58.11 ⁸⁵	36.924 ¹⁶²	44.56 ⁸	38.856 ²⁰⁹	39.93 ⁷⁵	44.057 ³²⁹	74.55 ¹
	214	131	140	17	188	116	301	1
27.1	29.730 ¹⁸¹	56.80 ¹⁷³	36.784 ¹⁰⁷	44.73 ²⁷	38.668 ¹⁵⁴	38.77 ¹⁵⁴	43.756 ²⁶²	73.09 ¹
Nov. 6.1	29.549 ¹³⁸	55.07 ²¹²	36.677 ⁶⁸	45.00 ³⁷	38.514 ¹¹⁵	37.23 ¹⁹⁰	43.494 ²¹¹	71.15 ¹
16.1	29.411 ⁹⁰	52.95 ²⁴⁸	36.609 ²⁴	45.37 ⁴⁹	38.399 ⁷⁰	35.33 ²²³	43.283 ¹⁵⁴	68.78 ¹
26.1	29.321 ³⁷	50.47 ²⁷⁶	36.585 ²³	45.86 ⁶⁰	38.329 ²⁰	33.10 ²⁴⁹	43.129 ⁸⁹	66.02 ¹
Dec. 6.0	29.284 ¹⁸	47.71 ²⁹⁹	36.608 ⁷⁰	46.46 ⁷²	38.309 ³¹	30.61 ²⁷⁰	43.040 ²¹	62.94 ¹
16.0	29.302 ⁷³	44.72 ³¹⁰	36.678 ¹¹⁵	47.18 ⁸⁰	38.340 ⁸²	27.91 ²⁸²	43.019 ⁴⁹	59.64 ¹
26.0	29.375 ¹²⁶	41.62 ³¹²	36.793 ¹⁵⁸	47.98 ⁸⁶	38.422 ¹³⁰	25.09 ²⁸⁵	43.068 ¹¹⁶	56.20 ¹
36.0	29.501	38.50	36.951	48.84	38.552	22.24	43.184	52.74 ¹
Mean Place	28.491	37.78	33.998	53.13	37.040	20.91	43.502	52.38
Sec δ , Tan δ	1.256	+0.761	1.015	-0.172	1.146	+0.560	1.606	+1.257
$D\psi a$, $D\omega a$	+0.04	0.00	+0.07	0.00	+0.05	0.00	+0.03	0.00
$D\psi \delta$, $D\omega \delta$	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

APPARENT PLACES OF STARS, 1919.

461

FOR THE UPPER TRANSIT AT WASHINGTON.

Right Ascension.	67 Ophiuchi. Mag. 3.9		θ Arse. Mag. 3.9		γ Sagittarii. Mag. 3.1		70 Ophiuchi. Mag. 4.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 17 56 s	° ' " + 2 55 "	h m 18 0 s	° ' " -50 5 "	h m 18 0 s	° ' " -30 25 "	h m 18 1 s	° ' " + 2 30 "
1.0	34.985	65.64	18.989	49.88	35.930	31.07	21.296	63.67
10.9	35.156	64.06	19.249	48.33	36.137	30.67	21.464	62.10
20.9	35.361	62.52	19.562	46.93	36.382	30.34	21.665	60.57
30.9	35.593	61.10	19.919	45.72	36.658	30.10	21.894	59.14
9.9	35.847	59.87	20.311	44.70	36.960	29.91	22.146	57.90
19.8	36.117	58.86	20.728	43.89	37.279	29.77	22.414	56.88
1.8	36.398	58.14	21.163	43.30	37.610	29.65	22.694	56.15
11.8	36.685	57.74	21.610	42.92	37.948	29.56	22.980	55.72
21.8	36.974	57.66	22.059	42.76	38.289	29.47	23.269	55.63
31.7	37.261	57.94	22.504	42.80	38.628	29.40	23.557	55.87
10.7	37.541	58.54	22.942	43.05	38.961	29.34	23.839	56.42
20.7	37.812	59.41	23.365	43.49	39.284	29.29	24.111	57.27
30.6	38.068	60.55	23.766	44.13	39.592	29.28	24.370	58.37
10.6	38.307	61.88	24.141	44.95	39.881	29.31	24.612	59.66
20.6	38.523	63.36	24.481	45.94	40.145	29.40	24.832	61.10
30.6	38.713	64.94	24.781	47.10	40.380	29.55	25.027	62.64
9.5	38.872	66.55	25.033	48.38	40.581	29.79	25.190	64.22
19.5	38.996	68.16	25.233	49.77	40.742	30.08	25.320	65.79
29.5	39.084	69.72	25.374	51.23	40.860	30.43	25.414	67.31
9.5	39.133	71.19	25.455	52.71	40.932	30.84	25.467	68.75
19.4	39.141	72.53	25.473	54.17	40.957	31.27	25.479	70.06
29.4	39.109	73.73	25.427	55.57	40.935	31.71	25.452	71.22
8.4	39.038	74.77	25.322	56.84	40.866	32.14	25.386	72.22
18.3	38.932	75.63	25.161	57.92	40.755	32.52	25.284	73.05
28.3	38.798	76.30	24.952	58.78	40.608	32.82	25.153	73.69
7.3	38.638	76.78	24.706	59.37	40.432	33.01	24.996	74.15
17.3	38.464	77.06	24.435	59.67	40.238	33.10	24.824	74.40
27.2	38.283	77.16	24.153	59.65	40.034	33.05	24.643	74.47
7.2	38.104	77.05	23.874	59.29	39.833	32.86	24.464	74.34
17.2	37.939	76.72	23.614	58.60	39.646	32.55	24.298	74.00
27.2	37.795	76.20	23.387	57.62	39.485	32.13	24.152	73.47
6.1	37.682	75.46	23.207	56.37	39.361	31.61	24.037	72.73
16.1	37.606	74.53	23.085	54.91	39.280	31.03	23.959	71.80
26.1	37.573	73.40	23.029	53.28	39.249	30.42	23.923	70.68
6.0	37.586	72.10	23.042	51.57	39.271	29.81	23.931	69.39
16.0	37.644	70.66	23.128	49.84	39.347	29.24	23.986	67.96
26.0	37.747	69.12	23.283	48.13	39.474	28.72	24.086	66.43
36.0	37.891	67.53	23.502	46.52	39.650	28.28	24.227	64.85
lace	35.312	64.02	19.506	54.85	36.186	34.86	21.623	61.86
an δ	1.001	+0.051	1.559	-1.196	1.160	-0.587	1.001	+0.044
α	+0.06	0.00	+0.09	0.00	+0.08	0.00	+0.06	0.00
γ	0.6	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	72 Ophiuchi. Mag. 3.7		o Herculis. Mag. 3.8		μ Sagittarii. Mag. 4.0		η Sagittarii. Mag. 3.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 18 3	° ' " + 9 32	h m 18 4	° ' " +28 44	h m 18 8	° ' " -21 4	h m 18 12	° ' " -36 47
	s	"	s	"	s	"	s	"
Jan. 1.0	30.132	66.72	22.196	62.51	54.878	49.12	8.494	9.42
11.0	30.292 160	64.81 191	22.345 149	59.73 278	55.061 183	49.24 12	8.700 206	8.57 83
20.9	30.486 194	62.96 185	22.534 189	57.08 265	55.280 319	49.40 16	8.948 248	7.81 78
30.9	30.710 224	61.27 169	22.760 226	54.64 244	55.530 250	49.57 17	9.231 283	7.15 68
Feb. 9.9	30.957 247	59.78 149	23.015 255	52.52 212	55.803 273	49.74 17	9.544 313	6.58 57
	266	120	277	171	280	12	333	48
19.8	31.223	58.58	23.292	50.81	56.093	49.86	9.877	6.10
Mar. 1.8	31.501 278	57.72 86	23.586 294	49.56 125	56.397 304	49.93 7	10.227 350	5.71 28
11.8	31.786 285	57.24 48	23.892 306	48.84 72	56.708 311	49.92 1	10.585 358	5.40 21
21.8	32.074 288	57.14 10	24.201 309	48.66 18	57.022 314	49.81 11	10.949 364	5.17 23
31.7	32.362 288	57.45 31	24.509 308	49.03 37	57.337 315	49.61 20	11.312 363	5.01 14
	282	69	301	89	310	37	360	8
Apr. 10.7	32.644	58.14	24.810	49.92	57.647	49.34	11.672	4.93
20.7	32.917 273	59.18 104	25.100 290	51.30 138	57.948 301	48.99 35	12.021 349	4.93 0
30.7	33.175 258	60.51 133	25.373 273	53.11 181	58.238 290	48.60 29	12.357 336	5.02 9
May 10.6	33.416 241	62.10 159	25.622 249	55.28 217	58.512 274	48.18 42	12.674 317	5.23 21
20.6	33.694 218	63.86 176	25.844 222	57.72 244	58.763 251	47.77 41	12.965 291	5.53 30
	193	191	191	265	224	40	260	48
30.6	33.827	65.77	26.035	60.37	58.987	47.37	13.225	5.93
June 9.5	33.987 160	67.73 196	26.188 153	63.13 276	59.181 194	47.02 35	13.450 225	6.44 51
19.5	34.113 126	69.70 197	26.302 114	65.92 279	59.339 158	46.73 29	13.634 184	7.05 61
29.5	34.202 89	71.63 193	26.374 72	68.68 276	59.457 118	46.52 21	13.771 137	7.75 79
July 9.5	34.251 49	73.45 182	26.401 27	71.31 263	59.533 76	46.36 16	13.861 90	8.49 71
	8	168	17	248	31	10	37	78
19.4	34.259	75.13	26.384	73.79	59.564	46.26	13.898	9.27
29.4	34.225 31	76.66 153	26.322 62	76.04 225	59.551 13	46.23 3	13.883 15	10.05 78
Aug. 8.4	34.153 72	77.99 133	26.219 103	78.00 196	59.494 57	46.23 0	13.818 65	10.79 71
18.4	34.046 107	79.09 110	26.079 140	79.66 166	59.399 95	46.26 3	13.706 112	11.45 66
28.3	33.908 138	79.96 87	25.905 174	80.97 131	59.268 131	46.30 4	13.553 153	12.02 57
	163	63	199	95	159	3	185	41
Sept. 7.3	33.745	80.59	25.706	81.92	59.109	46.33	13.368	12.43
17.3	33.566 179	80.97 38	25.489 217	82.48 56	58.931 178	46.33 0	13.159 209	12.67 24
27.2	33.379 187	81.08 11	25.265 221	82.64 16	58.744 187	46.30 3	12.939 220	12.72 5
Oct. 7.2	33.194 185	80.94 14	25.041 224	82.38 26	58.557 187	46.23 7	12.718 221	12.56 16
17.2	33.020 174	80.54 40	24.830 211	81.72 66	58.383 174	46.12 11	12.512 206	12.21 35
	152	68	190	106	152	14	183	53
27.2	32.868	79.86	24.640	80.66	58.231	45.98	12.329	11.68
Nov. 6.1	32.744 124	78.94 92	24.480 160	79.20 146	58.111 120	45.84 14	12.184 145	10.97 71
16.1	32.658 86	77.76 118	24.359 121	77.39 181	58.031 80	45.70 14	12.083 101	10.14 83
26.1	32.612 46	76.36 140	24.282 77	75.24 215	57.996 35	45.58 12	12.036 47	9.23 91
Dec. 6.1	32.612 0	74.74 162	24.253 29	72.82 242	58.009 13	45.51 7	12.043 7	8.26 97
	45	177	21	264	63	1	65	97
16.0	32.657	72.97	24.274	70.18	58.072	45.50	12.108	7.29
26.0	32.748 91	71.09 188	24.345 71	67.41 277	58.182 110	45.54 4	12.229 121	6.34 95
36.0	32.881 133	69.16 193	24.464 119	64.60 281	58.337 155	45.65 11	12.402 173	5.46 88
Mean Place	30.534	65.20	22.938	61.71	55.117	52.30	8.815	13.33
Sec δ, Tan δ	1.014	+0.168	1.141	+0.549	1.072	-0.385	1.249	-0.748
D _ψ δ, D _ω δ	+0.06	0.00	+0.05	0.00	+0.07	0.00	+0.08	0.00
D _ψ δ, D _ω δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

APPARENT PLACES OF STARS, 1919.

463

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	Groombridge 2533. Mag. 5.4		36 Draconis. Mag. 5.0		δ Sagittarii. Mag. 2.8		η Serpentis. Mag. 3.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 18 13	° ' +42 7	h m 18 13	° ' +64 21	h m 18 15	° ' -29 51	h m 18 17	° ' - 2 55
	s "	"	s "	"	s "	"	s "	"
Jan. 1.0	6.402	53.01	22.85	71.88	48.232	46.12	6.756	12.36
11.0	6.534 ¹³²	49.82 ³¹⁹	22.97 ¹²	68.37 ³⁵¹	48.420 ¹⁸⁸	45.67 ⁴⁵	6.911 ¹⁵⁵	13.57 ¹²¹
20.9	6.719 ¹⁸⁵	46.77 ³⁰⁵	23.19 ²²	64.99 ³³⁸	48.649 ²²⁹	45.28 ³⁹	7.100 ¹⁸⁹	14.75 ¹¹⁸
30.9	6.949 ²³⁰	43.94 ²⁸³	23.50 ³¹	61.89 ³¹⁰	48.910 ²⁶¹	44.95 ³³	7.320 ²²⁰	15.85 ¹¹⁰
Feb. 9.9	7.218 ²⁶⁹	41.46 ²⁴⁸	23.89 ³⁹	59.16 ²⁷³	49.198 ²⁸⁸	44.66 ²⁹	7.562 ²⁴²	16.82 ⁹⁷
	300	204	45	225	308	25	261	78
19.8	7.518	39.42	24.34	56.91	49.506	44.41	7.823	17.60
Mar. 1.8	7.842 ³²⁴	37.95 ¹⁴⁷	24.84 ⁵⁰	55.24 ¹⁶⁷	49.828 ³²²	44.17 ²⁴	8.097 ²⁷⁴	18.16 ⁵⁶
11.8	8.182 ³⁴⁰	37.05 ⁹⁰	25.37 ⁵³	54.20 ¹⁰⁴	50.160 ³³²	43.95 ²²	8.380 ²⁸³	18.45 ²⁹
21.8	8.530 ³⁴⁸	36.74 ³¹	25.91 ⁵⁴	53.83 ³⁷	50.497 ³³⁷	43.73 ²²	8.668 ²⁸⁸	18.47 ²
31.7	8.879 ³⁴⁹	37.05 ³¹	26.47 ⁵⁶	54.13 ³⁰	50.834 ³³⁷	43.51 ²²	8.958 ²⁹⁰	18.21 ²⁶
	342	93	53	96	334	21	286	52
Apr. 10.7	9.221	37.98	27.00	55.09	51.168	43.30	9.244	17.69
20.7	9.549 ³²⁸	39.45 ¹⁴⁷	27.50 ⁵⁰	56.65 ¹⁵⁶	51.496 ³²⁸	43.11 ¹⁹	9.524 ²⁸⁰	16.91 ⁷⁸
30.7	9.856 ³⁰⁷	41.43 ¹⁹⁸	27.96 ⁴⁶	58.76 ²¹¹	51.810 ³¹⁴	42.95 ¹⁶	9.793 ²⁶⁹	15.94 ⁹⁷
May 10.6	10.137 ²⁸¹	43.82 ²³⁹	28.37 ⁴¹	61.35 ²⁵⁹	52.106 ²⁹⁶	42.83 ¹²	10.046 ²⁵³	14.79 ¹¹⁵
20.6	10.382 ²⁴⁵	46.56 ²⁷⁴	28.71 ³⁴	64.31 ²⁹⁶	52.382 ²⁷⁶	42.78 ⁵	10.281 ²³⁵	13.54 ¹²⁵
	207	300	27	323	247	3	209	133
30.6	10.589	49.56	28.98	67.54	52.629	42.81	10.490	12.21
June 9.5	10.752 ¹⁶³	52.71 ³¹⁵	29.17 ¹⁹	70.96 ³⁴²	52.842 ²¹³	42.91 ¹⁰	10.671 ¹⁸¹	10.85 ¹³⁶
19.5	10.868 ¹¹⁶	55.92 ³²¹	29.27 ¹⁰	74.48 ³⁵²	53.019 ¹⁷⁷	43.11 ²⁰	10.817 ¹⁴⁶	9.52 ¹³³
29.5	10.934 ⁶⁶	59.11 ³¹⁹	29.29 ²	77.97 ³⁴⁶	53.152 ¹³³	43.38 ²⁷	10.927 ¹¹⁰	8.24 ¹²⁸
July 9.5	10.947 ¹³	62.18 ³⁰⁷	29.22 ⁷	81.35 ³³⁸	53.241 ⁸⁹	43.72 ³⁴	10.997 ⁷⁰	7.05 ¹¹⁹
	38	293	16	321	40	40	28	109
19.4	10.909	65.11	29.06	84.56	53.281	44.12	11.025	5.96
29.4	10.819 ⁹⁰	67.77 ²⁶⁶	28.82 ²⁴	87.51 ²⁹⁵	53.274 ⁷	44.54 ⁴²	11.012 ¹³	5.01 ⁹⁵
Aug. 8.4	10.682 ¹³⁷	70.13 ²³⁶	28.51 ³¹	90.13 ²⁶²	53.219 ⁵⁵	44.97 ⁴³	10.959 ⁵³	4.19 ⁸²
18.4	10.501 ¹⁸¹	72.14 ²⁰¹	28.14 ³⁷	92.37 ²²⁴	53.121 ⁹⁸	45.38 ⁴¹	10.869 ⁹⁰	3.52 ⁶⁷
28.3	10.282 ²¹⁹	73.76 ¹⁶²	27.70 ⁴⁴	94.19 ¹⁸²	52.985 ¹³⁶	45.73 ³⁵	10.745 ¹²⁴	3.00 ⁵²
	249	120	48	135	169	27	150	38
Sept. 7.3	10.033	74.96 ⁷⁴	27.22 ⁵¹	95.54 ⁸⁵	52.816 ¹⁸⁹	46.00 ¹⁵	10.595 ¹⁷⁰	2.62 ²²
17.3	9.764 ²⁶⁹	75.70 ²⁸	26.71 ⁵³	96.39 ³⁴	52.627 ²⁰²	46.15 ⁵	10.425 ¹⁸⁰	2.40 ¹⁰
27.2	9.484 ²⁸¹	75.98 ²¹	26.18 ⁵³	96.73 ²⁰	52.425 ²⁰²	46.20 ⁹	10.245 ¹⁷⁹	2.30 ⁶
Oct. 7.2	9.203 ²⁷⁰	75.77 ⁶⁷	25.65 ⁵²	96.53 ⁷³	52.223 ¹⁹⁰	46.11 ²³	10.066 ¹⁶⁹	2.36 ²²
17.2	8.933 ²⁴⁷	75.10 ¹¹⁶	25.13 ⁴⁸	95.80 ¹²⁵	52.033 ¹⁶⁸	45.88 ³⁴	9.897 ¹⁵¹	2.58 ³⁶
27.2	8.686	73.94	24.65	94.55	51.865	45.54	9.746	2.94
Nov. 6.1	8.470 ²¹⁶	72.32 ¹⁶²	24.22 ⁴³	92.77 ¹⁷⁸	51.731 ¹³⁴	45.11 ⁴³	9.623 ¹²³	3.44 ⁵⁰
16.1	8.295 ¹⁷⁵	70.28 ²⁰⁴	23.84 ³⁸	90.53 ²²⁴	51.637 ⁹⁴	44.59 ⁵²	9.537 ⁸⁶	4.11 ⁶⁷
26.1	8.168 ¹²⁷	67.84 ²⁴⁴	23.53 ³¹	87.85 ²⁶⁸	51.592 ⁴⁵	44.03 ⁵⁶	9.489 ⁴⁸	4.92 ⁸¹
Dec. 6.1	8.095 ⁷³	65.09 ²⁷⁵	23.32 ²¹	84.82 ³⁰³	51.599 ⁷	43.45 ⁵⁸	9.487 ²	5.87 ⁹⁵
	16	302	13	331	59	57	42	107
16.0	8.079	62.07	23.19	81.51	51.658	42.88	9.529	6.94
26.0	8.120 ⁴¹	58.90 ³¹⁷	23.16 ³	78.01 ³⁵⁰	51.768 ¹¹⁰	42.36 ⁵²	9.616 ⁸⁷	8.11 ¹¹⁷
36.0	8.218 ⁹⁸	55.67 ³²³	23.23 ⁷	74.46 ³⁵⁵	51.927 ¹⁵⁹	41.89 ⁴⁷	9.745 ¹²⁹	9.32 ¹²¹
Mean Place	7.580	51.81	25.842	70.70	48.504	49.65	7.053	14.85
Sec δ , Tan δ	1.348	+0.905	2.312	+2.084	1.153	-0.574	1.001	-0.051
$D\psi\alpha$, $D\omega\alpha$	+0.04	0.00	+0.01	-0.01	+0.08	0.00	+0.06	0.00
$D\psi\delta$, $D\omega\delta$	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ϵ Sagittarii. Mag. 2.0		109 Hercules. Mag. 3.9		α Telescopii. Mag. 3.8		χ Draconis. Mag. 3.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 18 18	° ' -34 25	h m 18 20	° ' +21 43	h m 18 20	° ' -46 0	h m 18 22	° ' +72
	s "	"	s "	"	s "	"	s "	"
Jan. 1.0	47.407	22.88	14.160	56.59	57.592	48.15	26.30	54.88
11.0	47.601 ¹⁹⁴	22.14 ⁷⁴	14.295 ¹³⁵	54.12 ²⁴⁷	57.809 ²¹⁷	46.71 ¹⁴⁴	26.41 ¹¹	51.38 ¹
20.9	47.835 ²³⁴	21.48 ⁶⁶	14.471 ¹⁷⁶	51.73 ²³⁹	58.077 ²⁶⁸	45.38 ¹³³	26.65 ²⁴	47.97 ¹
30.9	48.106 ²⁷¹	20.88 ⁶⁰	14.680 ²⁰⁹	49.53 ²²⁰	58.387 ³¹⁰	44.18 ¹²⁰	27.02 ³⁷	44.81 ¹
Feb. 9.9	48.405 ²⁹⁹	20.36 ⁵²	14.917 ²³⁷	47.58 ¹⁹⁵	58.732 ³⁴⁵	43.11 ¹⁰⁷	27.52 ⁵⁰	41.99 ¹
	320	45	260	159	372	90	59	1
19.9	48.725	19.91	15.177	45.99	59.104	42.21	28.11	39.66
Mar. 1.8	49.061 ³³⁶	19.52 ³⁹	15.455 ²⁷⁸	44.81 ¹¹⁸	59.497 ³⁹³	41.47 ⁷⁴	28.79 ⁶⁸	37.87 ¹
11.8	49.407 ³⁴⁶	19.18 ³⁴	15.744 ²⁹⁹	44.10 ⁷¹	59.903 ⁴⁰⁶	40.88 ⁵⁹	29.52 ⁷³	36.70 ¹
21.8	49.761 ³⁵⁴	18.88 ³⁰	16.040 ²⁹⁶	43.87 ²³	60.316 ⁴¹³	40.47 ⁴¹	30.29 ⁷⁷	36.20 ¹
31.7	50.115 ³⁵⁴	18.65 ²³	16.338 ²⁹⁸	44.15 ²⁸	60.731 ⁴¹⁵	40.24 ²⁸	31.06 ⁷⁷	36.36 ¹
	351	18	295	76	413	8	76	1
Apr. 10.7	50.466	18.47	16.633	44.91	61.144	40.16	31.82	37.17
20.7	50.809 ³⁴³	18.35 ¹²	16.920 ²⁸⁷	46.11 ¹²⁰	61.546 ⁴⁰³	40.26 ¹⁰	32.53 ⁷¹	38.61 ¹
30.7	51.141 ³³²	18.31 ⁴	17.194 ²⁷⁴	47.72 ¹⁶¹	61.934 ³⁹⁸	40.55 ²⁹	33.19 ⁶⁶	40.60 ¹
May 10.6	51.454 ³¹³	18.35 ⁴	17.449 ²⁵⁵	49.65 ¹⁹³	62.301 ³⁶⁷	41.00 ⁴⁵	33.76 ⁵⁷	43.08 ¹
20.6	51.744 ²⁹⁰	18.49 ¹⁴	17.682 ²³³	51.85 ²²⁰	62.639 ³³⁸	41.64 ⁶⁴	34.23 ⁴⁷	45.94 ¹
	261	25	203	239	308	79	37	1
30.6	52.005	18.74	17.885	54.24	62.942	42.43	34.60	49.11
June 9.6	52.231 ²²⁶	19.09 ³⁵	18.056 ¹⁷¹	56.75 ²⁵¹	63.204 ²⁶²	43.38 ⁹⁵	34.85 ²⁵	52.48 ¹
19.5	52.417 ¹⁸⁶	19.53 ⁴⁴	18.191 ¹³⁵	59.29 ²⁵⁴	63.418 ²¹⁴	44.45 ¹⁰⁷	34.98 ¹³	55.96 ¹
29.5	52.559 ¹⁴²	20.07 ⁵⁴	18.286 ⁹⁵	61.81 ²⁵²	63.580 ¹⁶²	45.64 ¹¹⁹	34.97 ¹	59.45 ¹
July 9.5	52.653 ⁹⁴	20.67 ⁶⁰	18.339 ⁵³	64.24 ²⁴³	63.685 ¹⁰⁵	46.89 ¹²⁵	34.84 ¹³	62.86 ¹
	43	65	8	228	46	128	24	1
19.4	52.696	21.32	18.347	66.52	63.731	48.17	34.60	66.11
29.4	52.689 ⁷	21.99 ⁶⁷	18.313 ³⁴	68.59 ²⁰⁷	63.717 ¹⁴	49.42 ¹²⁵	34.23 ³⁷	69.11 ¹
Aug. 8.4	52.632 ⁵⁷	22.64 ⁶⁵	18.237 ⁷⁶	70.44 ¹⁸⁵	63.644 ⁷³	50.60 ¹¹⁸	33.75 ⁴⁸	71.82 ¹
18.4	52.529 ¹⁰³	23.25 ⁶¹	18.123 ¹¹⁴	72.00 ¹⁵⁶	63.518 ¹²⁶	51.67 ¹⁰⁷	33.18 ⁵⁷	74.17 ¹
28.3	52.387 ¹⁴²	23.76 ⁵¹	17.976 ¹⁴⁷	73.26 ¹²⁶	63.344 ¹⁷⁴	52.57 ⁹⁰	32.53 ⁶⁵	76.10 ¹
	177	40	176	95	214	68	71	1
Sept. 7.3	52.210	24.16	17.800	74.21	63.130	53.25	31.82	77.58
17.3	52.010 ²⁰⁰	24.40 ²⁴	17.606 ¹⁹⁴	74.81 ⁶⁰	62.889 ²⁴¹	53.70 ⁴⁵	31.05 ⁷⁷	78.58 ¹
27.3	51.797 ²¹³	24.49 ⁹	17.401 ²⁰⁵	75.06 ²⁵	62.631 ²⁵⁸	53.86 ¹⁶	30.26 ⁷⁹	79.05 ¹
Oct. 7.2	51.584 ²¹³	24.40 ⁹	17.196 ²⁰⁵	74.95 ¹¹	62.373 ²⁵⁸	53.72 ¹⁴	29.46 ⁸⁰	78.99 ¹
17.2	51.382 ²⁰²	24.13 ²⁷	16.999 ¹⁹⁷	74.48 ⁴⁷	62.126 ²⁴⁷	53.30 ⁴²	28.68 ⁷⁸	78.41 ¹
	179	44	179	83	219	71	75	1
27.2	51.203	23.69	16.820	73.65	61.907	52.59	27.93	77.29
Nov. 6.1	51.058 ¹⁴⁵	23.11 ⁵⁸	16.669 ¹⁵¹	72.46 ¹¹⁹	61.726 ¹⁸¹	51.64 ⁹⁵	27.24 ⁶⁹	75.66 ¹
16.1	50.956 ¹⁰²	22.41 ⁷⁰	16.553 ¹¹⁶	70.95 ¹⁵¹	61.595 ¹³¹	50.46 ¹¹⁸	26.63 ⁶¹	73.54 ¹
26.1	50.904 ⁵²	21.63 ⁷⁸	16.478 ⁷⁵	69.14 ¹⁸¹	61.522 ⁷³	49.12 ¹³⁴	26.12 ⁵¹	70.98 ¹
Dec. 6.1	50.907 ³	20.81 ⁸²	16.447 ³¹	67.05 ²⁰⁹	61.511 ¹¹	47.67 ¹⁴⁵	25.74 ³⁹	68.03 ¹
	56	84	16	228	56	151	27	1
16.0	50.963	19.97	16.463	64.77	61.567	46.16	25.47	64.79
26.0	51.074 ¹¹¹	19.16 ⁸¹	16.526 ⁶³	62.34 ²⁴³	61.685 ¹¹⁸	44.64 ¹⁵²	25.34 ¹³	61.35 ¹
36.0	51.235 ¹⁶¹	18.39 ⁷⁷	16.634 ¹⁰⁸	59.84 ²⁵⁰	61.863 ¹⁷⁸	43.17 ¹⁴⁷	25.36 ²	57.81 ¹
Mean Place	47.718	26.53	14.753	54.57	58.065	52.17	31.194	52.60
Sec δ , Tan δ	1.212	-0.685	1.076	+0.399	1.440	-1.036	3.363	+3.211
$D\psi\alpha$, $D\omega\alpha$	+0.08	0.00	+0.05	0.00	+0.09	+0.01	-0.02	-0.02
$D\psi\delta$, $D\omega\delta$	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

APPARENT PLACES OF STARS, 1919.

465

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	λ Sagittarii. Mag. 2.9		ε Serpentis. Mag. 5.4		ι Aquilæ. Mag. 4.1		ζ Pavonis. Mag. 4.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 18 22	° ' -25 27	h m 18 25	° ' - 2 2	h m 18 30	° ' - 8 17	h m 18 33	° ' -71 29
	s "	"	s "	"	s "	"	s "	"
Jan. 1.0	58.056	60.76	27.732	16.74	47.674	63.44	32.46	54.50
11.0	58.230 174	60.56 20	27.880 148	17.95 121	47.822 148	64.27 83	32.80 34	51.72 278
20.9	58.443 213	60.40 16	28.063 183	19.15 120	48.004 182	65.09 82	33.26 46	49.09 263
30.9	58.688 245	60.26 14	28.274 211	20.25 110	48.218 214	65.86 77	33.83 57	46.66 243
Feb. 9.9	58.959 271	60.13 13	28.511 237	21.21 96	48.456 238	66.51 65	34.48 65	44.50 216
	291	13	255	79	256	53	73	186
19.9	59.250	60.00	28.766	22.00	48.714	67.04	35.21	42.64
Mar. 1.8	59.557 307	59.84 16	29.037 271	22.53 53	48.987 273	67.38 34	36.00 79	41.12 152
11.8	59.873 316	59.64 20	29.318 281	22.81 28	49.271 284	67.51 13	36.82 82	39.97 115
21.8	60.195 323	59.39 25	29.605 287	22.79 2	49.562 291	67.43 8	37.66 84	39.20 77
31.7	60.520 326	59.11 28	29.895 290	22.50 29	49.856 294	67.11 32	38.52 86	38.81 39
	328	32	288	58	294	53	85	1
Apr. 10.7	60.843	58.79	30.183	21.92	50.150	66.58	39.37	38.80
20.7	61.159 316	58.45 24	30.466 283	21.10 82	50.439 289	65.86 72	40.21 84	39.18 38
30.7	61.464 305	58.10 35	30.739 273	20.05 105	50.719 280	64.98 88	41.01 80	39.94 76
May 10.6	61.754 290	57.77 33	30.998 259	18.84 121	50.986 267	63.98 100	41.76 75	41.06 112
20.6	62.024 270	57.47 30	31.237 239	17.51 133	51.234 248	62.89 109	42.45 69	42.50 144
	244	23	217	142	226	113	60	174
30.6	62.268	57.24	31.454	16.09	51.460	61.76	43.05	44.24
June 9.6	62.480 212	57.07 17	31.641 187	14.65 144	51.657 197	60.63 113	43.57 52	46.25 201
19.5	62.657 177	56.98 9	31.797 186	13.22 143	51.821 184	59.54 109	43.98 41	48.45 220
29.5	62.798 136	56.97 1	31.914 117	11.84 138	51.948 127	58.51 103	44.28 30	50.81 236
July 9.5	62.887 94	57.06 9	31.993 79	10.56 128	52.086 88	57.56 95	44.46 18	53.25 244
	47	14	36	117	46	84	5	245
19.4	62.934	57.20	32.029	9.39	52.082	56.72	44.51	55.70
29.4	62.933 1	57.40 20	32.024 5	8.36 103	52.084 2	56.02 70	44.43 8	58.08 238
Aug. 8.4	62.887 46	57.65 25	31.977 47	7.46 90	52.045 39	55.42 60	44.23 20	60.32 224
18.4	62.798 89	57.89 24	31.893 84	6.73 73	51.966 79	54.94 48	43.92 31	62.32 200
28.3	62.671 127	58.12 23	31.775 118	6.15 58	51.851 115	54.58 36	43.50 42	64.02 170
	159	19	147	42	142	25	50	133
Sept. 7.3	62.512	58.31	31.628	5.73	51.709	54.33	43.00	65.35
17.3	62.332 180	58.45 14	31.462 166	5.45 28	51.544 165	54.19 14	42.43 57	66.25 90
27.3	62.140 192	58.51 6	31.285 177	5.34 11	51.368 176	54.14 5	41.82 61	66.67 42
Oct. 7.2	61.945 195	58.49 2	31.106 179	5.38 4	51.188 180	54.18 4	41.21 61	66.59 8
17.2	61.761 184	58.38 11	30.936 170	5.57 19	51.016 172	54.31 13	40.61 60	65.99 60
	164	19	153	36	153	23	55	109
27.2	61.597	58.19	30.783	5.93	50.863	54.54	40.06	64.90
Nov. 6.1	61.464 133	57.93 25	30.657 126	6.44 51	50.736 127	54.86 32	39.58 48	63.34 156
16.1	61.369 95	57.63 30	30.564 93	7.11 67	50.641 95	55.28 42	39.19 39	61.36 198
26.1	61.320 49	57.31 32	30.512 52	7.92 81	50.587 54	55.80 52	38.91 28	59.06 230
Dec. 6.1	61.320 0	56.98 33	30.503 9	8.89 97	50.577 10	56.42 62	38.76 15	56.48 258
	50	30	35	109	35	73	0	275
16.0	61.370	56.68	30.538	9.98	50.612	57.15	38.76	53.73
26.0	61.469 99	56.42 26	30.617 79	11.13 115	50.691 79	57.93 78	38.88 12	50.91 282
36.0	61.614 145	56.21 21	30.738 121	12.36 123	50.813 122	58.77 84	39.14 26	48.09 282
Mean Place	58.317	64.03	28.038	19.41	47.949	66.32	34.472	58.69
Sec δ, Tan δ	1.108	-0.476	1.001	-0.035	1.011	-0.146	3.151	-2.988
D _α , D _α	+0.07	0.00	+0.06	0.00	+0.06	0.00	+0.14	+0.83
D _δ , D _δ	0.0	-1.0	0.0	-1.0	+0.1	-1.0	+0.1	-1.0

5934°—1919—30

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Lyrae. (Vega.) Mag. 0.1		γ Aquilæ. Mag. 4.7		ϕ Sagittarii. Mag. 3.3		η Herculis. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 18 34	° ' " +38 42	h m 18 37	° ' " - 9 7	h m 18 40	° ' " -27 4	h m 18 42	° ' " +20
	s 110	" 306	s 141	" 178	s 158	" 38	s 114	" 154
Jan. 1.0	10.722	30.11	50.116	49.11	35.478	27.68	9.918	67.47
11.0	10.832	27.05	50.257	49.86	35.636	27.30	10.032	65.10
20.9	10.991	24.07	50.435	50.60	35.834	26.94	10.186	62.79
30.9	11.194	21.28	50.643	51.27	36.065	26.60	10.374	60.63
Feb. 9.9	11.436	18.80	50.876	51.86	36.325	26.27	10.593	58.71
	274	207	255	45	282	33	243	
19.9	11.710	16.73	51.131	52.31	36.607	25.94	10.836	57.11
Mar. 1.8	12.010	15.15	51.401	52.58	36.908	25.59	11.100	55.89
	300	158	270	27	301	35	264	
11.8	12.329	14.12	51.683	52.67	37.222	25.21	11.379	55.12
	319	103	282	9	314	38	279	
21.8	12.661	13.68	51.973	52.53	37.544	24.80	11.668	54.83
	332	44	290	14	322	43	289	
31.8	12.998	13.84	52.268	52.18	37.872	24.37	11.964	55.02
	337	16	295	35	328	43	296	
	335	75	295	55	329	46	296	
Apr. 10.7	13.333	14.59	52.563	51.63	38.201	23.91	12.260	55.68
	327	130	292	75	325	46	292	
20.7	13.660	15.89	52.855	50.88	38.526	23.45	12.552	56.80
	311	181	284	89	318	44	283	
30.7	13.971	17.70	53.139	49.99	38.844	23.01	12.835	58.31
	290	225	271	101	304	41	268	
May 10.6	14.261	19.95	53.410	48.98	39.148	22.60	13.103	60.16
	261	261	254	109	286	35	247	
20.6	14.522	22.56	53.664	47.89	39.434	22.25	13.350	62.30
	226	287	232	112	261	28	221	
30.6	14.748	25.43	53.896	46.77	39.695	21.97	13.571	64.63
	188	306	203	112	232	17	192	
June 9.6	14.936	28.49	54.099	45.65	39.927	21.80	13.763	67.10
	143	315	172	108	195	8	156	
19.5	15.079	31.64	54.271	44.57	40.122	21.72	13.919	69.62
	95	316	135	102	155	2	117	
29.5	15.174	34.80	54.406	43.55	40.277	21.74	14.036	72.14
	44	307	95	93	111	12	74	
July 9.5	15.218	37.87	54.501	42.62	40.388	21.86	14.110	74.58
	6	295	52	81	65	22	31	
19.5	15.212	40.82	54.553	41.81	40.453	22.08	14.141	76.90
	55	273	9	69	16	29	13	
29.4	15.157	43.55	54.562	41.12	40.469	22.37	14.128	79.03
	105	246	33	57	32	33	57	
Aug. 8.4	15.052	46.01	54.529	40.55	40.437	22.70	14.071	80.94
	149	214	74	45	77	35	95	
18.4	14.903	48.15	54.455	40.10	40.360	23.05	13.976	82.58
	187	177	110	34	117	34	133	
28.3	14.716	49.92	54.345	39.76	40.243	23.39	13.843	83.95
	220	139	139	23	151	31	163	
Sept. 7.3	14.496	51.31	54.206	39.53	40.092	23.70	13.680	85.00
	244	96	163	13	177	24	184	
17.3	14.252	52.27	54.043	39.40	39.915	23.94	13.496	85.72
	259	50	175	5	192	16	199	
27.3	13.993	52.77	53.868	39.35	39.723	24.10	13.297	86.10
	262	4	180	4	197	6	204	
Oct. 7.2	13.731	52.81	53.688	39.39	39.526	24.16	13.093	86.15
	255	42	173	12	191	4	198	
17.2	13.476	52.39	53.515	39.51	39.335	24.12	12.895	85.83
	239	90	156	21	173	14	183	
27.2	13.237	51.49	53.359	39.72	39.162	23.98	12.712	85.17
	211	134	131	29	146	25	159	
Nov. 6.2	13.026	50.15	53.228	40.01	39.016	23.73	12.553	84.16
	175	178	98	38	108	32	127	
16.1	12.851	48.37	53.130	40.39	38.908	23.41	12.426	82.82
	131	218	58	46	65	37	91	
26.1	12.720	46.19	53.072	40.85	38.843	23.04	12.335	81.17
	84	252	16	56	18	40	48	
Dec. 6.1	12.636	43.67	53.056	41.41	38.825	22.64	12.287	79.26
	31	279	29	64	32	41	3	
16.0	12.605	40.88	53.055	42.05	38.857	22.23	12.284	77.11
	23	299	73	72	81	40	42	
26.0	12.628	37.89	53.158	42.77	38.938	21.83	12.326	74.82
	76	308	115	76	129	38	86	
36.0	12.704	34.81	53.273	43.53	39.067	21.45	12.412	72.44
Mean Place	11.758	27.12	50.390	52.09	35.761	30.76	10.482	64.16
Sec δ , Tan δ	1.282	+0.802	1.013	-0.161	1.123	-0.511	1.067	+0.37
$D\psi\alpha$, $D\omega\alpha$	+0.04	-0.01	+0.07	0.00	+0.07	+0.01	+0.05	0.00
$D\psi\delta$, $D\omega\delta$	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

APPARENT PLACES OF STARS, 1919.

467

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	6 Aquilæ. Mag. 4.5		λ Pavonis. Mag. 4.4		β Lyreæ. Var. 3.4-4.1		50 Draconis. Mag. 5.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 18 42	° ' " - 4 49	h m 18 44	° ' " - 62 16	h m 18 47	° ' " + 33 15	h m 18 48	° ' " + 75 20
Jan. 1.0	52.304 ¹³³	65.10 ¹⁰⁰	41.79 ²⁴	51.96 ²⁴²	4.500 ¹⁰⁰	68.18 ²⁸⁷	53.91 ⁰	25.04 ³⁴⁵
11.0	52.437 ¹⁶⁰	66.10 ⁹⁷	42.03 ³²	49.54 ²³³	4.600 ¹⁴⁴	65.31 ²⁸²	53.91 ¹⁶	21.59 ³⁴²
21.0	52.606 ²⁰⁰	67.07 ⁹⁰	42.35 ³⁹	47.21 ²¹⁶	4.744 ¹⁸⁵	62.49 ²⁶³	54.07 ³⁴	18.17 ³²⁵
30.9	52.806 ²²⁵	67.97 ⁷⁹	42.74 ⁴⁴	45.05 ¹⁶⁸	4.929 ²²²	59.86 ²³⁸	54.41 ⁴⁷	14.92 ²⁹⁶
Feb. 9.9	53.031 ²⁴⁶	68.76 ⁶¹	43.18 ⁵⁰	43.07 ¹⁷³	5.151 ²⁵³	57.48 ²⁰⁰	54.88 ⁶¹	11.96 ²⁵⁶
19.9	53.277 ²⁶⁴	69.37 ⁴¹	43.68 ⁵⁴	41.34 ¹⁴⁷	5.404 ²⁷⁷	55.48 ¹⁵⁵	55.49 ⁷²	9.40 ²⁰⁶
Mar. 1.8	53.541 ²⁷⁶	69.78 ¹⁶	44.22 ⁵⁶	39.87 ¹¹⁸	5.681 ²⁹⁹	53.93 ¹⁰⁴	56.21 ⁸²	7.34 ¹⁴⁹
11.8	53.817 ²⁸⁵	69.94 ⁹	44.78 ⁶⁰	38.69 ⁸⁹	5.980 ³¹¹	52.89 ⁴⁸	57.03 ⁸⁶	5.85 ⁸⁵
21.8	54.102 ²⁹¹	69.85 ³⁴	45.38 ⁶⁰	37.80 ²⁵	6.291 ³¹⁹	52.41 ⁹	57.89 ⁸⁹	5.00 ¹⁹
31.8	54.393 ²⁹¹	69.51 ⁶⁰	45.98 ⁶⁰	37.24 ²⁵	6.610 ³²⁰	52.50 ⁶⁵	58.78 ⁸⁹	4.81 ⁴⁸
Apr. 10.7	54.684 ²⁹⁰	68.91 ⁸²	46.58 ⁵⁷	36.99 ⁷	6.930 ³¹⁶	53.15 ¹¹⁸	59.67 ⁸⁶	5.29 ¹¹⁰
20.7	54.973 ²⁸²	68.09 ¹⁰¹	47.15 ⁵⁸	37.06 ³⁹	7.246 ³⁰³	54.33 ¹⁶⁷	60.53 ⁸⁰	6.39 ¹⁶⁹
30.7	55.255 ²⁷⁶	67.08 ¹¹⁸	47.73 ⁵⁴	37.45 ⁷²	7.549 ²⁸⁷	56.00 ²⁰⁹	61.33 ⁷¹	8.08 ²²²
May 10.7	55.525 ²⁵²	65.90 ¹²⁷	48.27 ⁵⁰	38.17 ¹⁰⁰	7.836 ²⁶²	58.09 ²⁴³	62.04 ⁶²	10.30 ²⁶⁵
20.6	55.777 ²³²	64.63 ¹³⁴	48.77 ⁴⁶	39.17 ¹²⁹	8.098 ²³³	60.52 ²⁷¹	62.66 ⁵⁰	12.95 ³⁰²
30.6	56.009 ²⁰³	63.29 ¹³⁶	49.23 ⁴⁰	40.46 ¹⁵⁴	8.331 ¹⁹⁸	63.23 ²⁸⁹	63.16 ³⁶	15.97 ³²⁸
June 9.6	56.212 ¹⁷²	61.93 ¹³³	49.63 ³³	42.00 ¹⁷⁵	8.529 ¹⁵⁷	66.12 ³⁰⁰	63.52 ²²	19.25 ³⁴⁴
19.5	56.384 ¹³⁶	60.60 ¹²⁷	49.96 ²⁵	43.75 ¹⁹⁰	8.686 ¹¹⁴	69.12 ³⁰¹	63.74 ⁸	22.69 ³⁵³
29.5	56.520 ⁹⁶	59.33 ¹¹⁷	50.21 ¹⁷	45.65 ²⁰²	8.800 ⁶⁶	72.13 ²⁸⁴	63.82 ²³	26.22 ³⁴⁹
July 9.5	56.616 ¹¹	58.16 ¹⁰⁷	50.38 ⁷	47.67 ²⁰⁷	8.866 ¹⁹	75.08 ²⁸⁴	63.74 ²³	29.71 ³⁴⁰
19.5	56.670 ³²	57.09 ⁹³	50.45 ¹	49.74 ²⁰⁶	8.885 ³⁰	77.92 ²⁶³	63.51 ³⁶	33.11 ³²³
29.4	56.681 ⁸⁰	56.16 ⁸⁰	50.44 ⁹	51.79 ¹⁹⁷	8.855 ⁷⁷	80.55 ²³⁰	63.15 ⁴⁹	36.34 ²⁹⁶
Aug. 8.4	56.649 ⁷¹	55.36 ⁶⁴	50.35 ¹⁸	53.76 ¹⁷⁹	8.778 ¹²⁰	82.94 ²⁰⁹	62.66 ⁶¹	39.30 ²⁶⁵
18.4	56.578 ¹⁰⁸	54.72 ⁵⁰	50.17 ²⁵	55.55 ¹⁵⁷	8.658 ¹⁹²	85.03 ¹⁷⁶	62.05 ⁷³	41.95 ²²⁸
28.4	56.470 ¹³⁷	54.22 ³⁶	49.92 ³²	57.12 ¹²⁶	8.498 ¹⁹²	86.79 ¹⁴⁰	61.32 ⁸¹	44.23 ¹⁸⁸
Sept. 7.3	56.333 ¹⁶¹	53.86 ²²	49.60 ³⁷	58.38 ⁹¹	8.306 ²¹⁷	88.19 ⁹⁹	60.51 ⁸⁸	46.11 ¹⁴¹
17.3	56.172 ¹⁷⁴	53.64 ⁹	49.23 ³⁹	59.29 ⁵¹	8.089 ²³²	89.18 ⁵⁸	59.63 ⁹²	47.52 ⁹⁰
27.3	55.998 ¹⁷⁸	53.55 ³	48.84 ⁴¹	59.80 ⁸	7.857 ²³⁹	89.76 ¹⁴	58.71 ⁹⁴	48.42 ⁴⁰
Oct. 7.2	55.820 ¹⁷⁴	53.58 ¹⁶	48.43 ⁴⁰	59.88 ³⁷	7.618 ²³⁴	89.90 ²⁹	57.77 ⁹⁴	48.82 ¹³
17.2	55.646 ¹⁵⁷	53.74 ²⁹	48.03 ³⁷	59.51 ⁸¹	7.384 ²¹⁹	89.61 ⁷³	56.83 ⁹²	48.69 ⁶⁸
27.2	55.489 ¹³⁴	54.03 ⁴¹	47.66 ³¹	58.70 ¹²²	7.165 ¹⁹⁷	88.88 ¹¹⁶	55.91 ⁸⁷	48.01 ¹²¹
Nov. 6.2	55.355 ¹⁰¹	54.44 ⁵³	47.35 ²⁶	57.48 ¹⁶⁰	6.968 ¹⁶³	87.72 ¹⁵⁸	55.04 ⁷⁸	46.80 ¹⁷²
16.1	55.254 ⁶⁴	54.97 ⁶⁷	47.09 ¹⁹	55.88 ¹⁹⁰	6.805 ¹²⁴	86.14 ¹⁹⁶	54.26 ⁶⁸	45.08 ²²¹
26.1	55.190 ²²	55.64 ⁷⁷	46.90 ⁹	53.98 ²¹⁶	6.681 ³¹	84.18 ²⁵⁷	53.58 ⁴²	42.87 ²⁶⁴
Dec. 6.1	55.168 ²²	56.41 ⁸⁷	46.81 ¹	51.82 ²³²	6.601 ¹⁸	81.89 ²⁷⁶	53.01 ²⁷	40.23 ³⁰¹
16.1	55.190 ⁶⁵	57.28 ⁹⁵	46.80 ⁸	49.50 ²⁴¹	6.570 ⁶⁷	79.32 ²⁷⁶	52.59 ¹⁰	37.22 ³²⁶
26.0	55.255 ¹⁰⁶	58.23 ¹⁰⁰	46.88 ¹⁹	47.09 ²⁴³	6.588 ¹⁸	76.56 ²⁸⁷	52.32 ²⁷	33.96 ³⁴³
36.0	55.361 ¹⁰⁶	59.23 ¹⁰⁰	47.07 ¹⁹	44.66 ²⁴³	6.655 ⁶⁷	73.69 ²⁸⁷	52.22 ¹⁰	30.53 ²⁴³
Mean Place	52.597	68.17	42.917	55.33	5.348	64.27	59.741	19.72
Sec δ, Tan δ	1.004	-0.085	2.150	-1.903	1.196	+0.656	3.952	+3.823
D _α , D _{αα}	+0.06	0.00	+0.11	+0.02	+0.04	-0.01	-0.04	-0.05
D _β , D _{ββ}	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Draconis. Mag. 4.8		σ Sagittarii. Mag. 2.1		θ Serpentis <i>pr.</i> Mag. 4.5		R Lyræ. Var. 4.0-4.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 18 49	° ' " +59 17	h m 18 50	° ' " -26 23	h m 18 52	° ' " + 4 5	h m 18 52	° ' " +43 50
	s	"	s	"	s	"	s	"
Jan. 1.0	58.225	25.41	14.270	52.15	11.195	53.29	51.023	24.21
11.0	58.286	21.96	14.416	51.78	11.313	51.81	51.105	21.03
21.0	58.427	18.56	14.601	51.42	11.466	50.35	51.240	17.90
30.9	58.643	15.32	14.822	51.07	11.650	48.99	51.425	14.94
Feb. 9.9	58.928	12.40	15.072	50.72	11.862	47.80	51.655	12.27
19.9	59.273	9.89	15.345	50.35	12.097	46.83	51.925	9.98
Mar. 1.8	59.668	7.88	15.637	49.95	12.351	46.13	52.228	8.18
11.8	60.102	6.48	15.945	49.51	12.619	45.76	52.555	6.92
21.8	60.562	5.69	16.263	49.03	12.898	45.71	52.901	6.26
31.8	61.036	5.57	16.588	48.52	13.184	46.01	53.257	6.23
Apr. 10.7	61.511	6.12	16.915	47.98	13.472	46.65	53.616	6.80
20.7	61.975	7.29	17.240	47.43	13.759	47.59	53.968	7.97
30.7	62.414	9.05	17.560	46.89	14.040	48.82	54.308	9.68
May 10.7	62.817	11.32	17.867	46.39	14.311	50.27	54.626	11.86
20.6	63.175	14.04	18.158	45.95	14.564	51.90	54.915	14.45
30.6	63.479	17.10	18.424	45.58	14.796	53.64	55.168	17.35
June 9.6	63.719	20.41	18.663	45.33	15.001	55.45	55.380	20.48
19.5	63.891	23.89	18.866	45.17	15.174	57.27	55.545	23.74
29.5	63.990	27.42	19.030	45.12	15.311	59.04	55.659	27.05
July 9.5	64.016	30.92	19.150	45.18	15.409	60.74	55.720	30.33
19.5	63.965	34.32	19.223	45.34	15.465	62.30	55.725	33.49
29.4	63.841	37.53	19.248	45.60	15.478	63.73	55.675	36.45
Aug. 8.4	63.645	40.47	19.224	45.90	15.448	64.97	55.572	39.16
18.4	63.385	43.09	19.155	46.25	15.378	66.03	55.420	41.57
28.4	63.070	45.33	19.045	46.60	15.272	66.89	55.224	43.62
Sept. 7.3	62.705	47.14	18.900	46.92	15.136	67.54	54.992	45.27
17.3	62.303	48.49	18.727	47.20	14.975	67.98	54.730	46.48
27.3	61.878	49.34	18.539	47.40	14.801	68.20	54.450	47.24
Oct. 7.2	61.442	49.67	18.343	47.51	14.620	68.22	54.162	47.51
17.2	61.008	49.47	18.152	47.53	14.443	68.02	53.877	47.30
27.2	60.591	48.72	17.976	47.44	14.280	67.62	53.605	46.59
Nov. 6.2	60.206	47.45	17.827	47.27	14.138	67.01	53.358	45.39
16.1	59.864	45.66	17.713	47.00	14.027	66.19	53.146	43.72
26.1	59.578	43.40	17.641	46.69	13.952	65.19	52.975	41.62
Dec. 6.1	59.356	40.71	17.614	46.34	13.917	64.01	52.854	39.13
16.1	59.208	37.68	17.636	45.97	13.924	62.68	52.785	36.34
26.0	59.136	34.40	17.706	45.60	13.972	61.25	52.773	33.30
36.0	59.147	30.96	17.823	45.24	14.062	59.75	52.817	30.14
Mean Place	60.506	20.47	14.554	55.10	11.546	49.86	52.240	19.51
Sec δ , Tan δ	1.958	+1.684	1.116	-0.496	1.003	+0.072	1.386	+0.960
$D\psi\alpha$, $D\omega\alpha$	+0.02	-0.02	+0.07	+0.01	+0.06	0.00	+0.04	-0.01
$D\psi\delta$, $D\omega\delta$	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

APPARENT PLACES OF STARS, 1919.

469

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Lyrae. Mag. 3.3		ε Aquilæ. Mag. 4.2		ζ Sagittarii. Mag. 2.7		ζ Aquilæ. Mag. 3.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 18 55 s	° ' " +32 34 "	h m 18 55 s	° ' " +14 57 "	h m 18 57 s	° ' " -29 59 "	h m 19 1 s	° ' " +13 44 "
Jan. 1.0	53.968	43.93	56.279	30.16	27.214	47.57	40.765	35.71
11.0	54.058 ⁹⁰	41.11 ²⁸²	56.385 ¹⁰⁶	28.10 ²⁰⁶	27.356 ¹⁴²	46.95 ⁶²	40.865 ¹⁰⁰	33.72 ¹⁹⁹
21.0	54.193 ¹³⁵	38.33 ²⁷⁸	56.527 ¹⁴²	26.09 ²⁰¹	27.540 ¹⁸⁴	46.34 ⁶¹	41.002 ¹³⁷	31.77 ¹⁹⁵
30.9	54.368 ¹⁷⁵	35.71 ²⁸²	56.703 ¹⁷⁶	24.19 ¹⁹⁰	27.760 ²²⁰	45.74 ⁶⁰	41.174 ¹⁷²	29.94 ¹⁸³
Feb. 9.9	54.581 ²¹³	33.33 ²³⁸	56.910 ²⁰⁷	22.50 ¹⁶⁹	28.011 ²⁵¹	45.15 ⁵⁹	41.376 ²⁰²	28.30 ¹⁶⁴
19.9	54.824 ²⁴³	31.32 ²⁰¹	57.141 ²³¹	21.09 ¹⁴¹	28.287 ²⁷⁶	44.56 ⁵⁹	41.602 ²²⁶	26.93 ¹³⁷
Mar. 1.8	55.094 ²⁷⁰	29.74 ¹⁵⁸	57.393 ²⁵²	20.02 ¹⁰⁷	28.584 ²⁹⁷	43.97 ⁵⁹	41.850 ²⁴⁸	25.90 ¹⁰³
11.8	55.387 ²⁹³	28.66 ¹⁰⁸	57.661 ²⁶⁸	19.35 ⁶⁷	28.897 ³¹³	43.38 ⁵⁹	42.115 ²⁶⁵	25.25 ⁶⁵
21.8	55.694 ³⁰⁷	28.13 ⁵³	57.941 ²⁸⁰	19.11 ²⁴	29.223 ³²⁶	42.78 ⁶⁰	42.393 ²⁷⁸	25.02 ²³
31.8	56.010 ³¹⁶	28.17 ⁴	58.229 ²⁸⁸	19.30 ¹⁹	29.556 ³³³	42.19 ⁵⁹	42.680 ²⁸⁷	25.21 ¹⁹
Apr. 10.7	56.329 ³¹⁹	28.76 ⁵⁹	58.521 ²⁹²	19.93 ⁶³	29.893 ³³⁷	41.60 ⁵⁹	42.971 ²⁹¹	25.83 ⁶²
20.7	56.645 ³¹⁶	29.88 ¹¹²	58.810 ²⁸⁹	20.96 ¹⁰⁸	30.229 ³³⁶	41.04 ⁵⁶	43.262 ²⁹¹	26.85 ¹⁰²
30.7	56.951 ³⁰⁶	31.49 ¹⁶¹	59.094 ²⁸⁴	22.35 ¹³⁹	30.560 ³³¹	40.53 ⁵¹	43.547 ²⁸⁵	28.21 ¹³⁶
May 10.7	57.242 ²⁹¹	33.52 ²⁰⁸	59.366 ²⁷²	24.07 ¹⁷²	30.881 ³²¹	40.09 ⁴⁴	43.822 ²⁷⁵	29.90 ¹⁶⁹
20.6	57.511 ²⁶⁹	35.91 ²³⁹	59.620 ²⁵⁴	26.03 ¹⁹⁶	31.184 ³⁰³	39.73 ³⁶	44.080 ²⁵⁸	31.82 ¹⁹²
30.6	57.751 ²⁴⁰	38.59 ²⁶⁸	59.852 ²³²	28.19 ²¹⁶	31.465 ²⁸¹	39.49 ²⁴	44.317 ²³⁷	33.94 ²¹²
June 9.6	57.957 ²⁰⁶	41.45 ²⁸⁶	60.056 ²⁰⁴	30.46 ²²⁷	31.716 ²⁵¹	39.36 ¹³	44.525 ²⁰⁸	36.17 ²²³
19.5	58.123 ¹⁶⁶	44.42 ²⁹⁷	60.226 ¹⁷⁰	32.78 ²³²	31.932 ²¹⁶	39.36 ⁰	44.701 ¹⁷⁶	38.44 ²²⁷
29.5	58.247 ¹²⁴	47.42 ³⁰⁰	60.360 ¹³⁴	35.10 ²³²	32.108 ¹⁷⁶	39.48 ¹²	44.841 ¹⁴⁰	40.71 ²²⁷
July 9.5	58.324 ⁷⁷	50.38 ²⁹⁶	60.453 ⁹³	37.34 ²²⁴	32.239 ¹³¹	39.74 ²⁶	44.940 ⁹⁹	42.91 ²²⁰
19.5	58.353 ²⁰	53.22 ²⁸⁴	60.503 ⁵⁰	39.45 ²¹¹	32.322 ⁸³	40.10 ³⁶	44.996 ⁵⁶	44.99 ²⁰⁸
29.4	58.534 ¹⁹	55.88 ²⁶⁶	60.509 ⁶	41.41 ¹⁹⁶	32.354 ³²	40.54 ⁴⁴	45.009 ¹³	46.91 ¹⁹²
Aug. 8.4	58.268 ⁶⁶	58.31 ²⁴³	60.473 ³⁶	43.17 ¹⁷⁶	32.337 ¹⁷	41.04 ⁵⁰	44.978 ³¹	48.63 ¹⁷²
18.4	58.157 ¹¹¹	60.44 ²¹³	60.395 ⁷⁸	44.68 ¹⁵¹	32.272 ⁶⁵	41.56 ⁵²	44.906 ⁷²	50.13 ¹⁵⁰
28.4	58.006 ¹⁵¹	62.26 ¹⁸²	60.280 ¹¹⁵	45.94 ¹²⁶	32.163 ¹⁰⁹	42.08 ⁵²	44.796 ¹¹⁰	51.37 ¹²⁴
Sept. 7.3	57.822 ¹⁸⁴	63.71 ¹⁴⁵	60.135 ¹⁴⁵	46.93 ⁹⁹	32.018 ¹⁴⁵	42.55 ⁴⁷	44.656 ¹⁴⁰	52.35 ⁹⁸
17.3	57.611 ²¹¹	64.78 ¹⁰⁷	59.964 ¹⁷¹	47.62 ⁶⁹	31.842 ¹⁷⁶	42.95 ⁴⁰	44.490 ¹⁶⁶	53.05 ⁷⁰
27.3	57.384 ²²⁷	65.42 ⁶⁴	59.779 ¹⁸⁵	48.03 ⁴¹	31.648 ¹⁹⁴	43.25 ³⁰	44.308 ¹⁸²	53.46 ⁴¹
Oct. 7.2	57.149 ²³⁵	65.65 ²³	59.587 ¹⁹²	48.12 ⁹	31.446 ²⁰²	43.42 ¹⁷	44.119 ¹⁸⁹	53.57 ¹¹
17.2	56.917 ²³²	65.44 ²¹	59.397 ¹⁹⁰	47.91 ²¹	31.247 ¹⁹⁹	43.45 ³	43.931 ¹⁸⁸	53.39 ¹⁸
27.2	56.698 ²¹⁹	64.80 ⁶⁴	59.220 ¹⁷⁷	47.40 ⁵¹	31.062 ¹⁸⁵	43.34 ¹¹	43.755 ¹⁷⁶	52.92 ⁴⁷
Nov. 6.2	56.501 ¹⁹⁷	63.72 ¹⁰⁶	59.066 ¹⁵⁴	46.57 ⁸³	30.904 ¹⁵⁸	43.09 ²⁵	43.601 ¹⁵⁴	52.14 ⁷⁸
16.1	56.335 ¹⁶⁶	62.25 ¹⁴⁷	58.940 ¹²⁶	45.46 ¹¹¹	30.779 ¹²⁵	42.73 ³⁶	43.474 ¹²⁷	51.09 ¹⁰⁶
26.1	56.207 ¹²⁸	60.37 ¹⁸⁸	58.849 ⁹¹	44.08 ¹³⁸	30.697 ⁸²	42.27 ⁴⁶	43.381 ⁹³	49.77 ¹³²
Dec. 6.1	56.121 ⁸⁶	58.16 ²²¹	58.798 ⁵¹	42.45 ¹⁶³	30.662 ³⁵	41.74 ⁵³	43.328 ⁵³	48.22 ¹⁵⁵
16.1	56.083 ³⁸	55.67 ²⁴⁹	58.791 ⁷	40.63 ¹⁸²	30.676 ¹⁴	41.16 ⁵⁸	43.317 ¹¹	46.47 ¹⁷⁵
26.0	56.093 ¹⁰	52.97 ²⁷⁰	58.826 ³⁵	38.66 ¹⁹⁷	30.740 ⁶⁴	40.56 ⁶⁰	43.348 ³¹	44.57 ¹⁹⁰
36.0	56.151 ⁵⁸	50.15 ²⁸²	58.903 ⁷⁷	36.60 ²⁰⁶	30.851 ¹¹¹	39.95 ⁶¹	43.421 ⁷³	42.59 ¹⁹⁸
Mean Place	54.785	39.40	56.746	26.25	27.519	50.36	41.211	31.58
Sec δ, Tan δ	1.187	+0.639	1.035	+0.267	1.155	-0.577	1.023	+0.245
D _α , D _β	+0.04	-0.01	+0.05	0.00	+0.08	+0.01	+0.05	0.00
D _γ , D _δ	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	λ Aquilæ. Mag. 3.6		α Coronæ Australis, Mag. 4.1		ι Lyre. Mag. 5.1		π Sagittarii. Mag. 3.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 19 1	° ' " - 5 0	h m 19 3	° ' " -38 1	h m 19 4	° ' " +35 58	h m 19 4	° ' " -21 9
	s	"	s	"	s	"	s	"
Jan. 1.0	56.731	14.27	57.336	53.04	23.804	26.00	56.582	9.61
11.0	56.846 ¹¹⁵	15.20 ⁹³	57.481 ¹⁴⁵	51.90 ¹¹⁴	23.880 ⁷⁶	23.08 ²⁹²	56.707 ¹²⁵	9.52 ⁹
21.0	56.997 ¹⁵¹	16.10 ⁹⁰	57.670 ¹⁸⁰	50.78 ¹¹²	24.003 ¹²³	20.19 ²⁸⁹	56.871 ¹⁶⁴	9.43 ⁹
30.9	57.179 ¹⁸²	16.94 ⁸⁴	57.901 ²³¹	49.69 ¹⁰⁹	24.170 ¹⁶⁷	17.44 ²⁷⁵	57.068 ¹⁹⁷	9.31 ¹¹
Feb. 9.9	57.389 ²¹⁰	17.65 ⁷¹	58.168 ²⁶⁷	48.63 ¹⁰⁶	24.377 ²⁰⁷	14.95 ²⁴⁹	57.294 ²²⁶	9.15 ¹⁶
	232	55	295	99	241	214	232	20
19.9	57.621	18.20	58.463	47.64	24.618	12.81	57.546	8.91
Mar. 1.9	57.874 ²⁵³	18.55 ³⁵	58.782 ³¹⁹	46.70 ⁹⁴	24.889 ²⁷¹	11.11 ¹⁷⁰	57.816 ²⁷⁰	8.61 ²⁸
11.8	58.141 ²⁶⁷	18.66 ¹¹	59.121 ³³⁹	45.82 ⁸⁸	25.183 ²⁹⁴	9.91 ¹²⁰	58.104 ²⁸⁸	8.22 ²⁸
21.8	58.421 ²⁸⁰	18.51 ¹⁵	59.475 ³⁵⁴	45.02 ⁸⁰	25.496 ³¹³	9.26 ⁶⁵	58.405 ³⁰¹	7.73 ⁴⁶
31.8	58.708 ²⁸⁷	18.11 ⁴⁰	59.838 ³⁶³	44.31 ⁷¹	25.819 ³²³	9.19 ⁷	58.714 ³⁰⁹	7.15 ⁵²
	293	65	368	63	329	51	314	60
Apr. 10.7	59.001	17.46	60.206	43.68	26.148	9.70	59.028	6.49
20.7	59.293 ²⁹²	16.59 ⁸⁷	60.575 ³⁶⁹	43.16 ⁵²	26.475 ³²⁷	10.78 ¹⁰⁸	59.343 ³¹⁵	5.75 ⁷⁰
30.7	59.581 ²⁸⁸	15.51 ¹⁰⁸	60.938 ³⁶³	42.77 ³⁹	26.793 ³¹⁸	12.36 ¹⁵⁸	59.654 ³¹¹	4.99 ⁷⁰
May 10.7	59.861 ²⁸⁰	14.30 ¹²¹	61.290 ³⁵²	42.52 ²⁵	27.095 ³⁰²	14.39 ²⁰³	59.956 ³⁰²	4.22 ⁷⁰
20.6	60.125 ²⁶⁴	12.98 ¹³²	61.625 ³³⁵	42.43 ⁹	27.376 ²⁸¹	16.80 ²⁴¹	60.244 ²⁸⁸	3.47 ⁷⁰
	245	139	310	7	251	272	267	80
30.6	60.370	11.59	61.935	42.50	27.627	19.52	60.511	2.78
June 9.6	60.588 ²¹⁸	10.18 ¹⁴¹	62.214 ²⁷⁹	42.75 ²⁵	27.843 ²¹⁶	22.45 ²⁹³	60.752 ²⁴¹	2.16 ⁶⁰
19.6	60.777 ¹⁸⁹	8.80 ¹³⁸	62.454 ²⁴⁰	43.16 ⁴¹	28.020 ¹⁷⁷	25.53 ³⁰⁸	60.961 ²⁰⁹	1.64 ⁶⁰
29.5	60.929 ¹⁵²	7.49 ¹³¹	62.650 ¹⁹⁶	43.72 ⁵⁶	28.152 ¹³²	28.65 ³¹²	61.131 ¹⁷⁰	1.22 ⁶⁰
July 9.5	61.042 ¹¹³	6.27 ¹²²	62.797 ¹⁴⁷	44.43 ⁷¹	28.236 ⁸⁴	31.72 ³⁰⁷	61.261 ¹³⁰	0.93 ²⁰
	71	110	94	81	34	298	84	10
19.5	61.113	5.17	62.891	45.24	28.270	34.70	61.345	0.77
29.4	61.140 ²⁷	4.21 ⁹⁶	62.931 ⁴⁰	46.14 ⁹⁰	28.253 ¹⁷	37.52 ²⁸²	61.382 ³⁷	0.71 ⁻
Aug. 8.4	61.124 ¹⁶	3.39 ⁸²	62.915 ¹⁶	47.06 ⁹²	28.187 ⁶⁶	40.09 ²⁵⁷	61.373 ⁹	0.74 ⁻
18.4	61.066 ⁵⁸	2.73 ⁶⁶	62.847 ⁶⁸	47.98 ⁹²	28.075 ¹¹²	42.39 ²³⁰	61.318 ⁵⁵	0.85 ¹⁰
28.4	60.972 ⁹⁴	2.22 ⁵¹	62.730 ¹¹⁷	48.85 ⁸⁷	27.921 ¹⁵⁴	44.35 ¹⁹⁶	61.224 ⁹⁴	1.02 ¹⁰
	128	36	158	77	190	160	131	10
Sept. 7.3	60.844	1.86	62.572	49.62	27.731	45.95	61.093	1.22
17.3	60.692 ¹⁵²	1.64 ²²	62.382 ¹⁹⁰	50.24 ⁶²	27.513 ²¹⁸	47.15 ¹²⁰	60.933 ¹⁶⁰	1.43 ¹⁰
27.3	60.522 ¹⁷⁰	1.54 ¹⁰	62.168 ²¹⁴	50.70 ⁴⁶	27.276 ²³⁷	47.93 ⁷⁸	60.756 ¹⁷⁷	1.62 ¹⁰
Oct. 7.3	60.345 ¹⁷⁷	1.57 ³	61.944 ²²⁴	50.94 ²⁴	27.030 ²⁴⁶	48.26 ³³	60.570 ¹⁸⁶	1.78 ¹⁰
17.2	60.170 ¹⁷⁵	1.73 ¹⁶	61.722 ²²²	50.97 ³	26.785 ²⁴⁵	48.15 ¹¹	60.385 ¹⁸⁵	1.89 ¹⁰
	161	28	207	20	235	57	171	10
27.2	60.009	2.01	61.515	50.77	26.550	47.58	60.214	1.96
Nov. 6.2	59.867 ¹⁴²	2.41 ⁴⁰	61.333 ¹⁸²	50.36 ⁴¹	26.338 ²¹²	46.55 ¹⁰³	60.065 ¹⁴⁹	1.97 ⁻
16.1	59.756 ¹¹¹	2.92 ⁵¹	61.188 ¹⁴⁵	49.76 ⁶⁰	26.154 ¹⁸⁴	45.10 ¹⁴⁵	59.947 ¹¹⁸	1.95 ⁻
26.1	59.679 ⁷⁷	3.55 ⁶³	61.088 ¹⁰⁰	48.97 ⁷⁹	26.008 ¹⁴⁶	43.24 ¹⁸⁶	59.867 ⁸⁰	1.91 ⁻
Dec. 6.1	59.642 ³⁷	4.29 ⁷⁴	61.038 ⁵⁰	48.05 ⁹²	25.906 ¹⁰²	41.01 ²²³	59.829 ³⁸	1.84 ⁻
	5	83	5	102	55	253	7	10
16.1	59.647	5.12	61.043	47.03	25.851	38.48	59.836	1.77
26.0	59.693 ⁴⁶	6.02 ⁹⁰	61.101 ⁵⁸	45.95 ¹⁰⁸	25.845 ⁶	35.72 ²⁷⁶	59.889 ⁵³	1.71 ⁻
36.0	59.781 ⁸⁸	6.96 ⁹⁴	61.211 ¹¹⁰	44.83 ¹¹²	25.888 ⁴³	32.82 ²⁹⁰	59.985 ⁹⁶	1.64 ⁻
Mean Place	57.018	17.67	57.723	55.54	24.702	20.67	56.850	12.49
Sec δ, Tan δ	1.004	-0.088	1.270	-0.782	1.236	+0.726	1.072	-0.387
Dψα, Dωα	+0.06	0.00	+0.08	+0.01	+0.04	-0.01	+0.07	+0.01
Dψδ, Dωδ	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

APPARENT PLACES OF STARS, 1919.

471

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ψ Sagittarii. Mag. 4.9		δ Draconis. Mag. 3.2		d Sagittarii. Mag. 5.0		θ Lyrae. Mag. 4.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 19 10	° ' -25 23	h m 19 12	° ' +67 30	h m 19 12	° ' -19 5	h m 19 13	° ' +37 59
	s "	"	s "	"	s "	"	s "	"
Jan. 1.0	34.209	48.21	29.12	76.08	53.521	50.46	32.403	25.96
11.0	34.332 ¹²³	47.84 ³⁷	29.10 ²	72.66 ³⁴²	53.636 ¹¹⁵	50.48 ²	32.466 ⁶³	23.01 ²⁹⁵
21.0	34.495 ¹⁶³	47.45 ³⁰	29.19 ⁹	69.21 ³⁴⁵	53.789 ¹⁵³	50.49 ¹	32.578 ¹¹²	20.06 ²⁹⁵
30.9	34.693 ¹⁹⁶	47.05 ⁴⁰	29.38 ¹⁹	65.87 ³²⁴	53.975 ¹⁸⁶	50.45 ⁴	32.735 ¹⁵⁷	17.24 ²⁸²
Feb. 9.9	34.921 ²³⁸	46.63 ⁴²	29.68 ³⁰	62.79 ³⁰⁸	54.192 ²¹⁷	50.36 ⁹	32.934 ¹⁹⁹	14.66 ²⁵⁸
19.9	35.176 ²⁵⁵	46.17 ⁴⁶	30.08 ⁴⁰	60.05 ²⁷⁴	54.432 ²⁴⁰	50.19 ¹⁷	33.169 ²³⁵	12.43 ²²³
Mar. 1.9	35.452 ²⁷⁶	45.66 ⁵¹	30.54 ⁴⁶	57.78 ²²⁷	54.695 ²⁶³	49.92 ²⁷	33.438 ²⁶⁰	10.62 ¹⁸¹
11.8	35.745 ²⁹³	45.10 ⁵⁶	31.07 ⁵³	56.07 ¹⁷¹	54.974 ²⁷⁹	49.54 ³⁸	33.733 ²⁹⁵	9.32 ¹³⁰
21.8	36.053 ³⁰⁸	44.49 ⁶¹	31.64 ⁵⁷	54.96 ¹¹¹	55.266 ²⁹²	49.05 ⁴⁹	34.047 ³¹⁴	8.58 ⁷⁴
31.8	36.370 ³¹⁷	43.82 ⁶⁷	32.25 ⁶¹	54.53 ⁴³	55.570 ³⁰⁴	48.44 ⁶¹	34.376 ³²⁹	8.42 ¹⁶
Apr. 10.7	36.694 ³²⁴	43.11 ⁷¹	32.86 ⁶¹	54.74 ²¹	55.879 ³⁰⁹	47.72 ⁷²	34.711 ³³⁵	8.86 ⁴⁴
20.7	37.019 ³²⁵	42.39 ⁷²	33.45 ⁵⁹	55.62 ⁸⁸	56.190 ³¹¹	46.92 ⁸⁰	35.047 ³³⁶	9.86 ¹⁰⁰
30.7	37.341 ³²²	41.67 ⁷²	34.05 ⁶⁰	57.10 ¹⁴⁸	56.499 ³⁰⁰	46.07 ⁸⁵	35.375 ³²⁸	11.38 ¹⁵²
May 10.7	37.655 ³¹⁴	41.00 ⁶⁷	34.59 ⁵⁴	59.13 ²⁰³	56.798 ²⁹⁹	45.20 ⁸⁷	35.688 ³¹³	13.38 ²⁰⁰
20.6	37.954 ²⁹⁹	40.37 ⁶³	35.08 ⁴⁹	61.64 ²⁵¹	57.086 ²⁸⁸	44.32 ⁸⁸	35.980 ²⁹²	15.78 ²⁴⁰
30.6	38.233 ²⁷⁹	39.82 ⁵⁸	35.48 ⁴⁰	64.56 ²⁹²	57.356 ²⁷⁰	43.48 ⁸⁴	36.243 ²⁶³	18.50 ²⁷²
June 9.6	38.485 ²⁶²	39.38 ⁴⁴	35.81 ³³	67.78 ³²²	57.599 ²⁴³	42.71 ⁷⁷	36.471 ²²⁸	21.45 ²⁹⁵
19.6	38.705 ²³⁰	39.06 ³²	36.06 ²⁶	71.21 ³⁴³	57.811 ²¹²	42.05 ⁶⁶	36.659 ¹⁸⁸	24.57 ³¹²
29.5	38.887 ¹⁸²	38.87 ¹⁹	36.21 ¹⁵	74.78 ³⁵⁷	57.987 ¹⁷⁶	41.48 ⁵⁷	36.799 ¹⁴⁰	27.75 ³¹⁸
July 9.5	39.027 ¹⁴⁰	38.81 ⁶	36.26 ⁵	78.38 ³⁶⁰	58.122 ¹³⁵	41.05 ⁴³	36.890 ⁹¹	30.92 ³¹⁷
19.5	39.118 ⁹¹	38.87 ⁶	36.20 ⁶	81.90 ³⁵²	58.213 ⁹¹	40.74 ³¹	36.932 ⁴²	34.00 ³⁰⁶
29.4	39.162 ⁴⁴	39.05 ¹⁸	36.05 ¹⁵	85.31 ³⁴¹	58.257 ⁴⁴	40.56 ¹⁸	36.921 ¹¹	36.92 ²⁹²
Aug. 8.4	39.159 ³	39.32 ²⁷	35.81 ²⁴	88.50 ³¹⁹	58.255 ²	40.48 ⁸	36.860 ⁶¹	39.63 ²⁷¹
18.4	39.109 ⁵⁰	39.65 ³³	35.48 ²³	91.39 ²⁸⁹	58.209 ⁴⁶	40.50 ²	36.751 ¹⁰⁹	42.04 ²⁴¹
28.4	39.016 ⁹³	40.02 ³⁷	35.07 ⁴¹	93.95 ²⁵⁶	58.121 ⁸⁸	40.59 ⁹	36.597 ¹⁵⁴	44.13 ²⁰⁰
Sept. 7.3	38.884 ¹³²	40.39 ³⁷	34.59 ⁴⁸	96.11 ²¹⁶	57.996 ¹²⁵	40.73 ¹⁴	36.407 ¹⁹⁰	45.86 ¹⁷³
17.3	38.723 ¹⁶¹	40.73 ³⁴	34.06 ⁵³	97.83 ¹⁷²	57.843 ¹⁵³	40.91 ¹⁸	36.186 ²²¹	47.19 ¹³³
27.3	38.542 ¹⁸¹	41.02 ²⁹	33.49 ⁵⁷	99.06 ¹²³	57.670 ¹⁷³	41.10 ¹⁹	35.945 ²⁴¹	48.09 ⁹⁰
Oct. 7.3	38.350 ¹⁹²	41.23 ²¹	32.90 ⁵⁹	99.78 ⁷²	57.487 ¹⁸³	41.27 ¹⁷	35.693 ²⁵²	48.55 ⁴⁶
17.2	38.159 ¹⁹¹	41.36 ¹³	32.30 ⁶⁰	99.97 ¹⁹	57.305 ¹⁸²	41.42 ¹⁵	35.439 ²⁵⁴	48.53 ²
27.2	37.979 ¹⁸⁰	41.39 ³	31.71 ⁵⁹	99.60 ³⁷	57.134 ¹⁷¹	41.54 ¹²	35.195 ²⁴⁴	48.06 ⁴⁷
Nov. 6.2	37.823 ¹⁵⁶	41.33 ⁶	31.15 ⁵⁶	98.68 ⁹²	56.983 ¹⁵¹	41.63 ⁹	34.970 ²²⁵	47.12 ⁹⁴
16.1	37.698 ¹²⁵	41.18 ¹⁵	30.64 ⁵¹	97.21 ¹⁴⁷	56.862 ¹²¹	41.70 ⁷	34.774 ¹⁹⁶	45.73 ¹³⁰
26.1	37.610 ⁸⁸	40.95 ²³	30.19 ⁴⁵	95.24 ¹⁹⁷	56.778 ⁸⁴	41.75 ⁵	34.615 ¹⁵⁹	43.91 ¹⁸²
Dec. 6.1	37.566 ⁴⁴	40.68 ²⁷	29.81 ³⁸	92.80 ²⁴⁴	56.733 ⁴⁵	41.79 ⁴	34.498 ¹¹⁷	41.71 ²²⁰
16.1	37.568 ²	40.37 ⁸¹	29.52 ²⁹	89.97 ²⁸³	56.733 ⁰	41.83 ⁴	34.427 ⁷¹	39.18 ²⁵³
26.0	37.617 ⁴⁹	40.04 ³³	29.34 ¹⁸	86.81 ³¹⁶	56.776 ⁴³	41.87 ⁴	34.407 ²⁰	36.42 ²⁷⁶
36.0	37.710 ⁹³	39.70 ³⁴	29.25 ⁹	83.44 ³³⁷	56.863 ⁸⁷	41.91 ⁴	34.436 ²⁹	33.49 ²⁹³
Mean Place	34.489	50.89	32.458	68.50	53.780	53.38	33.349	19.84
Sec δ , Tan δ	1.107	-0.475	2.616	+2.417	1.058	-0.346	1.269	+0.781
D_{ψ} , D_{δ}	+0.07	+0.01	0.00	-0.05	+0.07	+0.01	+0.04	-0.02
D_{ψ} , D_{δ}	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-0.8

APPARENT PLACES OF STARS, 1910.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Aquilæ. Mag. 5.1		κ Cygni. Mag. 4.0		τ Draconis. Mag. 4.6		δ Aquilæ. Mag. 3.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 19 14	° ' +11 26	h m 19 15	° ' +53 12	h m 19 17	° ' +73 12	h m 19 21	° ' + 2 57
	s	"	s	"	s	"	s	"
Jan. 1.0	0.462	58.77 183	12.227	73.81 330	2.50	23.13 330	24.551	12.54 123
11.0	0.552 90	56.94 183	12.260 83	70.51 330	2.42 8	24.74 330	24.641 90	11.21 123
21.0	0.680 128	55.14 180	12.361 101	67.20 331	2.48 6	21.81 332	24.768 127	9.90 123
30.9	0.841 161	53.45 169	12.524 168	64.00 330	2.70 23	17.96 335	24.827 189	8.68 123
Feb. 9.9	1.031 190	51.93 183	12.747 223	61.05 305	3.05 35	14.85 311	25.114 187	7.59 123
	217	137	276	289	47	279	214	214
19.9	1.248	50.66 96	13.023	58.46 213	3.52	12.06 223	25.228 236	6.71 6
Mar. 1.9	1.488 240	49.70 80	13.346 323	56.33 159	4.10 58	9.74 189	25.584 286	6.10 6
11.8	1.746 268	49.10 80	13.707 361	54.74 96	4.77 67	7.94 189	25.819 286	5.78 6
21.8	2.018 272	48.90 20	14.098 361	53.76 86	5.50 73	6.75 119	26.087 286	5.77 1
31.8	2.301 283	49.10 20	14.506 408	53.42 34	6.29 79	6.20 85	26.367 280	6.10 1
	289	61	418	29	79	13	286	286
Apr. 10.8	2.590	49.71 98	14.924	53.71 94	7.08 78	6.32 77	26.655 283	6.78 1
20.7	2.882 292	50.69 98	15.339 415	54.65 94	7.86 74	7.09 77	26.947 283	7.72 123
30.7	3.170 288	52.02 123	15.742 403	56.17 182	8.60 74	8.48 189	27.237 280	8.95 123
May 10.7	3.450 280	53.65 163	16.124 382	58.22 305	9.29 69	10.41 198	27.520 283	10.49 123
20.6	3.714 284	55.50 185	16.472 348	60.74 282	9.91 63	12.84 243	27.791 271	12.04 123
	246	205	308	285	82	284	261	261
30.6	3.960	57.55 215	16.780	63.62 319	10.43 42	15.68 317	28.042 229	13.79 123
June 9.6	4.178 218	59.70 220	17.039 250	66.81 319	10.85 29	18.85 330	28.271 199	15.61 123
19.6	4.367 199	61.90 220	17.243 204	70.18 337	11.14 17	22.24 330	28.470 163	17.44 123
29.5	4.519 152	64.09 219	17.386 143	73.67 349	11.31 17	25.78 354	28.633 163	19.23 123
July 9.5	4.631 112	66.21 212	17.466 80	77.17 350	11.35 4	29.36 358	28.759 126	20.95 123
	70	201	15	343	9	353	83	83
19.5	4.701 26	68.22 186	17.481 53	80.60 329	11.26 22	32.89 342	28.842 40	22.53 123
29.5	4.727 18	70.08 166	17.428 115	83.89 306	11.04 34	36.31 323	28.882 4	23.98 123
Aug. 8.4	4.709 60	71.74 145	17.313 174	86.95 278	10.70 45	39.54 295	28.878 44	25.26 123
18.4	4.649 97	73.19 121	17.139 229	89.73 244	10.25 56	42.49 263	28.834 85	26.33 123
28.4	4.552 131	74.40 96	16.910 276	92.17 204	9.69 65	45.12 234	28.749 119	27.22 123
Sept. 7.3	4.421 157	75.36 70	16.634 313	94.21 161	9.04 72	47.36 182	28.630 145	27.90 123
17.3	4.264 175	76.06 43	16.321 339	95.82 113	8.32 77	49.18 134	28.485 166	28.39 123
27.3	4.089 185	76.49 15	15.982 355	96.95 64	7.55 80	50.52 83	28.319 175	28.65 123
Oct. 7.3	3.904 184	76.64 12	15.627 357	97.59 11	6.75 81	51.35 30	28.144 176	28.73 123
17.2	3.720 174	76.52 40	15.270 348	97.70 41	5.94 81	51.65 25	27.968 167	28.60 123
27.2	3.546 156	76.12 68	14.922 327	97.29 95	5.13 77	51.40 80	27.801 150	28.27 123
Nov. 6.2	3.390 129	75.44 93	14.595 283	96.34 146	4.36 71	50.60 134	27.651 123	27.76 123
16.2	3.261 97	74.51 119	14.302 251	94.88 195	3.65 63	49.26 187	27.528 93	27.05 123
26.1	3.164 59	73.32 140	14.051 199	92.93 239	3.02 55	47.39 234	27.435 56	26.18 123
Dec. 6.1	3.105 19	71.92 160	13.852 139	90.54 276	2.47 43	45.05 277	27.379 16	25.14 123
16.1	3.086 22	70.32 174	13.713 77	87.78 307	2.04 30	42.28 300	27.363 24	23.95 123
26.0	3.108 62	68.58 182	13.636 10	84.71 326	1.74 17	39.19 332	27.387 63	22.67 123
36.0	3.170	66.76	13.626	81.45	1.57	35.87	27.450	21.33 123
Mean Place	0.868	54.23	13.906	66.67	7.262	19.82	24.869	8.31
Sec δ, Tan δ	1.020	+0.203	1.670	+1.338	3.462	+3.314	1.001	+0.052
D _α , D _κ	+0.06	0.00	+0.03	-0.03	-0.02	-0.07	+0.06	0.00
D _τ , D _δ	+0.1	-0.9	+0.1	-0.9	+0.1	-0.9	+0.1	-0.9

APPARENT PLACES OF STARS, 1919.

473

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Cygni. Mag. 3.2		ϵ Cygni. Mag. 3.9		μ Aquilæ. Mag. 4.6		λ Sagittarii. Mag. 4.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 19 27	° ' +27 47	h m 19 27	° ' +51 33	h m 19 30	° ' + 7 12	h m 19 31	° ' -25 3
	s 19 27	" +27 47	s 19 27	" +51 33	s 19 30	" + 7 12	s 19 31	" -25 3
Jan. 1.0	26.624	25.70	38.342	32.31	7.637	26.99	46.495	46.23
11.0	26.685 61	23.16 254	38.360 18	29.08 323	7.715 78	25.43 166	46.595 100	45.83 40
21.0	26.787 102	20.61 255	38.442 82	25.81 327	7.830 115	23.90 153	46.733 138	45.39 44
31.0	26.928 141	18.17 244	38.586 144	22.63 318	7.977 147	22.45 145	46.909 176	44.92 47
Feb. 9.9	27.107 179	15.92 225	38.787 201	19.68 295	8.156 179	21.15 130	47.116 207	44.40 52
	212	195	254	263	205	106	234	57
19.9	27.319	13.97	39.041	17.05	8.361	20.09	47.350	43.83
Mar. 1.9	27.558 230	12.41 156	39.341 300	14.86 219	8.589 228	19.30 79	47.610 260	43.20 63
11.8	27.822 264	11.29 112	39.681 340	13.19 167	8.838 249	18.82 48	47.889 279	42.48 72
21.8	28.106 284	10.66 63	40.051 370	12.10 109	9.103 265	18.70 12	48.184 295	41.72 76
31.8	28.404 298	10.56 10	40.444 393	11.66 44	9.381 278	18.95 25	48.495 311	40.90 82
	308	42	403	18	286	61	319	87
Apr. 10.8	28.712	10.98	40.847	11.84	9.667	19.56	48.814	40.03
20.7	29.023 311	11.93 95	41.253 406	12.64 80	9.958 291	20.51 95	49.139 325	39.14 89
30.7	29.332 309	13.33 140	41.650 397	14.05 141	10.249 291	21.78 127	49.465 326	38.25 89
May 10.7	29.630 298	15.16 183	42.030 380	16.00 195	10.535 286	23.32 164	49.785 320	37.40 85
20.7	29.914 284	17.35 219	42.383 353	18.41 241	10.809 274	25.07 175	50.094 309	36.61 79
	261	248	314	280	255	190	293	69
30.6	30.175	19.83	42.697	21.21	11.064	26.97	50.387	35.92
June 9.6	30.408 233	22.51 268	42.967 270	24.33 312	11.297 233	28.97 200	50.654 267	35.34 58
19.6	30.605 197	25.32 281	43.186 219	27.66 333	11.500 203	31.00 203	50.892 238	34.89 45
29.5	30.764 159	28.19 287	43.348 162	31.11 345	11.669 169	33.02 202	51.092 200	34.59 30
July 9.5	30.879 115	31.05 286	43.448 100	34.60 349	11.799 130	34.97 195	51.251 159	34.44 15
	69	278	37	345	89	184	113	0
19.5	30.948	33.83	43.485	38.05	11.888	36.81	51.364	34.44
29.5	30.969 21	36.44 261	43.459 26	41.37 332	11.934 46	38.49 168	51.429 65	34.57 13
Aug. 8.4	30.943 26	38.87 243	43.369 90	44.49 312	11.935 1	40.00 151	51.445 16	34.82 25
18.4	30.872 71	41.04 217	43.221 148	47.34 285	11.893 42	41.31 131	51.413 32	35.16 34
28.4	30.759 113	42.94 190	43.019 202	49.87 253	11.812 81	42.39 108	51.336 77	35.55 39
	150	156	251	215	116	86	117	43
Sept. 7.4	30.609	44.50	42.768	52.02	11.696	43.25	51.219	35.98
17.3	30.431 178	45.71 121	42.481 287	53.74 172	11.552 144	43.87 62	51.071 148	36.40 42
27.3	30.232 199	46.55 84	42.164 317	55.01 127	11.387 165	44.26 39	50.897 174	36.78 38
Oct. 7.3	30.019 213	47.01 46	41.830 334	55.79 78	11.211 176	44.40 14	50.711 186	37.10 32
17.2	29.804 215	47.06 5	41.491 339	56.06 27	11.033 178	44.31 9	50.521 190	37.33 23
	207	36	334	26	171	33	182	14
27.2	29.597	46.70	41.157	55.80	10.862	43.98	50.339	37.47
Nov. 6.2	29.405 192	45.95 75	40.843 314	55.02 78	10.707 155	43.44 54	50.175 164	37.52 5
16.2	29.239 166	44.79 116	40.557 286	53.71 131	10.575 132	42.65 79	50.038 137	37.47 5
26.1	29.104 135	43.27 152	40.311 246	51.91 180	10.475 100	41.67 98	49.937 101	37.33 14
Dec. 6.1	29.006 98	41.42 185	40.112 199	49.67 224	10.410 65	40.48 119	49.875 62	37.10 23
	56	215	144	265	27	135	18	27
16.1	28.950	39.27	39.968	47.02	10.383	39.13	49.857	36.83
26.1	28.937 13	36.91 236	39.883 85	44.06 296	10.396 13	37.66 147	49.884 27	36.51 32
36.0	28.968 31	34.38 253	39.860 23	40.89 317	10.448 52	36.11 155	49.953 69	36.15 36
Mean Place	27.264	19.31	39.862	24.13	7.976	22.16	46.764	48.62
Sec δ , Tan δ	1.130	+0.527	1.609	+1.260	1.008	+0.126	1.104	-0.468
D_{δ}^{α} , D_{α}^{δ}	+0.05	-0.01	+0.03	-0.03	+0.06	0.00	+0.07	+0.01
D_{δ}^{δ} , D_{α}^{α}	+0.1	-0.9	+0.1	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	κ Aquilæ. Mag. 5.0		θ Cygni. Mag. 4.6		δ Sagittarii. Mag. 5.4		β Sagittæ. Mag. 4.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 19 32	° ' " - 7 12	h m 19 34	° ' " +50 1	h m 19 36	° ' " -16 28	h m 19 37	° ' " +17 17
	s	"	s	"	s	"	s	"
Jan. 1.0	31.844	26.70	14.779	67.23	4.804	45.14	24.194	21.14
11.0	31.931	27.39	14.792	64.06	4.893	45.26	24.256	19.10
21.0	32.053	28.07	14.866	60.84	5.020	45.35	24.356	17.06
31.0	32.209	28.68	14.999	57.69	5.181	45.39	24.491	15.10
Feb. 9.9	32.393	29.18	15.188	54.75	5.371	45.35	24.659	13.31
19.9	32.604	29.53	15.429	52.13	5.589	45.20	24.857	11.78
Mar. 1.9	32.837	29.68	15.715	49.93	5.829	44.92	25.081	10.58
11.8	33.090	29.63	16.040	48.23	6.091	44.51	25.327	9.75
21.8	33.358	29.34	16.396	47.12	6.368	43.95	25.593	9.35
31.8	33.639	28.82	16.775	46.63	6.659	43.24	25.874	9.40
Apr. 10.8	33.930	28.07	17.167	46.75	6.961	42.41	26.165	9.88
20.7	34.225	27.13	17.563	47.51	7.268	41.47	26.461	10.80
30.7	34.521	25.99	17.954	48.86	7.577	40.44	26.758	12.13
May 10.7	34.813	24.73	18.329	50.76	7.880	39.36	27.049	13.81
20.7	35.095	23.38	18.678	53.11	8.175	38.27	27.328	15.78
30.6	35.359	21.97	18.994	55.87	8.454	37.20	27.589	17.98
June 9.6	35.603	20.56	19.267	58.95	8.710	36.19	27.826	20.34
19.6	35.817	19.19	19.492	62.25	8.938	35.27	28.032	22.80
29.5	35.998	17.89	19.662	65.68	9.131	34.47	28.202	25.28
July 9.5	36.142	16.71	19.774	69.15	9.285	33.81	28.333	27.73
19.5	36.243	15.66	19.823	72.59	9.395	33.29	28.421	30.08
29.5	36.300	14.75	19.811	75.92	9.460	32.91	28.464	32.29
Aug. 8.4	36.311	14.00	19.737	79.04	9.479	32.68	28.463	34.31
18.4	36.280	13.40	19.606	81.93	9.452	32.57	28.417	36.11
28.4	36.207	12.96	19.421	84.48	9.382	32.56	28.330	37.65
Sept. 7.4	36.098	12.67	19.189	86.67	9.275	32.65	28.207	38.91
17.3	35.961	12.51	18.918	88.45	9.137	32.81	28.056	39.89
27.3	35.801	12.46	18.618	89.78	8.975	32.99	27.882	40.55
Oct. 7.3	35.630	12.53	18.300	90.63	8.800	33.21	27.695	40.89
17.2	35.457	12.70	17.976	90.97	8.621	33.44	27.505	40.92
27.2	35.291	12.97	17.656	90.79	8.449	33.66	27.320	40.62
Nov. 6.2	35.140	13.32	17.354	90.09	8.295	33.87	27.151	40.01
16.2	35.014	13.76	17.077	88.87	8.165	34.07	27.004	39.09
26.1	34.919	14.27	16.837	87.16	8.066	34.26	26.886	37.86
Dec. 6.1	34.860	14.86	16.643	84.99	8.005	34.45	26.803	36.37
16.1	34.841	15.51	16.501	82.43	7.985	34.63	26.757	34.64
26.1	34.861	16.22	16.414	79.55	8.006	34.80	26.752	32.74
36.0	34.920	16.95	16.388	76.44	8.068	34.96	26.787	30.71
Mean Place	32.095	30.39	16.181	58.58	5.044	48.10	24.631	15.13
Sec δ , Tan δ	1.008	-0.126	1.557	+1.194	1.043	-0.296	1.047	+0.311
$D\psi\alpha$, $D\omega\alpha$	+0.06	0.00	+0.03	-0.03	+0.07	+0.01	+0.05	-0.01
$D\psi\delta$, $D\omega\delta$	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

APPARENT PLACES OF STARS, 1919.

475

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	15 Cygni. Mag. 5.0		f Sagittarii. Mag. 5.1		γ Aquilae. Mag. 2.8		δ Cygni. Mag. 3.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 19 41	° ' +37 9	h m 19 41	° ' -19 57	h m 19 42	° ' +10 24	h m 19 42	° ' +44 55
	s	"	s	"	s	"	s	"
Jan. 1.0	20.525	37.37	38.058	21.90	24.174	59.33	25.532	65.57
11.0	20.557 ³²	34.55 ²⁸²	38.143 ⁸⁵	21.80 ¹⁰	24.237 ⁶³	57.64 ¹⁰⁰	25.547 ¹⁵	62.53 ³⁰⁴
21.0	20.636 ⁷⁹	31.70 ²⁸⁵	38.267 ¹²⁴	21.66 ¹⁴	24.336 ⁹⁹	55.97 ¹⁶⁷	25.616 ⁶⁹	59.44 ³⁰⁹
31.0	20.761 ¹²⁶	28.91 ²⁷⁹	38.425 ¹⁶⁸	21.45 ²¹	24.470 ¹³⁴	54.38 ¹⁵⁹	25.738 ¹²²	56.42 ³⁰²
Feb. 9.9	20.929 ¹⁶⁸	26.32 ²⁶⁹	38.614 ¹⁸⁹	21.18 ²⁷	24.636 ¹⁶⁶	52.94 ¹⁴⁴	25.910 ¹⁷²	53.58 ²⁸⁴
	207	281	217	36	193	121	218	254
19.9	21.136	24.01	38.831	20.82	24.829	51.73	26.128	51.04
Mar. 1.9	21.377 ²⁴¹	22.09 ¹⁹²	39.072 ²⁴¹	20.37 ⁴⁵	25.048 ²¹⁹	50.80 ⁹³	26.388 ²⁶⁰	48.90 ²¹⁴
11.9	21.649 ²⁷²	20.64 ¹⁴⁵	39.335 ²⁶³	19.80 ⁵⁷	25.289 ²⁴¹	50.22 ⁵⁸	26.684 ²⁹⁶	47.25 ¹⁶⁵
21.8	21.947 ²⁹⁸	19.73 ⁹¹	39.614 ²⁷⁹	19.10 ⁷⁰	25.549 ²⁶⁰	50.01 ²¹	27.008 ³²⁴	46.15 ¹¹⁰
31.8	22.264 ³¹⁷	19.37 ³⁶	39.908 ³⁰⁴	18.30 ⁸⁰	25.823 ²⁷⁴	50.19 ¹⁸	27.356 ³⁴⁸	45.65 ⁵⁰
	330	21	307	99	286	57	362	11
Apr. 10.8	22.594	19.58	40.215	17.41	26.109	50.76	27.718	45.76
20.7	22.929 ³³⁵	20.36 ⁷⁸	40.527 ³¹²	16.44 ⁹⁷	26.401 ²⁶²	51.69 ⁹³	28.085 ³⁶⁷	46.47 ⁷¹
30.7	23.264 ³³⁵	21.69 ¹³³	40.842 ³¹⁵	15.42 ¹⁰²	26.695 ²⁹⁴	52.98 ¹²⁹	28.451 ³⁶⁶	47.76 ¹²⁹
May 10.7	23.589 ³²⁵	23.50 ¹⁸¹	41.154 ³¹²	14.38 ¹⁰⁴	26.984 ²⁸⁹	54.56 ¹⁶⁸	28.806 ³⁵⁵	49.58 ¹⁸²
20.7	23.897 ³⁰⁸	25.73 ²³³	41.456 ³⁰²	13.37 ¹⁰¹	27.264 ²⁸⁰	56.38 ¹⁸²	29.139 ³³³	51.86 ²²⁸
	286	280	287	96	263	201	305	267
30.6	24.183	28.33	41.743	12.41	27.527	58.39	29.444	54.53
June 9.6	24.437 ²⁵⁴	31.18 ²⁸⁵	42.007 ²⁶⁴	11.53 ⁸⁸	27.767 ²⁴⁰	60.53 ²¹³	29.714 ²⁷⁰	57.51 ²⁹⁸
19.6	24.653 ²¹⁶	34.24 ³⁰⁶	42.244 ²³⁷	10.77 ⁷⁶	27.978 ²¹¹	62.72 ²¹⁹	29.941 ²²⁷	60.70 ³¹⁹
29.6	24.827 ¹⁷⁴	37.40 ³¹⁶	42.446 ²⁰²	10.14 ⁶³	28.156 ¹⁷⁸	64.91 ²¹⁹	30.119 ¹⁷⁸	64.03 ³³³
July 9.5	24.964 ¹²⁷	40.58 ³¹⁸	42.608 ¹⁶²	9.65 ⁴⁹	28.296 ¹⁴⁰	67.04 ²¹³	30.244 ¹²⁵	67.41 ³³⁸
	77	314	118	33	97	204	69	335
19.5	25.031 ²⁴	43.72	42.726 ⁷²	9.32 ¹⁷	28.393 ⁵³	69.08	30.313 ¹¹	70.76
29.5	25.055 ²⁸	46.72 ³⁰⁰	42.798 ²⁴	9.15 ⁵	28.446 ⁹	70.97 ¹⁸⁹	30.324 ⁴⁶	74.00 ³²⁴
Aug. 8.4	25.027 ⁷⁷	49.54 ²⁸²	42.822 ²²	9.10 ⁷	28.455 ³⁴	72.67 ¹⁷⁰	30.278 ⁹⁹	77.05 ³⁰⁵
18.4	24.950 ¹²⁴	52.12 ²²⁸	42.800 ⁶⁷	9.17 ¹⁷	28.421 ⁷⁵	74.18 ¹²⁷	30.179 ¹⁵¹	79.86 ²⁸¹
28.4	24.826 ¹⁶⁴	54.40 ¹⁹⁴	42.733 ¹⁰⁶	9.34 ²⁵	28.346 ¹¹¹	75.45 ¹⁰³	30.028 ¹⁹⁴	82.36 ²¹⁶
Sept. 7.4	24.662	56.34	42.627	9.59	28.235	76.48	29.834	84.52
17.3	24.464 ¹⁹⁸	57.91 ¹⁵⁷	42.489 ¹³⁸	9.88 ²⁹	28.095 ¹⁴⁰	77.25 ⁷⁷	29.603 ²³¹	86.28 ¹⁷⁶
27.3	24.241 ²²³	59.06 ¹¹⁵	42.326 ¹⁶³	10.18 ³⁰	27.932 ¹⁶³	77.77 ⁵²	29.343 ²⁶⁰	87.60 ¹³²
Oct. 7.3	24.003 ²³⁸	59.79 ⁷⁸	42.149 ¹⁷⁷	10.47 ²⁹	27.757 ¹⁷⁵	78.01 ²⁴	29.065 ²⁷⁸	88.46 ⁸⁶
17.3	23.758 ²⁴⁵	60.06 ²⁷	41.967 ¹⁸²	10.74 ²⁷	27.577 ¹⁸⁰	78.00 ¹	28.780 ²⁸⁵	88.84 ³⁸
	240	19	176	22	175	28	281	12
27.2	23.518	59.87	41.791	10.96	27.402	77.72	28.499	88.72
Nov. 6.2	23.290 ²²⁸	59.22 ⁶⁵	41.631 ¹⁶⁰	11.13 ¹⁷	27.241 ¹⁶¹	77.18 ⁵⁴	28.231 ²⁶⁸	88.10 ⁶²
16.2	23.087 ²⁰³	58.12 ¹¹⁰	41.495 ¹³⁶	11.25 ¹²	27.102 ¹³⁹	76.39 ⁷⁹	27.987 ²⁴⁴	86.98 ¹¹²
26.1	22.915 ¹⁷²	56.58 ¹⁵⁴	41.392 ¹⁰³	11.33 ⁸	26.992 ¹¹⁰	75.36 ¹⁰³	27.777 ²¹⁰	85.38 ¹⁶⁰
Dec. 6.1	22.779 ¹³⁶	54.63 ¹⁹⁵	41.325 ⁶⁷	11.37 ⁴	26.914 ⁷⁸	74.10 ¹²⁶	27.606 ¹⁷¹	83.33 ²⁰⁵
	93	228	26	0	40	143	124	243
16.1	22.686	52.35	41.299	11.37	26.874	72.67	27.482	80.90
26.1	22.639 ⁴⁷	49.77 ²⁵⁸	41.315 ¹⁶	11.34 ³	26.872 ²	71.09 ¹⁵⁸	27.408 ⁷⁴	78.16 ²⁷⁴
36.0	22.639 ⁰	47.00 ²⁷⁷	41.373 ⁵⁸	11.29 ⁵	26.909 ³⁷	69.41 ¹⁶⁸	27.387 ²¹	75.20 ²⁹⁶
Mean Place	21.362	29.24	38.298	24.54	24.521	53.79	26.649	56.65
Sec δ, Tan δ	1.255	+0.758	1.064	-0.363	1.017	+0.184	1.413	+0.998
D ₁ α, D ₂ α	+0.04	-0.02	+0.07	+0.01	+0.06	-0.01	+0.04	-0.03
D ₁ δ, D ₂ δ	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON

Washington Mean Time.	δ Sagittæ. Mag. 3.8		α Aquilæ. (Altair.) Mag. 0.9		γ Aquilæ. Var. 3.7-4.4		ϵ Draconis. Mag. 4.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 19 43	° ' " +18 19	h m 19 46	° ' " + 8 39	h m 19 48	° ' " + 0 47	h m 19 48	° ' " +70 3
	s	"	s	"	s	"	s	"
Jan. 1.0	46.126	67.60	49.553	17.75	20.572	53.28	23.79	53.11
11.0	46.181	65.52	49.617	16.19	20.638	52.14	23.66	49.85
21.0	46.272	63.45	49.718	14.64	20.739	51.03	23.65	46.46
31.0	46.401	61.45	49.851	13.17	20.873	49.99	23.76	43.08
Feb. 9.9	46.564	59.61	50.016	11.85	21.037	49.08	23.98	39.83
19.9	46.755	58.03	50.209	10.76	21.228	48.37	24.33	36.86
Mar. 1.9	46.975	56.78	50.428	9.94	21.445	47.88	24.77	34.28
11.9	47.219	55.91	50.668	9.44	21.683	47.66	25.29	32.18
21.8	47.483	55.45	50.928	9.31	21.939	47.73	25.89	30.64
31.8	47.762	55.46	51.202	9.55	22.210	48.12	26.53	29.74
Apr. 10.8	48.053	55.92	51.487	10.17	22.493	48.82	27.21	29.47
20.7	48.351	56.82	51.780	11.14	22.784	49.79	27.89	29.86
30.7	48.650	58.13	52.074	12.44	23.077	51.02	28.56	30.89
May 10.7	48.944	59.81	52.365	14.03	23.369	52.46	29.21	32.50
20.7	49.228	61.78	52.646	15.84	23.652	54.08	29.80	34.65
30.6	49.493	64.01	52.910	17.81	23.920	55.80	30.32	37.26
June 9.6	49.735	66.40	53.153	19.91	24.167	57.58	30.77	40.26
19.6	49.946	68.89	53.367	22.05	24.387	59.38	31.12	43.54
29.6	50.122	71.42	53.548	24.19	24.576	61.13	31.36	47.04
July 9.5	50.258	73.93	53.691	26.25	24.727	62.79	31.50	50.64
19.5	50.352	76.35	53.792	28.21	24.836	64.33	31.53	54.28
29.5	50.400	78.62	53.850	30.03	24.902	65.73	31.45	57.85
Aug. 8.4	50.402	80.71	53.862	31.65	24.924	66.95	31.27	61.29
18.4	50.361	82.59	53.832	33.08	24.902	67.98	30.97	64.52
28.4	50.278	84.21	53.761	34.28	24.839	68.83	30.58	67.46
Sept. 7.4	50.158	85.55	53.654	35.25	24.740	69.47	30.11	70.06
17.3	50.010	86.58	53.518	35.97	24.609	69.92	29.57	72.28
27.3	49.837	87.31	53.359	36.44	24.457	70.18	28.98	74.04
Oct. 7.3	49.651	87.73	53.186	36.66	24.289	70.26	28.34	75.32
17.3	49.460	87.80	53.010	36.63	24.117	70.15	27.68	76.07
27.2	49.274	87.54	52.838	36.35	23.949	69.88	27.01	76.28
Nov. 6.2	49.101	86.95	52.680	35.84	23.794	69.44	26.36	75.93
16.2	48.951	86.05	52.543	35.09	23.660	68.84	25.75	75.00
26.1	48.829	84.83	52.435	34.12	23.555	68.09	25.18	73.53
Dec. 6.1	48.739	83.35	52.361	32.94	23.483	67.21	24.69	71.54
16.1	48.687	81.61	52.322	31.60	23.447	66.20	24.28	69.07
26.1	48.674	79.69	52.321	30.13	23.448	65.11	23.98	66.23
36.0	48.702	77.63	52.359	28.56	23.488	63.95	23.78	63.06
Mean Place	46.564	61.18	49.878	12.36	20.833	48.58	27.372	41.73
Sec δ , Tan δ	1.054	+0.332	1.012	+0.152	1.000	+0.014	2.933	+2.757
$D\delta\alpha$, $D\omega\alpha$	+0.05	-0.01	+0.06	0.00	+0.06	0.00	0.00	-0.08
$D\delta\delta$, $D\omega\delta$	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

APPARENT PLACES OF STARS, 1919.

477

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Sagittarii. Mag. 4.2			ε Pavonis. Mag. 4.1			β Aquilæ. Mag. 3.9			γ Sagittæ. Mag. 3.7		
	Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.		Right Ascension.	Declina- tion.	
	h m 19 49	° ' " -42 4		h m 19 51	° ' " -73 7		h m 19 51	° ' " + 6 12		h m 19 55	° ' " +19 16	
	s	"		s	"		s	"		s	"	
Jan. 1.1	40.059	55.36	147	12.24	33.68	305	19.777	18.20	8.844	23.85	207	
11.0	40.146	53.89	147	12.33	30.63	310	19.835	16.75	8.886	21.78	210	
21.0	40.283	52.35	154	12.55	27.53	305	19.929	15.32	8.966	19.68	202	
31.0	40.466	50.78	157	12.91	24.48	296	20.057	13.96	9.083	17.66	187	
Feb. 9.9	40.690	49.21	157	13.39	21.52	279	20.216	12.76	9.234	15.79	163	
19.9	40.950	47.66	150	13.97	18.73	255	20.402	11.74	9.416	14.16	131	
Mar. 1.9	41.243	46.16	145	14.64	16.18	238	20.615	11.00	9.627	12.85	94	
11.9	41.562	44.71	136	15.38	13.90	195	20.849	10.55	9.863	11.91	50	
21.8	41.906	43.35	126	16.19	11.95	159	21.104	10.45	10.121	11.41	6	
31.8	42.268	42.09	113	17.05	10.36	121	21.374	10.70	10.398	11.35	41	
Apr. 10.8	42.645	40.96	99	17.94	9.15	80	21.656	11.31	10.688	11.76	85	
20.7	43.030	39.97	82	18.84	8.35	38	21.947	12.25	10.986	12.61	165	
30.7	43.420	39.15	61	19.75	7.97	4	22.241	13.50	11.288	13.89	222	
May 10.7	43.806	38.54	41	20.64	8.01	47	22.533	15.00	11.587	15.54	196	
20.7	44.181	38.13	17	21.49	8.48	89	22.816	16.73	11.876	17.50	241	
30.6	44.538	37.96	6	22.29	9.37	127	23.085	18.61	12.149	19.72	253	
June 9.6	44.869	38.02	31	23.02	10.64	163	23.331	20.58	12.399	22.13	258	
19.6	45.164	38.33	52	23.66	12.27	194	23.551	22.59	12.620	24.66	249	
29.6	45.418	38.85	75	24.18	14.21	221	23.739	24.60	12.807	27.24	241	
July 9.5	45.624	39.60	92	24.59	16.42	259	23.889	26.53	12.964	29.79	236	
19.5	45.775	40.52	107	24.88	18.81	251	23.997	28.36	13.057	32.28	217	
29.5	45.868	41.59	119	25.02	21.32	255	24.062	30.04	13.116	34.64	196	
Aug. 8.4	45.901	42.78	122	25.01	23.87	249	24.082	31.55	13.129	36.81	170	
18.4	45.877	44.00	123	24.87	26.36	235	24.059	32.86	13.097	40.47	144	
28.4	45.797	45.23	116	24.60	28.71	210	23.995	33.95	13.023	41.91	113	
Sept. 7.4	45.666	46.39	104	24.19	30.81	178	23.895	34.83	12.911	43.04	81	
17.3	45.492	47.43	89	23.69	32.59	138	23.763	35.46	12.768	43.85	50	
27.3	45.285	48.32	66	23.10	33.97	92	23.609	35.87	12.600	44.35	15	
Oct. 7.3	45.057	48.98	41	22.45	34.89	41	23.440	36.05	12.417	44.50	18	
17.3	44.821	49.39	14	21.78	35.30	12	23.265	36.01	12.227	44.32	51	
27.2	44.588	49.53	15	21.10	35.18	67	23.094	35.73	12.040	43.81	85	
Nov. 6.2	44.373	49.38	42	20.46	34.51	119	22.937	35.25	11.864	42.96	117	
16.2	44.186	48.96	29	19.87	33.32	168	22.799	34.54	11.709	40.34	171	
26.1	44.037	48.27	91	19.37	31.64	212	22.689	33.64	11.580	38.63	190	
Dec. 6.1	43.933	47.36	113	18.98	29.52	247	22.610	32.56	11.482	36.73	206	
16.1	43.880	46.23	127	18.71	27.05	275	22.567	31.31	11.420	34.67		
26.1	43.880	44.96	140	18.58	24.30	295	22.562	29.94	11.397			
36.0	43.933	43.56		18.57	21.35		22.595	28.50	11.413			
Mean Place	40.496	56.15		14.672	33.22		20.069	12.83	9.266	16.80		
Sec δ, Tan δ	1.347	-0.903		3.444	-3.296		1.006	+0.109	1.058	+0.355		
D _α α, D _α α	+0.06	+0.03		+0.14	+0.10		+0.06	0.00	+0.05	-0.01		
D _β β, D _β β	+0.2	-0.9		+0.2	-0.9		+0.2	-0.9	+0.2	-0.9		

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ϵ Sagittarii. Mag. 4.6		τ Aquilæ. Mag. 5.6		θ Aquilæ. Mag. 3.4		α Cygni, <i>sup.</i> Mag. 4.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 19 57 s	° ' " -27 55 "	h m 20 0 s	° ' " + 7 2 "	h m 20 7 s	° ' " - 1 3 "	h m 20 11 s	° ' " +46 8 "
Jan. 1.1	40.534	68.23	10.718	61.21	7.348	40.55	3.863	53.75
11.0	40.607	67.60	10.767	59.76	7.396	41.54	3.837	50.82
21.0	40.719	66.90	10.852	58.32	7.480	42.49	3.866	47.76
31.0	40.869	66.15	10.971	56.95	7.597	43.38	3.948	44.73
Feb. 10.0	41.053	65.34	11.121	55.73	7.744	44.13	4.083	41.80
19.9	41.268	64.47	11.300	54.70	7.920	44.71	4.269	39.12
Mar. 1.9	41.510	63.54	11.505	53.93	8.123	45.08	4.501	36.79
11.9	41.778	62.56	11.733	53.46	8.348	45.19	4.776	34.91
21.8	42.064	61.52	11.983	53.35	8.595	45.02	5.087	33.55
31.8	42.370	60.45	12.249	53.59	8.859	44.57	5.428	32.76
Apr. 10.8	42.689	59.36	12.529	54.19	9.138	43.82	5.789	32.57
20.8	43.018	58.27	12.819	55.12	9.428	42.82	6.164	33.01
30.7	43.352	57.22	13.113	56.38	9.724	41.56	6.544	34.02
May 10.7	43.685	56.23	13.407	57.92	10.020	40.11	6.918	35.58
20.7	44.011	55.34	13.693	59.67	10.311	38.50	7.278	37.69
30.7	44.323	54.56	13.966	61.58	10.590	36.80	7.614	40.14
June 9.6	44.614	53.95	14.218	63.61	10.850	35.05	7.917	42.98
19.6	44.877	53.49	14.445	65.69	11.086	33.29	8.180	46.10
29.6	45.105	53.23	14.639	67.76	11.290	31.59	8.396	49.40
July 9.5	45.293	53.14	14.796	69.77	11.458	29.98	8.561	52.80
19.5	45.435	53.23	14.912	71.68	11.585	28.49	8.667	56.22
29.5	45.527	53.49	14.985	73.45	11.669	27.15	8.715	59.58
Aug. 8.5	45.569	53.88	15.013	75.03	11.709	25.99	8.705	62.82
18.4	45.561	54.39	14.997	76.43	11.704	25.02	8.637	65.84
28.4	45.505	54.98	14.940	77.59	11.658	24.24	8.515	68.60
Sept. 7.4	45.405	55.60	14.846	78.54	11.573	23.64	8.345	71.04
17.4	45.269	56.22	14.719	79.24	11.455	23.23	8.132	73.11
27.3	45.103	56.80	14.569	79.72	11.313	23.01	7.886	74.77
Oct. 7.3	44.920	57.30	14.402	79.95	11.152	22.95	7.616	75.98
17.3	44.728	57.70	14.228	79.95	10.985	23.05	7.333	76.72
27.2	44.539	57.96	14.057	79.72	10.820	23.32	7.047	76.95
Nov. 6.2	44.363	58.10	13.898	79.27	10.663	23.72	6.767	76.68
16.2	44.211	58.09	13.757	78.59	10.525	24.26	6.507	75.89
26.2	44.089	57.95	13.642	77.72	10.413	24.94	6.271	74.60
Dec. 6.1	44.005	57.67	13.558	76.65	10.331	25.72	6.072	72.84
16.1	43.962	57.28	13.508	75.41	10.281	26.60	5.914	70.65
26.1	43.961	56.80	13.495	74.06	10.268	27.56	5.803	68.10
36.1	44.004	56.25	13.519	72.61	10.292	28.55	5.742	65.28
Mean Place	40.791	69.93	10.997	55.49	7.563	45.36	4.912	42.42
Sec δ , Tan δ	1.132	-0.530	1.008	+0.124	1.000	-0.018	1.453	+1.054
$D\alpha$, $D\omega$	+0.07	+0.02	+0.06	0.00	+0.06	0.00	+0.04	-0.04
δ , $D\omega\delta$		-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

APPARENT PLACES OF STARS, 1919.

479

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	κ Cephei. Mag. 4.4		γ Vulpeculæ. Mag. 5.4		α^2 Capricorni. Mag. 3.8		β Capricorni. Mag. 3.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 20 11	° ' " +77 27	h m 20 13	° ' " +24 25	h m 20 13	° ' " -12 47	h m 20 16	° ' " -15 1
	s	"	s	"	s	"	s	"
Jan. 1.1	32.71	79.12	18.699	23.60	33.526	45.21	27.573	74.04
11.0	32.36	76.04 ³⁰⁸	18.718 ¹⁹	21.37 ²²³	33.575 ⁴⁹	45.49 ²⁸	27.621 ⁴⁸	74.18 ¹⁴
21.0	32.18 ¹⁸	72.76 ³²⁸	18.775 ⁵⁷	19.09 ²²⁸	33.661 ⁸⁶	45.71 ²²	27.704 ⁸³	74.26 ⁸
31.0	32.21 ³	69.42 ³³⁴	18.869 ⁹⁴	16.85 ²²⁴	33.780 ¹¹⁹	45.86 ¹⁵	27.822 ¹¹⁸	74.25 ¹
Feb. 10.0	32.42 ²¹	66.13 ³²⁹	19.001 ¹³²	14.76 ²⁰⁹	33.930 ¹⁵⁰	45.90 ⁴	27.971 ¹⁴⁹	74.15 ¹⁰
19.9	32.81 ³⁹	63.04 ³⁰⁹	19.167 ¹⁶⁶	12.88 ¹⁸⁸	34.108 ¹⁷⁸	45.81 ⁹	28.149 ¹⁷⁸	73.91 ²⁴
Mar. 1.9	33.38 ⁵⁷	60.24 ²⁸⁰	19.365 ¹⁹⁸	11.32 ¹⁵⁶	34.313 ²⁰⁵	45.55 ²⁶	28.354 ²⁰⁵	73.54 ³⁷
11.9	34.10 ⁷²	57.88 ²³⁶	19.591 ²²⁶	10.15 ¹¹⁷	34.543 ²³⁰	45.12 ⁴³	28.583 ²²⁹	72.99 ⁵⁵
21.8	34.94 ⁸⁴	56.04 ¹⁸⁴	19.845 ²⁵⁴	9.41 ⁷⁴	34.794 ²⁵¹	44.50 ⁶²	28.835 ²⁵²	72.28 ⁷¹
31.8	35.89 ⁹⁵	54.77 ¹²⁷	20.119 ²⁷⁴	9.15 ²⁶	35.064 ²⁷⁰	43.71 ⁷⁹	29.106 ²⁷¹	71.42 ⁸⁶
Apr. 10.8	36.90 ¹⁰¹	54.12 ⁶⁵	20.411 ²⁹²	9.38 ²³	35.349 ²⁸⁵	42.74 ⁹⁷	29.393 ²⁸⁷	70.40 ¹⁰²
20.8	37.94 ¹⁰⁴	54.13 ¹	20.716 ³⁰⁵	10.09 ⁷¹	35.647 ²⁹⁸	41.61 ¹¹³	29.692 ²⁹⁹	69.24 ¹¹⁶
30.7	38.97 ¹⁰⁸	54.76 ⁶³	21.026 ³¹⁰	11.27 ¹¹⁸	35.953 ³⁰⁶	40.37 ¹²⁴	30.000 ³⁰⁸	67.99 ¹²³
May 10.7	39.96 ⁹⁹	56.00 ¹²⁴	21.336 ³¹⁰	12.87 ¹⁶⁰	36.260 ³⁰⁷	39.03 ¹³⁴	30.309 ³⁰⁹	66.68 ¹³¹
20.7	40.88 ⁹²	57.80 ¹⁸⁰	21.637 ³⁰¹	14.84 ¹⁹⁷	36.562 ³⁰²	37.65 ¹³⁸	30.615 ³⁰⁶	65.34 ¹³⁴
30.7	41.71 ⁸³	60.11 ²³¹	21.925 ²⁸⁸	17.10 ²²⁶	36.854 ²⁹²	36.28 ¹³⁷	30.911 ²⁹⁰	64.01 ¹³³
June 9.6	42.43 ⁷²	62.84 ²⁷³	22.190 ²⁶⁵	19.61 ²⁵¹	37.129 ²⁷⁵	34.95 ¹³³	31.190 ²⁷⁹	62.75 ¹²⁶
19.6	43.01 ⁸⁶	65.92 ³⁰⁸	22.428 ²³⁸	22.28 ²⁶⁷	37.379 ²⁵⁰	33.69 ¹²⁶	31.444 ²⁵⁴	61.59 ¹¹⁶
29.6	43.42 ⁴¹	69.26 ³³⁴	22.631 ²⁰³	25.03 ²⁷⁵	37.598 ²¹⁹	32.56 ¹¹³	31.668 ²²⁴	60.54 ¹⁰⁵
July 9.5	43.68 ²⁶	72.79 ³⁵³	22.793 ¹⁶²	27.81 ²⁷⁸	37.781 ¹⁸³	31.55 ¹⁰¹	31.858 ¹⁹⁰	59.66 ⁸⁸
19.5	43.78 ¹⁰	76.40 ³⁶¹	22.913 ¹²⁰	30.55 ²⁷⁴	37.923 ¹⁴²	30.70 ⁸⁵	32.005 ¹⁴⁷	58.93 ⁷³
29.5	43.69 ⁹	80.02 ³⁶²	22.985 ⁷²	33.17 ²⁶²	38.021 ⁹⁸	30.04 ⁶⁶	32.107 ¹⁰²	58.37 ⁵⁶
Aug. 8.5	43.45 ²⁴	83.56 ³⁵⁴	23.011 ²⁶	35.64 ²⁴⁷	38.073 ⁵²	29.54 ⁵⁰	32.163 ⁵⁶	58.00 ³⁷
18.4	43.04 ⁴¹	86.96 ³⁴⁰	22.991 ²⁰	37.90 ²²⁶	38.079 ⁶	29.20 ³⁴	32.172 ⁹	57.80 ²⁰
28.4	42.47 ⁵⁷	90.15 ³¹⁹	22.926 ⁶⁵	39.90 ²⁰⁰	38.040 ³⁹	29.02 ¹⁸	32.136 ³⁶	57.74 ⁶
Sept. 7.4	41.78 ⁶⁹	93.04 ²⁸⁹	22.821 ¹⁰⁵	41.62 ¹⁷²	37.961 ⁷⁹	28.98 ⁴	32.059 ⁷⁷	57.80 ⁶
17.4	40.97 ⁸¹	95.58 ²⁵⁴	22.682 ¹³⁹	43.04 ¹⁴²	37.848 ¹¹³	29.05 ⁷	31.947 ¹¹²	57.97 ¹⁷
27.3	40.06 ⁹¹	97.72 ²¹⁴	22.516 ¹⁶⁶	44.12 ¹⁰⁸	37.708 ¹⁴⁰	29.21 ¹⁶	31.807 ¹⁴⁰	58.23 ²⁶
Oct. 7.3	39.07 ⁹⁹	99.41 ¹⁶⁹	22.331 ¹⁸⁵	44.84 ⁷³	37.548 ¹⁶⁰	29.46 ²⁵	31.647 ¹⁶⁰	58.53 ³⁰
17.3	38.03 ¹⁰⁴	100.60 ¹¹⁹	22.137 ¹⁹⁴	45.20 ³⁶	37.379 ¹⁶⁹	29.75 ²⁹	31.478 ¹⁶⁹	58.87 ³⁴
27.2	36.96 ¹⁰⁷	101.26 ⁶⁶	21.942 ¹⁹⁵	45.19 ¹	37.211 ¹⁶⁸	30.07 ³²	31.308 ¹⁷⁰	59.21 ³⁴
Nov. 6.2	35.90 ¹⁰⁶	101.36 ¹⁰	21.754 ¹⁸⁸	44.80 ³⁹	37.053 ¹⁵⁸	30.42 ³⁵	31.148 ¹⁶⁰	59.55 ³⁴
16.2	34.87 ¹⁰³	100.88 ⁴⁸	21.584 ¹⁷⁰	44.03 ⁷⁷	36.912 ¹⁴¹	30.77 ³⁵	31.004 ¹⁴⁴	59.87 ³²
26.2	33.90 ⁹⁷	99.84 ¹⁰⁴	21.437 ¹⁴⁷	42.90 ¹¹³	36.797 ¹¹⁵	31.14 ³⁷	30.887 ¹¹⁷	60.18 ³¹
Dec. 6.1	33.01 ⁸⁹	98.25 ¹⁵⁰	21.319 ¹¹⁸	41.45 ¹⁴⁵	36.712 ⁸⁵	31.50 ³⁶	30.799 ⁸⁸	60.46 ²⁸
16.1	32.24 ⁷⁷	96.14 ²¹¹	21.235 ⁸⁴	39.69 ¹⁷⁶	36.661 ⁵¹	31.87 ³⁷	30.747 ⁵²	60.72 ²⁶
26.1	31.61 ⁶³	93.59 ²⁵⁵	21.187 ⁴⁸	37.70 ¹⁹⁹	36.648 ¹³	32.22 ³⁵	30.731 ¹⁶	60.95 ²³
36.1	31.15 ⁴⁶	90.66 ²⁶³	21.180 ⁷	35.52 ²¹⁸	36.672 ²⁴	32.54 ³²	30.753 ²²	61.14 ¹⁹
Mean Place	33.590	65.02	19.143	15.00	33.706	48.47	27.746	77.00
Sec δ , Tan δ	4.610	+4.500	1.098	+0.454	1.025	-0.227	1.035	-0.288
D_{δ}^{δ} , D_{δ}^{δ}	-0.04	-0.16	+0.05	-0.02	+0.07	+0.01	+0.07	+0.01
D_{δ}^{δ} , D_{δ}^{δ}	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Pavonis. Mag. 2.1		γ Cygni. Mag. 2.3		π Capricorni. Mag. 5.2		ρ Capricorni. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 20 19	° ' " -56 59	h m 20 19	° ' " +39 59	h m 20 22	° ' " -18 28	h m 20 24	° ' " -18 4
	s	"	s	"	s	"	s	"
Jan. 1.1	14.016	46.69	18.484	59.47	41.017	38.49	14.376	53.99
11.0	14.055	44.40	18.466	56.74	41.059	38.42	14.417	53.93
21.0	14.161	41.99	18.497	53.90	41.138	38.27	14.494	53.81
31.0	14.332	39.51	18.574	51.06	41.252	38.03	14.606	53.59
Feb. 10.0	14.564	37.02	18.697	48.34	41.396	37.69	14.748	53.27
19.9	14.851	34.58	18.865	45.84	41.572	37.24	14.922	52.84
Mar. 1.9	15.187	32.23	19.074	43.68	41.776	36.66	15.124	52.27
11.9	15.567	30.01	19.321	41.93	42.005	35.93	15.350	51.55
21.9	15.987	27.98	19.601	40.68	42.257	35.07	15.601	50.70
31.8	16.440	26.15	19.910	39.97	42.529	34.08	15.871	49.71
Apr. 10.8	16.917	24.58	20.239	39.84	42.818	32.95	16.159	48.58
20.8	17.415	23.28	20.583	40.29	43.122	31.74	16.462	47.37
30.7	17.922	22.28	20.935	41.30	43.434	30.46	16.773	46.08
May 10.7	18.430	21.61	21.283	42.83	43.750	29.16	17.088	44.76
20.7	18.931	21.29	21.623	44.83	44.063	27.86	17.400	43.45
30.7	19.411	21.31	21.943	47.24	44.366	26.61	17.703	42.18
June 9.6	19.862	21.70	22.236	49.97	44.653	25.46	17.990	41.00
19.6	20.270	22.43	22.494	52.97	44.916	24.40	18.254	39.93
29.6	20.628	23.48	22.712	56.14	45.150	23.50	18.488	39.01
July 9.6	20.926	24.82	22.883	59.39	45.347	22.79	18.686	38.26
19.5	21.153	26.42	23.003	62.66	45.502	22.24	18.843	37.69
29.5	21.306	28.19	23.070	65.87	45.613	21.88	18.954	37.30
Aug. 8.5	21.382	30.11	23.083	68.94	45.676	21.70	19.019	37.10
18.4	21.377	32.10	23.043	71.82	45.691	21.68	19.036	37.05
28.4	21.295	34.07	22.952	74.44	45.661	21.81	19.007	37.16
Sept 7.4	21.142	35.94	22.816	76.76	45.588	22.06	18.935	37.39
17.4	20.925	37.62	22.641	78.73	45.478	22.39	18.827	37.70
27.3	20.656	39.08	22.433	80.30	45.340	22.77	18.689	38.08
Oct. 7.3	20.349	40.21	22.203	81.45	45.179	23.18	18.530	38.48
17.3	20.020	40.97	21.960	82.16	45.008	23.58	18.360	38.89
27.3	19.685	41.33	21.713	82.40	44.835	23.97	18.188	39.27
Nov. 6.2	19.360	41.26	21.472	82.16	44.672	24.31	18.025	39.62
16.2	19.063	40.78	21.246	81.44	44.524	24.60	17.877	39.92
26.2	18.806	39.86	21.045	80.26	44.401	24.82	17.754	40.17
Dec. 6.1	18.601	38.56	20.874	78.63	44.308	24.99	17.660	40.35
16.1	18.457	36.91	20.740	76.59	44.251	25.10	17.601	40.48
26.1	18.379	34.99	20.647	74.23	44.230	25.16	17.579	40.55
36.1	18.370	32.82	20.600	71.59	44.247	25.15	17.593	40.57
Mean Place	14.863	45.18	19.253	48.36	41.186	40.92	14.539	56.46
Sec δ , Tan δ	1.836	-1.539	1.305	+0.839	1.054	-0.334	1.052	-0.336
$D\psi\alpha$, $D\omega\alpha$	+0.09	+0.06	+0.04	-0.03	+0.07	+0.01	+0.07	+0.01
$D\delta\delta$, $D\omega\delta$	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8

APPARENT PLACES OF STARS, 1919.

481

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	41 Cygni. Mag. 4.1		θ Cephei. Mag. 4.3		ε Delphini. Mag. 4.0		Groombridge 3941. Mag. 6.4	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 20 26	° ' +30 5	h m 20 28	° ' +62 43	h m 20 29	° ' +11 1	h m 20 30	° ' +72 15
	s "	"	s "	"	s "	"	s "	"
Jan. 1.1	4.707	61.43	11.51	31.84	20.379	44.82	18.45	41.91
11.0	4.703	59.05	11.37	28.81	20.398	43.26	18.18	38.91
21.0	4.740	56.58	11.32	25.59	20.453	41.68	18.04	35.69
31.0	4.818	54.12	11.35	22.28	20.538	40.15	18.02	32.35
Feb. 10.0	4.935	51.78	11.46	19.03	20.658	38.75	18.14	29.04
19.9	5.089	49.66	11.66	15.96	20.809	37.54	18.40	25.88
Mar. 1.9	5.279	47.83	11.95	13.19	20.988	36.58	18.77	22.99
11.9	5.502	46.39	12.29	10.83	21.196	35.95	19.25	20.50
21.9	5.754	45.41	12.70	8.98	21.427	35.66	19.83	18.50
31.8	6.031	44.92	13.17	7.72	21.682	35.75	20.50	17.07
Apr. 10.8	6.330	44.96	13.66	7.07	21.954	36.22	21.22	16.25
20.8	6.643	45.52	14.19	7.06	22.241	37.08	21.97	16.06
30.7	6.964	46.57	14.72	7.68	22.537	38.29	22.73	16.52
May 10.7	7.286	48.09	15.25	8.92	22.837	39.82	23.48	17.60
20.7	7.603	50.04	15.75	10.72	23.134	41.61	24.19	19.26
30.7	7.904	52.32	16.22	13.03	23.421	43.62	24.84	21.44
June 9.6	8.185	54.90	16.64	15.77	23.691	45.77	25.42	24.08
19.6	8.437	57.68	17.00	18.87	23.937	48.01	25.91	27.09
29.6	8.653	60.60	17.30	22.22	24.153	50.28	26.30	30.40
July 9.6	8.829	63.57	17.51	25.77	24.334	52.52	26.57	33.92
19.5	8.960	66.55	17.64	29.41	24.476	54.69	26.73	37.56
29.5	9.043	69.43	17.70	33.07	24.573	56.72	26.76	41.24
Aug. 8.5	9.077	72.17	17.67	36.65	24.626	58.59	26.67	44.88
18.4	9.062	74.71	17.56	40.08	24.634	60.25	26.46	48.38
28.4	9.001	77.01	17.36	43.30	24.599	61.70	26.14	51.70
Sept. 7.4	8.897	79.02	17.10	46.22	24.524	62.90	25.72	54.75
17.4	8.758	80.71	16.77	48.80	24.415	63.86	25.21	57.47
27.3	8.588	82.04	16.40	50.97	24.279	64.56	24.62	59.82
Oct. 7.3	8.397	83.01	15.98	52.69	24.123	65.00	23.96	61.70
17.3	8.193	83.57	15.54	53.92	23.955	65.16	23.26	63.09
27.3	7.986	83.73	15.08	54.62	23.784	65.07	22.54	63.97
Nov. 6.2	7.784	83.47	14.62	54.76	23.621	64.71	21.81	64.28
16.2	7.596	82.80	14.17	54.34	23.471	64.09	21.10	64.02
26.2	7.430	81.72	13.76	53.34	23.341	63.25	20.42	63.18
Dec. 6.1	7.291	80.28	13.39	51.80	23.238	62.17	19.80	61.76
16.1	7.186	78.48	13.06	49.75	23.165	60.90	19.26	59.81
26.1	7.117	76.39	12.80	47.24	23.124	59.48	18.81	57.40
36.1	7.087	74.06	12.62	44.38	23.118	57.94	18.46	54.57
Mean Place	5.201	51.33	13.538	17.36	20.610	37.66	22.041	26.42
Sec δ, Tan δ	1.156	+0.580	2.182	+1.940	1.019	+0.195	3.283	+3.128
D ₁ α, D ₁ α	+0.06	-0.02	+0.02	-0.08	+0.06	-0.01	0.00	-0.13
D ₁ δ, D ₁ δ	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Indi. Mag. 3.2		β Delphini. Mag. 3.7		ν Capricorni. Mag. 5.3		α Delphini. Mag. 3.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 20 31	° ' -47 34	h m 20 33	° ' +14 18	h m 20 35	° ' -18 25	h m 20 35	° ' +15 35
	s	"	s	"	s	"	s	"
Jan. 1.1	51.921	31.84	44.836	53.14	26.299	26.02	52.311	41.01
11.1	51.948	30.07	44.848	51.44	26.328	25.94	52.320	39.25
21.0	52.028	28.15	44.894	49.70	26.394	25.77	52.362	37.46
31.0	52.158	26.13	44.975	48.01	26.493	25.50	52.440	35.70
Feb. 10.0	52.336	24.05	45.089	46.44	26.625	25.13	52.551	34.07
19.9	52.559	21.96	45.234	45.05	26.788	24.64	52.694	32.62
Mar. 1.9	52.822	19.88	45.410	43.94	26.978	24.00	52.869	31.44
11.9	53.123	17.86	45.615	43.15	27.196	23.22	53.072	30.59
21.9	53.455	15.92	45.845	42.71	27.438	22.30	53.301	30.11
31.8	53.818	14.11	46.100	42.69	27.704	21.24	53.556	30.04
Apr. 10.8	54.204	12.47	46.373	43.08	27.987	20.04	53.829	30.38
20.8	54.610	11.00	46.661	43.87	28.288	18.76	54.117	31.15
30.8	55.028	9.77	46.959	45.04	28.599	17.42	54.416	32.30
May 10.7	55.451	8.77	47.261	46.57	28.915	16.03	54.721	33.82
20.7	55.871	8.06	47.561	48.37	29.231	14.66	55.021	35.63
30.7	56.278	7.64	47.851	50.43	29.538	13.34	55.312	37.71
June 9.6	56.665	7.53	48.125	52.67	29.832	12.11	55.588	39.97
19.6	57.021	7.74	48.374	55.01	30.104	11.01	55.838	42.35
29.6	57.337	8.24	48.593	57.41	30.346	10.06	56.059	44.80
July 9.6	57.605	9.04	48.778	59.80	30.553	9.29	56.246	47.25
19.5	57.819	10.11	48.922	62.13	30.720	8.69	56.391	49.64
29.5	57.971	11.38	49.022	64.33	30.842	8.29	56.492	51.91
Aug. 8.5	58.058	12.82	49.078	66.37	30.917	8.09	56.549	54.03
18.5	58.081	14.38	49.087	68.23	30.944	8.05	56.559	55.95
28.4	58.040	15.98	49.055	69.85	30.925	8.18	56.527	57.64
Sept. 7.4	57.938	17.57	48.981	71.23	30.863	8.44	56.453	59.09
17.4	57.783	19.07	48.873	72.33	30.764	8.79	56.345	60.27
27.3	57.583	20.41	48.736	73.17	30.632	9.20	56.209	61.17
Oct. 7.3	57.352	21.52	48.578	73.72	30.479	9.65	56.050	61.77
17.3	57.100	22.36	48.409	73.97	30.312	10.11	55.880	62.06
27.3	56.841	22.88	48.237	73.95	30.141	10.53	55.706	62.07
Nov. 6.2	56.589	23.06	48.070	73.62	29.977	10.92	55.537	61.77
16.2	56.356	22.88	47.915	73.02	29.827	11.26	55.381	61.16
26.2	56.154	22.36	47.780	72.14	29.699	11.53	55.243	60.29
Dec. 6.2	55.993	21.50	47.671	71.01	29.599	11.73	55.131	59.14
16.1	55.878	20.34	47.592	69.67	29.532	11.86	55.049	57.77
26.1	55.814	18.92	47.544	68.13	29.500	11.93	54.998	56.19
36.1	55.804	17.28	47.531	66.45	29.503	11.92	54.982	54.47
Mean Place	52.417	30.48	45.081	45.29	26.440	28.32	52.561	32.85
Sec δ , Tan δ	1.482	-1.094	1.032	+0.255	1.054	-0.333	1.038	+0.280
$D\psi\alpha$, $D\omega\alpha$	+0.08	+0.04	+0.06	-0.01	+0.07	+0.01	+0.06	-0.01
$D\alpha\delta$, $D\omega\delta$	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.3	-0.8

APPARENT PLACES OF STARS, 1919.

483

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington on Time.	β Pavonis. Mag. 3.6		α Cygni. (Deneb.) Mag. 1.3		δ Delphini. Mag. 4.5		ψ Capricorni. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 20 37	° ' " -66 29	h m 20 38	° ' " +44 59	h m 20 39	° ' " +14 46	h m 20 41	° ' " -25 33
	s		s		s		s	
l. 1.1	39.11	47.49	39.379	38.08	40.420	67.34	18.004	44.44
11.1	39.09	44.79	39.325	35.35	40.426	65.64	18.029	43.94
21.0	39.16	41.92	39.322	32.45	40.466	63.91	18.091	43.34
31.0	39.32	38.95	39.370	29.50	40.541	62.21	18.188	42.61
b. 10.0	39.56	35.96	39.468	26.62	40.649	60.63	18.320	41.78
19.9	39.88	33.02	39.616	23.93	40.788	59.22	18.484	40.85
r. 1.9	40.28	30.19	39.812	21.53	40.958	58.08	18.678	39.81
11.9	40.74	27.53	40.053	19.53	41.158	57.26	18.902	38.66
21.9	41.27	25.08	40.332	18.00	41.384	56.80	19.152	37.43
31.8	41.84	22.91	40.648	17.01	41.634	56.75	19.424	36.12
r. 10.8	42.45	21.03	40.991	16.61	41.905	57.10	19.718	34.75
20.8	43.10	19.50	41.353	16.80	42.191	57.87	20.029	33.36
30.8	43.76	18.34	41.726	17.56	42.489	59.02	20.352	31.97
y 10.7	44.42	17.59	42.101	18.89	42.791	60.52	20.682	30.62
20.7	45.08	17.24	42.469	20.72	43.091	62.31	21.012	29.35
30.7	45.72	17.32	42.819	23.01	43.384	64.37	21.336	28.20
ne 9.6	46.32	17.81	43.143	25.68	43.661	66.61	21.644	27.19
19.6	46.88	18.72	43.432	28.66	43.914	68.96	21.932	26.36
29.6	47.35	20.01	43.679	31.85	44.138	71.38	22.190	25.73
y 9.6	47.76	21.63	43.878	35.19	44.328	73.80	22.412	25.30
19.5	48.09	23.55	44.023	38.58	44.477	76.15	22.593	25.11
29.5	48.31	25.70	44.111	41.95	44.583	78.39	22.727	25.12
g. 8.5	48.43	28.00	44.142	45.24	44.643	80.47	22.812	25.33
18.5	48.44	30.38	44.116	48.35	44.659	82.36	22.847	25.71
28.4	48.35	32.75	44.036	51.24	44.630	84.02	22.833	26.23
pt. 7.4	48.16	35.01	43.905	53.85	44.561	85.44	22.773	26.86
17.4	47.88	37.08	43.730	56.12	44.456	86.58	22.671	27.54
27.3	47.52	38.87	43.518	58.01	44.324	87.46	22.538	28.24
t. 7.3	47.10	40.31	43.279	59.48	44.169	88.04	22.378	28.92
17.3	46.64	41.31	43.020	60.49	44.001	88.33	22.203	29.54
27.3	46.17	41.85	42.753	61.02	43.829	88.34	22.023	30.07
v. 6.2	45.69	41.88	42.488	61.05	43.662	88.05	21.847	30.47
16.2	45.25	41.39	42.235	60.57	43.505	87.47	21.687	30.73
26.2	44.84	40.41	42.000	59.59	43.367	86.62	21.547	30.86
c. 6.2	44.51	38.95	41.795	58.14	43.255	85.51	21.437	30.85
16.1	44.24	37.08	41.624	56.24	43.172	84.18	21.361	30.70
26.1	44.06	34.84	41.494	53.95	43.119	82.66	21.321	30.41
36.1	43.97	32.29	41.408	51.34	43.101	80.99	21.318	30.01
Place	40.560	44.46	40.208	24.97	40.646	59.21	18.163	45.55
, Tan δ	2.508	-2.300	1.414	+1.000	1.034	+0.264	1.108	-0.478
$D_{\omega\alpha}$	+0.11	+0.10	+0.04	-0.04	+0.06	-0.01	+0.07	+0.02
$D_{\omega\delta}$	+0.3	-0.8	+0.3	-0.8	+0.3	-0.8	+0.3	-0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Delphini <i>seq.</i> Mag. 4.5		ϵ Cygni. Mag. 2.6		ϵ Aquarii. Mag. 3.8		η Cephei. Mag. 3.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 20 42	" ' +15 49	h m 20 42	" ' +33 39	h m 20 43	" ' - 9 47	h m 20 43	" ' +61
	s	"	s	"	s	"	s	"
Jan. 1.1	53.788	62.38	55.534	69.89	17.445	31.32	36.92	41.54
11.1	53.789	60.64	55.508	67.49	17.465	31.73	36.77	38.66
21.0	53.826	58.86	55.523	64.96	17.518	32.09	36.69	35.53
31.0	53.896	57.10	55.579	62.41	17.604	32.34	36.70	32.30
Feb. 10.0	54.000	55.46	55.677	59.94	17.721	32.49	36.78	29.09
19.9	54.136	54.00	55.814	57.65	17.868	32.49	36.94	26.02
Mar. 1.9	54.304	52.80	55.990	55.65	18.044	32.30	37.20	23.21
11.9	54.502	51.92	56.204	54.03	18.247	31.92	37.51	20.80
21.9	54.726	51.41	56.451	52.85	18.473	31.33	37.88	18.86
31.8	54.975	51.31	56.727	52.17	18.724	30.52	38.31	17.47
Apr. 10.8	55.245	51.62	57.028	52.01	18.994	29.51	38.79	16.69
20.8	55.532	52.35	57.347	52.40	19.281	28.30	39.29	16.53
30.8	55.830	53.47	57.678	53.30	19.580	26.95	39.80	17.02
May 10.7	56.134	54.96	58.013	54.71	19.886	25.48	40.32	18.11
20.7	56.436	56.76	58.344	56.56	20.191	23.93	40.82	19.78
30.7	56.730	58.82	58.663	58.80	20.490	22.36	41.29	21.97
June 9.6	57.009	61.07	58.962	61.36	20.777	20.80	41.73	24.61
19.6	57.265	63.45	59.232	64.17	21.042	19.30	42.10	27.63
29.6	57.491	65.90	59.469	67.15	21.281	17.90	42.42	30.94
July 9.6	57.683	68.35	59.664	70.23	21.485	16.64	42.65	34.46
19.5	57.835	70.75	59.814	73.33	21.651	15.54	42.82	38.10
29.5	57.944	73.05	59.915	76.37	21.774	14.62	42.91	41.78
Aug. 8.5	58.007	75.18	59.965	79.31	21.852	13.90	42.91	45.42
18.5	58.024	77.14	59.964	82.07	21.884	13.35	42.84	48.93
28.4	57.998	78.85	59.916	84.60	21.872	12.99	42.68	52.26
Sept. 7.4	57.931	80.33	59.823	86.86	21.817	12.81	42.46	55.32
17.4	57.828	81.53	59.691	88.79	21.727	12.78	42.18	58.05
27.3	57.696	82.45	59.525	90.38	21.606	12.87	41.85	60.40
Oct. 7.3	57.542	83.08	59.336	91.58	21.463	13.09	41.47	62.32
17.3	57.373	83.40	59.131	92.37	21.306	13.38	41.06	63.75
27.3	57.201	83.44	58.918	92.75	21.144	13.74	40.63	64.65
Nov. 6.2	57.031	83.16	58.708	92.68	20.987	14.15	40.20	65.02
16.2	56.874	82.59	58.509	92.18	20.842	14.59	39.78	64.82
26.2	56.735	81.75	58.327	91.25	20.717	15.07	39.38	64.05
Dec. 6.2	56.620	80.63	58.171	89.91	20.617	15.55	39.01	62.73
16.1	56.532	79.29	58.045	88.18	20.547	16.05	38.69	60.85
26.1	56.477	77.74	57.953	86.13	20.510	16.53	38.43	58.56
36.1	56.455	76.03	57.900	83.83	20.505	16.99	38.23	55.85
Mean Place	54.014	53.95	56.024	58.29	17.552	35.03	38.675	25.96
Sec δ , Tan δ	1.040	+0.284	1.202	+0.667	1.015	-0.173	2.098	+1.84
$\bar{D}\phi\alpha$, $D\omega\alpha$	+0.06	-0.01	+0.05	-0.03	+0.06	+0.01	+0.02	-0.06
$\bar{D}\phi\delta$, $D\omega\delta$	+0.3	-0.8	+0.3	-0.8	+0.3	-0.8	+0.3	-0.8

APPARENT PLACES OF STARS, 1919.

485

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Time.	μ Aquarii. Mag. 4.8		β Indi. Mag. 3.7		γ Vulpeculae. Mag. 5.2		γ H ¹ . Draconis. Mag. 5.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 20 48	° ' " - 9 16	h m 20 48	° ' " -58 45	h m 20 51	° ' " +27 44	h m 20 51	° ' " +80 14
	s	"	s	"	s	"	s	"
1. 1.1	17.089	73.60	28.530	41.27	6.109	67.12	11.73	75.41
11.1	17.104	74.03	28.509	38.96	6.086	64.94	11.05	72.66
21.0	17.152	74.41	28.558	36.44	6.101	62.65	10.59	69.63
31.0	17.233	74.68	28.674	33.81	6.153	60.36	10.38	66.39
b. 10.0	17.345	74.85	28.854	31.12	6.242	58.14	10.41	63.10
	142	1	242	270	128	203	29	323
20.0	17.487	74.86	29.096	28.42	6.370	56.11	10.70	59.87
17. 1.9	17.657	74.69	29.394	25.77	6.533	54.34	11.20	56.85
11.9	17.855	74.32	29.744	23.23	6.731	52.91	11.93	54.15
21.9	18.078	73.74	30.140	20.83	6.960	51.91	12.86	51.87
31.8	18.325	72.93	30.577	18.64	7.219	51.36	13.94	50.11
	267	100	470	197	283	5	121	118
17. 10.8	18.592	71.93	31.047	16.67	7.502	51.31	15.15	48.93
20.8	18.876	70.72	31.547	14.98	7.804	51.76	16.43	48.36
30.8	19.173	69.36	32.064	13.61	8.119	52.69	17.74	48.43
17. 10.7	19.479	67.87	32.591	12.58	8.440	54.08	19.05	49.10
20.7	19.784	66.30	33.118	11.92	8.760	55.88	20.30	50.35
	308	161	514	27	310	216	115	185
30.7	20.084	64.69	33.632	11.65	9.070	58.04	21.45	52.20
17. 9.7	20.372	63.10	34.122	11.76	9.364	60.48	22.49	54.50
19.6	20.640	61.56	34.576	12.25	9.633	63.15	23.39	57.26
29.6	20.881	60.12	34.983	13.12	9.872	65.95	24.09	60.36
17. 9.6	21.090	58.81	35.332	14.34	10.071	68.84	24.62	63.69
	170	114	280	152	158	289	31	354
19.5	21.260	57.67	35.612	15.86	10.229	71.73	24.93	67.23
29.5	21.387	56.71	35.818	17.63	10.341	74.56	25.04	70.89
17. 8.5	21.470	55.94	35.943	19.59	10.404	77.27	24.94	74.56
18.5	21.507	55.36	35.984	21.68	10.420	79.80	24.62	78.17
28.4	21.499	54.97	35.944	23.80	10.389	82.11	24.11	81.63
	49	20	119	208	75	205	71	328
17. 7.4	21.450	54.77	35.825	25.88	10.314	84.16	23.40	84.91
17.4	21.363	54.71	35.633	27.84	10.201	85.90	22.53	87.89
27.4	21.245	54.79	35.381	29.57	10.057	87.33	21.52	90.54
17. 7.3	21.105	55.00	35.081	31.04	9.887	88.40	20.37	92.80
17.3	20.950	55.29	34.748	32.14	9.703	89.10	19.13	94.60
	161	36	348	68	193	31	131	130
27.3	20.789	55.65	34.400	32.82	9.510	89.41	17.82	95.90
17. 6.2	20.632	56.07	34.051	33.08	9.319	89.33	16.47	96.68
16.2	20.487	56.52	33.720	32.87	9.137	88.86	15.13	96.87
26.2	20.361	57.01	33.421	32.21	8.972	88.00	13.82	96.46
17. 6.2	20.259	57.52	33.168	31.12	8.829	86.77	12.58	95.47
	73	51	198	150	114	158	112	153
16.1	20.186	58.03	32.970	29.62	8.715	85.19	11.46	93.94
26.1	20.144	58.53	32.836	27.78	8.632	83.34	10.48	91.85
36.1	20.136	59.01	32.768	25.64	8.583	81.25	9.67	89.33
	8	48	68	214	49	209	81	252
Place	17.181	77.40	29.396	38.12	6.450	56.14	18.445	57.55
, Tan δ	1.013	-0.164	1.928	-1.648	1.130	+0.526	5.907	+5.822
D_{cor}	+0.06	+0.01	+0.09	+0.07	+0.06	-0.02	-0.05	-0.28
λ_{cor}	+0.8	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

486 APPARENT PLACES OF STARS, 1919.
FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	♄ Cygni. Mag. 4.0		♌ Octantis. Mag. 5.2		γ Microscopi. Mag. 4.7		♄ Capricorni. Mag. 4.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 20 54	° ' +40 51	h m 20 54	° ' -77 19	h m 20 56	° ' -32 34	h m 21 1	° ' -17
	s	"	s	"	s	"	s	"
Jan. 1.1	8.561 ⁵⁸	30.21 ²⁵⁵	53.84 ²¹	68.94 ³⁰⁶	19.449 ⁶	31.03 ⁸⁹	23.684 ⁴	77.99
11.1	8.503 ¹²	27.66 ²⁷¹	53.63 ²	65.88 ³²⁶	19.455 ⁴⁵	30.14 ¹⁰⁵	23.688 ³⁹	77.96
21.0	8.491 ³³	24.95 ²⁷⁸	53.61 ¹³	62.62 ³³⁹	19.500 ⁸⁵	29.09 ¹¹⁹	23.727 ⁷²	77.82
31.0	8.524 ⁸⁰	22.17 ²⁷⁴	53.74 ³⁰	59.23 ³⁴²	19.585 ¹²¹	27.90 ¹³⁰	23.799 ¹⁰³	77.55
Feb. 10.0	8.604 ¹²⁶	19.43 ²⁵⁶	54.04 ⁴⁶	55.81 ³³⁶	19.706 ¹⁵⁷	26.60 ¹⁴¹	23.902 ¹³⁴	77.17
20.0	8.730 ¹⁷¹	16.87 ²³²	54.50 ⁵⁹	52.45 ³²⁴	19.863 ¹⁸⁹	25.19 ¹⁴⁹	24.036 ¹⁶⁵	76.65
Mar. 1.9	8.901 ²¹⁴	14.55 ¹⁹⁴	55.09 ⁷⁴	49.21 ³⁰⁵	20.062 ²²²	23.70 ¹⁵⁶	24.201 ¹⁹³	75.96
11.9	9.115 ²⁵³	12.61 ¹⁸⁰	55.83 ⁸⁴	46.16 ²⁸⁰	20.274 ²⁶²	22.14 ¹⁶¹	24.394 ²²¹	75.13
21.9	9.368 ²⁸⁸	11.11 ⁹⁸	56.67 ⁹⁵	43.36 ²⁴⁷	20.526 ²⁷⁸	20.53 ¹⁶⁴	24.615 ²⁴⁷	74.14
31.9	9.656 ³¹⁷	10.13 ⁴³	57.62 ¹⁰³	40.89 ²¹²	20.804 ³⁰⁸	18.89 ¹⁶²	24.862 ²⁶⁹	72.96
Apr. 10.8	9.973 ³³⁹	9.70 ¹³	58.65 ¹⁰⁶	38.77 ¹⁷²	21.107 ³²³	17.27 ¹⁸⁰	25.131 ²⁸⁸	71.70
20.8	10.312 ³⁵⁴	9.83 ⁶⁹	59.73 ¹¹²	37.05 ¹²⁸	21.430 ³³⁸	15.67 ¹⁵³	25.419 ³⁰⁵	70.30
30.8	10.666 ³⁵⁹	10.52 ¹²³	60.85 ¹¹⁴	35.77 ⁸³	21.768 ³⁶⁰	14.15 ¹⁴³	25.724 ³¹³	68.82
May 10.7	11.025 ³⁵⁷	11.75 ¹⁷³	61.99 ¹¹³	34.94 ³³	22.118 ³⁸⁰	12.73 ¹²⁷	26.037 ³¹⁷	67.90
20.7	11.382 ³⁴⁴	13.48 ²¹⁷	63.12 ¹¹⁰	34.61 ¹³	22.468 ³⁴⁷	11.46 ¹⁰⁶	26.354 ³¹⁵	65.78
30.7	11.726 ³²³	15.65 ²⁵⁵	64.22 ¹⁰⁵	34.74 ⁶¹	22.815 ³³⁴	10.38 ⁸⁸	26.669 ³⁰²	64.30
June 9.7	12.049 ²⁹³	18.20 ²⁸⁵	65.27 ⁹⁵	35.35 ¹⁰⁷	23.149 ³¹³	9.50 ⁶⁴	26.971 ²⁸⁵	62.90
19.6	12.342 ²⁵⁶	21.05 ³⁰⁸	66.22 ⁸⁶	36.42 ¹⁵⁰	23.462 ²⁸⁵	8.86 ³⁹	27.256 ²⁶⁰	61.62
29.6	12.598 ²¹²	24.13 ³²²	67.08 ⁷³	37.92 ¹⁸⁸	23.747 ²⁴⁶	8.47 ¹²	27.516 ²²⁷	60.51
July 9.6	12.810 ¹⁶⁴	27.35 ³²⁸	67.81 ⁵⁷	39.80 ²²²	23.993 ²⁰⁵	8.35 ¹³	27.743 ¹⁸⁹	59.58
19.5	12.974 ¹¹²	30.63 ³²⁸	68.38 ⁴⁰	42.02 ²⁴⁸	24.198 ¹⁵⁷	8.48 ³⁶	27.932 ¹⁴⁶	58.86
29.5	13.086 ⁵⁷	33.91 ³²⁰	68.78 ²³	44.50 ²⁶⁶	24.355 ¹⁰⁶	8.84 ⁵⁸	28.078 ¹⁰⁰	58.34
Aug. 8.5	13.143 ³	37.11 ³⁰³	69.01 ⁵	47.16 ²⁷⁵	24.461 ⁵²	9.42 ⁷⁹	28.178 ⁵³	58.04
18.5	13.146 ⁵¹	40.14 ²⁸⁵	69.06 ¹⁵	49.91 ²⁷⁴	24.513 ²	10.21 ⁹⁰	28.231 ⁶	57.93
28.4	13.095 ⁹⁹	42.99 ²⁵⁶	68.91 ³³	52.65 ²⁶³	24.511 ⁵¹	11.11 ¹⁰⁰	28.237 ³⁹	58.01
Sept. 7.4	12.996 ¹⁴¹	45.55 ²²⁶	68.58 ⁵⁰	55.28 ²⁴²	24.460 ⁹⁵	12.11 ¹⁰⁴	28.198 ⁷⁹	58.24
17.4	12.855 ¹⁷⁸	47.81 ¹⁹⁰	68.08 ⁶³	57.70 ²¹¹	24.365 ¹³⁴	13.15 ¹⁰²	28.119 ¹¹²	58.59
27.4	12.677 ²⁰⁸	49.71 ¹⁵⁰	67.45 ⁷⁶	59.81 ¹⁷¹	24.231 ¹⁶⁴	14.17 ⁹⁶	28.007 ¹³⁷	59.05
Oct. 7.3	12.469 ²²⁶	51.21 ¹⁰⁷	66.69 ⁸⁵	61.52 ¹²⁴	24.067 ¹⁸³	15.13 ⁸⁴	27.870 ¹⁵⁵	59.56
17.3	12.243 ²³⁷	52.28 ⁶¹	65.84 ⁹⁰	62.76 ⁷¹	23.884 ¹⁹²	15.97 ⁶⁶	27.715 ¹⁶³	60.08
27.3	12.006 ²³⁸	52.89 ¹⁴	64.94 ⁹²	63.47 ¹⁴	23.692 ¹⁹¹	16.63 ⁴⁹	27.552 ¹⁶²	60.61
Nov. 6.2	11.768 ²³¹	53.03 ³⁴	64.02 ⁹⁰	63.61 ⁴⁶	23.501 ¹⁷⁹	17.12 ²⁷	27.390 ¹⁵³	61.10
16.2	11.537 ²¹³	52.69 ⁸²	63.12 ⁸⁴	63.15 ¹⁰²	23.322 ¹⁵⁸	17.39 ⁵	27.237 ¹³⁶	61.53
26.2	11.324 ¹⁹¹	51.87 ¹²⁸	62.28 ⁷⁴	62.13 ¹⁵⁹	23.164 ¹³⁰	17.44 ³⁸	27.101 ⁸²	61.91
Dec. 6.2	11.133 ¹⁶⁰	50.59 ¹⁷²	61.54 ⁶²	60.54 ²⁰⁸	23.034 ⁹⁸	17.26 ³⁸	26.990 ⁸²	62.21
16.1	10.973 ¹²⁵	48.87 ²¹¹	60.92 ⁴⁶	58.46 ²⁵¹	22.936 ⁶⁰	16.88 ⁵⁹	26.908 ⁵³	62.41
26.1	10.848 ⁸⁶	46.76 ²⁴⁰	60.46 ³²	55.95 ²⁸⁵	22.876 ²¹	16.29 ⁷⁸	26.855 ¹⁸	62.55
36.1	10.762	44.36	60.14	53.10	22.855	15.51	26.837	62.59
Mean Place	9.161	16.75	57.160	64.53	19.631	30.68	23.751	80.16
Sec δ, Tan δ	1.322	+0.865	4.560	-4.449	1.187	-0.639	1.049	-0.316
<i>D</i> ♄ <i>a</i> , <i>D</i> ♄ <i>a</i>	+0.04	-0.04	+0.15	+0.20	+0.07	+0.03	+0.07	+0.02
<i>δ</i> , <i>D</i> ♄ <i>δ</i>	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

APPARENT PLACES OF STARS, 1919.

487

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ξ Cygni. Mag. 3.9		61 Cygni pr. Mag. 5.6		ν Aquarii. Mag. 4.5		Bradley 2777. Mag. 5.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 21 1	° ' " +43 36	h m 21 3	° ' " +38 20	h m 21 5	° ' " -11 41	h m 21 7	° ' " +77 47
	s	"	s	"	s	"	s	"
Jan. 1.1	58.409 ⁷⁴	29.65 ²⁶⁵	15.343 ⁴⁶	74.68 ²³⁴	10.944 ⁰	57.77 ²⁰	4.14 ⁵⁶	72.39 ²⁶⁴
11.1	58.335 ²⁸	27.10 ²⁷⁴	15.297 ³	72.34 ²⁵¹	10.944 ³³	58.06 ¹⁹	3.58 ⁴¹	69.75 ²⁹⁷
21.0	58.307 ¹⁹	24.36 ²⁸³	15.294 ³⁹	69.83 ²⁶⁸	10.977 ⁶⁵	58.25 ¹¹	3.17 ²³	66.78 ³¹⁹
31.0	58.326 ⁶⁹	21.53 ²⁸¹	15.333 ⁸⁵	67.25 ²⁵³	11.042 ⁹⁵	58.36 ³	2.94 ²	63.59 ³²⁹
Feb. 10.0	58.395 ¹¹⁷	18.72 ²⁶⁶	15.418 ¹²⁸	64.72 ²³⁰	11.137 ¹²⁷	58.33 ¹⁸	2.92 ¹⁷	60.30 ³²⁵
20.0	58.512 ¹⁶⁵	16.06 ²⁴³	15.546 ¹⁷¹	62.33 ²¹²	11.264 ¹⁵⁶	58.15 ³⁵	3.09 ³⁶	57.05 ³⁰⁹
Mar. 1.9	58.677 ²¹⁰	13.63 ²⁰⁶	15.717 ²¹³	60.21 ¹⁷⁷	11.420 ¹⁸⁴	57.80 ⁵⁴	3.45 ⁵⁴	53.96 ²⁸⁰
11.9	58.887 ²⁵⁴	11.57 ¹⁶³	15.930 ²⁵¹	58.44 ¹³³	11.604 ²¹²	57.26 ⁷⁵	3.99 ⁷⁰	51.16 ²⁴⁰
21.9	59.141 ²⁹¹	9.94 ¹¹³	16.181 ²⁸⁵	57.11 ⁸⁴	11.816 ²³⁸	56.51 ⁹⁴	4.69 ⁸⁵	48.76 ¹⁹⁰
31.9	59.432 ³²²	8.81 ⁵⁸	16.466 ³¹⁵	56.27 ³¹	12.054 ²⁶¹	55.57 ¹¹⁴	5.54 ⁹⁴	46.86 ¹³⁴
Apr. 10.8	59.754 ³⁴⁸	8.23 ¹	16.781 ³³⁷	55.96 ²⁴	12.315 ²⁸⁰	54.43 ¹³⁰	6.48 ¹⁰²	45.52 ⁷⁵
20.8	60.102 ³⁶⁴	8.24 ⁵⁷	17.118 ³⁵⁴	56.20 ⁷⁹	12.595 ²⁹⁶	53.13 ¹⁴⁴	7.50 ¹⁰⁶	44.77 ¹¹
30.8	60.466 ³⁷¹	8.81 ¹¹²	17.472 ³⁶⁰	56.99 ¹³²	12.891 ³⁰⁷	51.69 ¹⁵⁵	8.56 ¹⁰⁷	44.66 ⁵²
May 10.7	60.837 ³⁷⁰	9.93 ¹⁶⁴	17.832 ³⁵⁹	58.31 ¹⁸⁰	13.198 ³¹⁰	50.14 ¹⁶⁰	9.63 ¹⁰⁴	45.18 ¹¹³
20.7	61.207 ³⁵⁸	11.57 ²¹¹	18.191 ³⁴⁸	60.11 ²²⁴	13.508 ³⁰⁷	48.54 ¹⁶²	10.67 ⁹⁹	46.30 ¹⁶⁸
30.7	61.565 ³³⁸	13.68 ²⁵¹	18.539 ³³⁰	62.35 ²⁶⁰	13.815 ²⁹⁸	46.92 ¹⁵⁸	11.66 ⁹⁰	47.98 ²²⁰
June 9.7	61.903 ³⁰⁷	16.19 ²⁸³	18.869 ³⁰²	64.95 ²⁸⁹	14.113 ²⁷⁹	45.34 ¹⁵¹	12.56 ⁷⁸	50.18 ²⁶⁴
19.6	62.210 ²⁷⁰	19.02 ³⁰⁹	19.171 ²⁶⁷	67.84 ³¹²	14.392 ²⁵⁵	43.83 ¹⁴⁰	13.34 ⁶⁶	52.82 ³⁰²
29.6	62.480 ²²⁵	22.11 ³²⁴	19.438 ²²⁶	70.96 ³³¹	14.647 ²²³	42.43 ¹²³	14.00 ³⁴	55.84 ³³⁰
July 9.6	62.705 ¹⁷⁵	25.35 ³³⁴	19.664 ¹⁷⁹	74.20 ³³¹	14.870 ¹⁸⁷	41.20 ¹⁰⁷	14.51 ³⁴	59.14 ³⁵³
19.6	62.880 ¹²²	28.69 ³³⁶	19.843 ¹²⁸	77.51 ³³⁰	15.057 ¹⁴⁵	40.13 ⁸⁶	14.85 ¹⁸	62.67 ³⁶⁵
29.5	63.002 ⁶⁶	32.05 ³²⁹	19.971 ⁷⁶	80.81 ³²¹	15.202 ¹⁰⁰	39.27 ⁶⁶	15.03 ²	66.32 ³⁷¹
Aug. 8.5	63.068 ⁹	35.34 ³¹⁶	20.047 ²⁴	84.02 ³⁰⁶	15.302 ⁵⁷	38.61 ⁴⁶	15.05 ¹⁷	70.03 ³⁶⁸
18.5	63.077 ⁴⁶	38.50 ²⁷²	20.071 ²⁸	87.08 ²⁸⁶	15.355 ⁹	38.15 ²⁶	14.88 ³²	73.71 ³⁵⁶
28.4	63.031 ⁹⁷	41.45 ²⁹⁵	20.043 ⁷⁵	89.94 ²⁵⁹	15.364 ³⁵	37.89 ⁹	14.56 ⁴⁷	77.27 ³⁴⁰
Sept. 7.4	62.934 ¹⁴¹	44.17 ²⁴⁰	19.968 ¹¹⁸	92.53 ²³⁰	15.329 ⁷⁴	37.80 ⁷	14.09 ⁶³	80.67 ³¹³
17.4	62.793 ¹⁸¹	46.57 ²⁰⁴	19.850 ¹⁵⁴	94.83 ¹⁹³	15.255 ¹⁰⁶	37.87 ²¹	13.46 ⁷⁴	83.80 ²⁸³
27.4	62.612 ²¹³	48.61 ¹⁶⁵	19.696 ¹⁸²	96.76 ¹⁵⁵	15.149 ¹³¹	38.08 ³⁰	12.72 ⁸⁵	86.63 ²⁴³
Oct. 7.3	62.399 ²³³	50.26 ¹²¹	19.514 ²⁰²	98.31 ¹¹³	15.018 ¹⁴⁸	38.38 ³⁸	11.87 ⁹⁴	89.06 ¹⁹⁹
17.3	62.166 ²⁴⁷	51.47 ⁷⁵	19.312 ²¹⁴	99.44 ⁷⁰	14.870 ¹⁵⁷	38.76 ⁴⁴	10.93 ¹⁰⁰	91.05 ¹⁵¹
27.3	61.919 ²⁵⁰	52.22 ²⁷	19.098 ²¹⁴	100.14 ²⁴	14.713 ¹⁵⁶	39.20 ⁴⁶	9.93 ¹⁰⁴	92.56 ⁹⁶
Nov. 6.3	61.669 ²⁴⁴	52.49 ²²	18.884 ²⁰⁷	100.38 ²³	14.557 ¹⁴⁸	39.66 ⁴⁸	8.89 ¹⁰⁴	93.52 ³⁸
16.2	61.425 ²³⁰	52.27 ⁷²	18.677 ¹⁹⁴	100.15 ⁶⁹	14.409 ¹³¹	40.14 ⁴⁷	7.85 ¹⁰⁴	93.90 ²⁰
26.2	61.195 ²⁰⁶	51.55 ¹²⁰	18.483 ¹⁴³	99.46 ¹⁵⁵	14.278 ⁸³	40.61 ⁴³	6.81 ⁹¹	93.70 ¹³⁹
Dec. 6.2	60.989 ¹⁷⁷	50.35 ¹⁶⁶	18.313 ¹⁴³	98.32 ¹⁶⁵	14.169 ⁸³	41.07 ⁴³	5.83 ⁹¹	92.91 ¹³⁹
16.1	60.812 ¹⁴⁴	48.69 ²⁰⁷	18.170 ¹¹⁰	96.77 ¹⁹¹	14.086 ⁵⁴	41.50 ⁴⁰	4.92 ⁸⁰	91.52 ¹⁹²
26.1	60.668 ¹⁰³	46.62 ²³⁹	18.060 ⁷²	94.86 ²²³	14.032 ²²	41.90 ³⁵	4.12 ⁶⁷	89.60 ²³⁵
36.1	60.565	44.23	17.988	92.63	14.010	42.25	3.45	87.22
Mean Place	59.037	15.27	15.836	61.37	10.966	61.06	8.907	53.39
Sec δ, Tan δ	1.381	+0.953	1.275	+0.791	1.021	-0.207	4.733	+4.627
D _α , D _α	+0.04	-0.05	+0.05	-0.04	+0.06	+0.01	-0.02	-0.22
D _δ , D _δ	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	3 Piscis Australis. Mag. 5.6		Cygni. Mag. 3.4		Cygni. Mag. 3.8		Equulei. Mag. 4.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m	° ' "	h m	° ' "	h m	° ' "	h m	° ' "
	21 8	-27 56	21 9	+29 53	21 11	+37 41	21 11	+4 54
Jan. 1.1	29.228	61.58	28.999	50.62	33.011	70.56	46.462	51.09
11.1	29.224	60.97	28.955	48.47	32.949	68.23	46.449	49.96
21.1	29.256	60.19	28.948	46.19	32.924	65.72	46.467	48.83
31.0	29.324	59.29	28.978	43.86	32.942	63.11	46.516	47.74
Feb. 10.0	29.427	58.24	29.047	41.57	33.004	60.53	46.597	46.76
20.0	29.563	57.06	29.154	39.44	33.108	58.09	46.708	45.94
Mar. 1.9	29.732	55.77	29.299	37.54	33.256	55.89	46.849	45.34
11.9	29.933	54.38	29.481	35.98	33.445	54.00	47.021	45.00
21.9	30.162	52.89	29.699	34.81	33.674	52.54	47.221	44.96
31.9	30.420	51.34	29.949	34.10	33.940	51.55	47.447	45.24
Apr. 10.8	30.703	49.74	30.225	33.88	34.236	51.09	47.699	45.85
20.8	31.008	48.12	30.526	34.16	34.556	51.17	47.970	46.76
30.8	31.329	46.52	30.843	34.94	34.895	51.78	48.258	47.99
May 10.8	31.663	44.98	31.169	36.19	35.243	52.92	48.557	49.48
20.7	32.001	43.54	31.498	37.88	35.593	54.55	48.860	51.20
30.7	32.338	42.25	31.820	39.94	35.935	56.61	49.160	53.09
June 9.7	32.664	41.14	32.127	42.32	36.262	59.05	49.451	55.09
19.6	32.971	40.22	32.412	44.96	36.562	61.78	49.724	57.16
29.6	33.254	39.55	32.667	47.77	36.830	64.76	49.971	59.23
July 9.6	33.502	39.11	32.885	50.69	37.059	67.86	50.189	61.25
19.6	33.711	38.93	33.063	53.64	37.242	71.06	50.370	63.19
29.5	33.874	38.99	33.194	56.57	37.377	74.26	50.510	64.98
Aug. 8.5	33.988	39.29	33.277	59.40	37.458	77.39	50.608	66.60
18.5	34.052	39.79	33.311	62.07	37.488	80.38	50.661	68.04
28.4	34.065	40.46	33.297	64.54	37.467	83.19	50.670	69.25
Sept. 7.4	34.029	41.25	33.239	66.76	37.397	85.75	50.637	70.25
17.4	33.950	42.12	33.141	68.69	37.284	88.02	50.567	71.02
27.4	33.833	43.03	33.008	70.30	37.134	89.94	50.465	71.57
Oct. 7.3	33.687	43.91	32.847	71.56	36.955	91.50	50.337	71.88
17.3	33.519	44.71	32.668	72.46	36.754	92.65	50.194	72.00
27.3	33.342	45.41	32.478	72.95	36.539	93.37	50.041	71.90
Nov. 6.3	33.164	45.98	32.286	73.05	36.322	93.64	49.887	71.60
16.2	32.996	46.39	32.099	72.73	36.109	93.45	49.741	71.13
26.2	32.844	46.60	31.925	72.02	35.908	92.80	49.607	70.47
Dec. 6.2	32.717	46.64	31.772	70.91	35.726	91.71	49.494	69.66
16.1	32.618	46.49	31.643	69.45	35.571	90.20	49.403	68.72
26.1	32.554	46.17	31.541	67.67	35.446	88.31	49.340	67.67
36.1	32.524	45.67	31.474	65.62	35.355	86.10	49.306	66.53
Mean Place	29.333	61.69	29.280	38.40	33.424	56.72	46.504	44.19
Sec δ , Tan δ	1.132	-0.530	1.154	+0.575	1.264	+0.773	1.004	+0.086
$D\psi\alpha$, $D\omega\alpha$	+0.07	+0.03	+0.05	-0.03	+0.05	-0.04	+0.06	0.00
ψ , $D\omega\delta$	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

APPARENT PLACES OF STARS, 1919.

489

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	σ Cygni. Mag. 4.3		θ ¹ Microscopii. Mag. 4.9		α Cephei. Mag. 2.6		ι Capricorni. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 21 14	° ' " +39 3	h m 21 15	° ' " -41 8	h m 21 16	° ' " +62 14	h m 21 17	° ' " -17 10
	s	"	s	"	s	"	s	"
Jan. 1.1	13.583 70	31.43 236	34.731 23	72.13 132	37.44 21	49.51 263	44.325 11	46.81 2
11.1	13.513 80	29.07 257	34.708 19	70.81 154	37.23 13	46.88 295	44.314 22	46.79 13
21.1	13.483 12	26.50 265	34.727 62	69.27 171	37.10 7	43.93 814	44.336 54	46.66 26
31.0	13.495 56	23.85 263	34.789 103	67.56 185	37.03 2	40.79 320	44.390 117	46.40 54
Feb. 10.0	13.551 101	21.22 251	34.892 145	65.71 195	37.05 10	37.59 315	44.476 147	46.00 71
20.0	13.652 146	18.71 239	35.037 182	63.76 203	37.15 19	34.44 295	44.593 177	45.46 87
Mar. 1.9	13.798 188	16.42 195	35.219 221	61.73 207	37.34 26	31.49 265	44.740 207	44.75 104
11.9	13.986 229	14.47 154	35.440 256	59.66 207	37.60 34	28.84 224	44.917 233	43.88 121
21.9	14.215 267	12.93 107	35.696 288	57.59 205	37.94 40	26.60 174	45.124 259	42.84 135
31.9	14.482 299	11.86 54	35.984 318	55.54 197	38.34 45	24.86 118	45.357 280	41.63 147
Apr. 10.8	14.781 323	11.32 2	36.302 343	53.57 187	38.79 50	23.68 58	45.616 299	40.28 155
20.8	15.104 343	11.34 55	36.645 378	51.70 173	39.29 52	23.10 6	45.896 310	38.81 160
30.8	15.447 354	11.89 108	37.008 385	49.97 153	39.81 53	23.16 67	46.195 317	37.26 161
May 10.8	15.801 355	12.98 158	37.386 383	48.44 131	40.34 53	23.83 126	46.505 317	35.66 158
20.7	16.156 346	14.56 208	37.771 383	47.13 105	40.87 51	25.09 181	46.822 307	34.05 149
30.7	16.502 323	16.59 241	38.154 373	46.08 76	41.38 48	26.90 231	47.139 293	32.47 137
June 9.7	16.834 306	19.00 273	38.527 353	45.32 46	41.86 43	29.21 274	47.446 268	30.98 121
19.6	17.139 273	21.72 298	38.880 326	44.86 14	42.29 38	31.95 306	47.739 240	29.61 81
29.6	17.412 187	24.70 321	39.206 242	44.72 48	42.67 23	35.03 355	48.007 202	28.40 59
July 9.6	17.645 136	27.82 334	39.492 194	44.90 77	42.98 15	38.39 365	48.247 160	27.38 37
19.6	17.832 85	31.03 317	39.734 134	45.38 101	43.21 8	41.94 368	48.449 115	26.57 14
29.5	17.968 31	34.27 303	39.928 77	46.15 123	43.36 0	45.59 382	48.609 21	25.98 4
Aug. 8.5	18.053 70	37.44 261	40.062 39	47.16 146	43.44 16	49.27 328	48.724 64	25.61 23
18.5	18.084 114	40.47 223	40.139 91	48.39 148	43.44 24	52.89 301	48.793 99	25.47 35
28.5	18.064 152	43.33 196	40.157 144	49.76 144	43.36 29	56.38 268	48.814 127	25.51 54
Sept. 7.4	17.994 182	45.94 160	40.118 174	51.22 132	43.20 33	59.66 228	48.790 184	25.74 57
17.4	17.880 205	48.27 77	40.027 215	52.70 92	42.96 41	62.67 134	48.726 157	26.09 55
27.4	17.728 218	50.25 31	39.891 218	54.14 63	42.67 42	65.35 81	48.627 159	26.56 50
Oct. 7.3	17.546 219	51.85 16	39.717 210	55.46 33	42.34 43	67.63 25	48.500 153	27.10 43
17.3	17.341 207	53.05 62	39.518 193	56.59 2	41.96 41	69.47 90	48.353 146	27.67 26
27.3	17.123 162	53.82 151	39.303 133	57.51 62	41.55 36	70.81 146	48.196 93	28.24 55
Nov. 6.3	16.901 122	54.13 81	39.085 218	58.14 159	41.13 42	71.62 159	48.037 153	28.79 50
16.2	16.682 307	53.97 62	38.875 193	58.47 138	40.70 41	71.87 33	47.884 117	29.29 35
26.2	16.475 162	53.35 151	38.682 133	58.49 62	40.29 31	71.54 197	47.746 63	29.72 17
Dec. 6.2	16.286 95	52.27 222	38.515 54	58.19 115	39.90 25	70.64 242	47.629 32	30.07 9
16.2	16.124 122	50.76 180	38.382 95	57.57 80	39.54 31	69.18 197	47.536 63	30.33 17
26.1	15.992 162	49.87 222	38.287 54	56.68 115	39.23 25	67.21 242	47.473 32	30.50 9
36.1	15.897 95	46.65 222	38.233 54	55.53 115	38.98 25	64.79 242	47.441 32	30.59 9
Mean Place	14.011	17.18	34.975	69.83	38.892	31.36	44.339	48.86
Sec δ, Tan δ	1.288	+0.812	1.328	-0.874	2.148	+1.900	1.047	-0.309
D ₂₀ , D ₂₀	+0.06	-0.04	+0.06	+0.04	+0.03	-0.10	+0.07	+0.02
D ₂₀ , D ₂₀	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	1 Pegasi. Mag. 4.2		γ Pavonis. Mag. 4.3		ζ Capricorni. Mag. 3.9		γ Cygni. Mag. 5.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 21 18	° ' " +19 27	h m 21 19	° ' " -65 43	h m 21 22	° ' " -22 45	h m 21 26	° ' " +46 18
Jan. 1.1	20.304 ³³	36.65 ¹⁷³	44.64 ¹²	67.36 ²⁵³	2.726 ¹⁶	45.61 ³²	27.041 ¹⁰⁹	74.98 ²⁵
11.1	20.271 ²	34.92 ¹⁸²	44.52 ³	64.83 ²⁷⁸	2.710 ¹⁸	45.29 ⁴⁶	26.932 ⁶⁴	72.59 ²⁵
21.1	20.269 ³³	33.10 ¹⁸³	44.49 ⁵	62.05 ²⁹⁹	2.728 ⁵⁰	44.83 ⁶⁰	26.868 ¹⁷	69.90 ²⁵
31.0	20.302 ⁶⁶	31.27 ¹⁷⁷	44.54 ¹²	59.06 ³¹⁰	2.778 ⁸⁴	44.23 ⁷⁶	26.851 ³³	67.12 ²⁵
Feb. 10.0	20.368 ⁹⁹	29.50 ¹⁶¹	44.66 ²¹	55.96 ³¹⁴	2.862 ¹¹⁶	43.47 ⁹⁰	26.884 ⁸⁴	64.29 ²⁵
20.0	20.467 ¹³⁴	27.89 ¹⁴⁰	44.87 ²⁸	52.82 ³¹³	2.978 ¹⁴⁷	42.57 ¹⁰⁵	26.968 ¹³⁷	61.53 ²⁵
Mar. 1.9	20.601 ¹⁶⁷	26.49 ¹⁰⁸	45.15 ³⁶	49.69 ³⁰²	3.125 ¹⁷⁹	41.52 ¹²⁰	27.105 ¹⁸⁸	58.98 ²⁵
11.9	20.768 ²⁰⁰	25.41 ⁷⁴	45.51 ⁴³	46.67 ²⁸⁹	3.304 ²⁰⁹	40.32 ¹³²	27.293 ²³⁵	56.73 ²⁵
21.9	20.968 ²²⁹	24.67 ³³	45.94 ⁴⁸	43.78 ²⁶⁷	3.513 ²³⁷	39.00 ¹⁴⁴	27.528 ²⁷⁹	54.87 ²⁵
31.9	21.197 ²⁵⁷	24.34 ⁹	46.42 ⁵³	41.11 ²⁴²	3.750 ²⁶⁴	37.56 ¹⁵⁴	27.807 ³¹⁷	53.49 ²⁵
Apr. 10.8	21.454 ²⁷⁹	24.43 ⁵²	46.95 ⁵⁸	38.69 ²¹²	4.014 ²⁸⁷	36.02 ¹⁶²	28.124 ³⁴⁹	52.64 ²⁵
20.8	21.733 ²⁹⁶	24.95 ⁹⁴	47.53 ⁶¹	36.57 ¹⁷⁶	4.301 ³⁰⁷	34.40 ¹⁶⁵	28.473 ³⁷²	52.38 ²⁵
30.8	22.029 ³⁰⁹	25.89 ¹³⁴	48.14 ⁶³	34.81 ¹³⁸	4.608 ³¹⁹	32.75 ¹⁶³	28.845 ³⁸⁵	52.64 ²⁵
May 10.8	22.338 ³¹³	27.23 ¹⁷⁰	48.77 ⁶⁴	33.43 ⁹⁶	4.927 ³²⁶	31.12 ¹⁵⁹	29.230 ³⁸⁸	53.50 ²⁵
20.7	22.651 ³¹⁰	28.93 ²⁰⁰	49.41 ⁶³	32.47 ⁵³	5.253 ³²⁷	29.53 ¹⁴⁹	29.618 ³⁸³	54.90 ²⁵
30.7	22.961 ²⁹⁸	30.93 ²²⁴	50.04 ⁶²	31.94 ⁷	5.580 ³¹⁹	28.04 ¹³⁷	30.001 ³⁶⁵	56.78 ²⁵
June 9.7	23.259 ²⁸¹	33.17 ²⁴²	50.66 ⁵⁸	31.87 ³⁷	5.899 ³⁰³	26.67 ¹¹⁸	30.366 ³³⁸	59.10 ²⁵
19.6	23.540 ²⁵³	35.59 ²⁵³	51.24 ⁵³	32.24 ⁸¹	6.202 ²⁸¹	25.49 ¹⁰⁰	30.704 ³⁰³	61.80 ²⁵
29.6	23.793 ²²²	38.12 ²⁶⁰	51.77 ⁴⁷	33.05 ¹²²	6.483 ²¹²	24.49 ⁵³	31.007 ²¹⁰	64.79 ²⁵
July 9.6	24.015 ¹⁸⁵	40.72 ²⁵⁷	52.24 ³⁸	34.27 ¹⁵⁸	6.732 ¹⁷⁰	23.73 ²⁸	31.267 ¹⁵⁶	68.00 ²⁵
19.6	24.200 ¹⁴²	43.29 ²⁵¹	52.62 ³⁰	35.85 ¹⁹⁰	6.944 ¹²³	23.20 ⁵	31.477 ⁹⁹	71.34 ²⁵
29.5	24.342 ⁹⁷	45.80 ²³⁹	52.92 ²¹	37.75 ²¹⁶	7.114 ⁷⁵	22.92 ¹⁸	31.633 ⁴⁰	74.74 ²⁵
Aug. 8.5	24.439 ⁵²	48.19 ²²²	53.13 ¹¹	39.91 ²⁴²	7.237 ²⁶	22.87 ³⁶	31.732 ¹⁶	78.13 ²⁵
18.5	24.491 ⁶	50.41 ²⁰⁰	53.24 ⁰	42.24 ²⁴²	7.312 ²¹	23.05 ⁵³	31.772 ⁷⁰	81.43 ²⁵
28.5	24.497 ³⁷	52.41 ¹⁷⁸	53.24 ¹⁰	44.66 ²⁴²	7.338 ⁶³	23.41 ⁶⁵	31.756 ¹²⁰	84.58 ²⁵
Sept. 7.4	24.460 ⁷⁵	54.19 ¹⁵¹	53.14 ²⁰	47.08 ²³³	7.317 ¹⁰⁰	23.94 ⁷³	31.686 ¹⁶³	87.50 ²⁵
17.4	24.385 ¹⁰⁹	55.70 ¹²¹	52.94 ²⁸	49.41 ²¹²	7.254 ¹³⁰	24.59 ⁷⁶	31.566 ¹⁹⁹	90.14 ²⁵
27.4	24.276 ¹³⁴	56.91 ⁹³	52.66 ³⁴	51.53 ¹⁸⁵	7.154 ¹⁵⁰	25.32 ⁶⁹	31.403 ²⁴⁴	92.47 ²⁵
Oct. 7.3	24.142 ¹⁵³	57.84 ²⁸	52.32 ⁴⁴	53.38 ¹⁰⁴	7.024 ¹⁶⁴	26.08 ⁶⁹	31.204 ²¹⁴	94.41 ²⁵
17.3	23.989 ¹⁶⁵	58.45 ¹²⁴	51.91 ³²	54.86 ¹⁴⁸	6.874 ¹⁸⁴	26.82 ²³	30.979 ²⁰³	95.94 ²⁵
27.3	23.824 ¹⁶⁶	58.73 ²	51.47 ⁴⁵	55.90 ⁵⁶	6.710 ¹⁶⁵	27.51 ⁶²	30.735 ²⁵⁴	97.01 ²⁵
Nov. 6.3	23.658 ¹⁶¹	58.71 ³⁶	51.02 ⁴⁵	56.46 ⁵	6.545 ¹⁵⁹	28.13 ⁵⁰	30.481 ²⁵³	97.60 ²⁵
16.2	23.497 ¹⁵⁰	58.35 ⁶⁷	50.57 ⁴³	56.51 ⁴⁹	6.386 ¹⁴⁶	28.63 ³⁸	30.228 ²⁴⁵	97.69 ²⁵
26.2	23.347 ¹³³	57.68 ⁹⁶	50.14 ³⁸	56.02 ⁹⁹	6.240 ¹²⁵	29.01 ²³	29.983 ²²⁹	97.27 ²⁵
Dec. 6.2	23.214 ¹¹⁰	56.72 ¹²⁴	49.76 ³²	55.03 ¹⁴⁸	6.115 ¹⁰¹	29.24 ⁹	29.754 ²⁰³	96.35 ²⁵
16.2	23.104 ⁸⁵	55.48 ¹⁴⁷	49.44 ²⁶	53.55 ¹⁹²	6.014 ⁷⁰	29.33 ⁶	29.551 ¹⁷³	94.94 ²⁵
26.1	23.019 ⁵⁴	54.01 ¹⁶⁷	49.18 ¹⁷	51.63 ²²⁹	5.944 ⁴⁰	29.27 ²¹	29.378 ¹³⁸	93.09 ²⁵
36.1	22.965	52.34	49.01	49.34	5.904	29.06	29.240	90.86
Mean Place	20.412	26.34	45.864	62.02	2.752	46.43	27.567	58.76
Sec δ, Tan δ	1.061	+0.353	2.433	-2.218	1.084	-0.420	1.444	+1.042
D _α , D _{αα}	+0.05	-0.02	+0.10	+0.11	+0.07	+0.02	+0.04	-0.05
D _δ , D _{αδ}	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6

APPARENT PLACES OF STARS, 1919.

491

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Aquarii. Mag. 3.1		β Cephei. Mag. 3.3		ξ Aquarii. Mag. 4.8		74 Cygni. Mag. 5.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 21 27	° ' " - 5 55	h m 21 27	° ' " +70 12	h m 21 33	° ' " - 8 12	h m 21 33	° ' " +40 2
	s	"	s	"	s	"	s	"
Jan. 1.1	17.800	37.11	35.06	37.62	26.541	61.21	41.782	72.13
11.1	17.780	37.67	34.74	35.10	26.518	61.66	41.689	69.88
21.1	17.791	38.19	34.47	32.24	26.522	62.04	41.636	67.41
31.0	17.830	38.60	34.32	29.11	26.557	62.30	41.623	64.80
Feb. 10.0	17.900	38.89	34.28	25.86	26.623	62.44	41.655	62.17
20.0	17.999	39.03	34.36	22.62	26.718	62.42	41.732	59.63
Mar. 2.0	18.130	38.97	34.56	19.52	26.843	62.21	41.854	57.28
11.9	18.291	38.69	34.87	16.67	26.999	61.80	42.023	55.22
21.9	18.480	38.18	35.28	14.20	27.184	61.16	42.235	53.55
31.9	18.698	37.42	35.80	12.20	27.399	60.29	42.488	52.33
Apr. 10.8	18.941	36.43	36.38	10.73	27.640	59.20	42.776	51.62
20.8	19.208	35.20	37.02	9.88	27.904	57.91	43.095	51.44
30.8	19.493	33.78	37.70	9.63	28.188	56.44	43.436	51.81
May 10.8	19.791	32.19	38.40	10.01	28.486	54.81	43.793	52.72
20.7	20.098	30.48	39.10	11.01	28.794	53.10	44.155	54.14
30.7	20.404	28.71	39.78	12.58	29.108	51.33	44.514	56.00
June 9.7	20.708	26.91	40.41	14.67	29.405	49.57	44.859	58.28
19.7	20.988	25.14	40.98	17.23	29.695	47.84	45.183	60.90
29.6	21.251	23.44	41.47	20.18	29.963	46.22	45.475	63.79
July 9.6	21.486	21.86	41.89	23.44	30.204	44.72	45.729	66.87
19.6	21.686	20.43	42.20	26.95	30.411	43.39	45.940	70.07
29.5	21.846	19.19	42.41	30.60	30.578	42.26	46.101	73.31
Aug. 8.5	21.963	18.15	42.51	34.33	30.702	41.33	46.210	76.52
18.5	22.035	17.31	42.50	38.05	30.782	40.63	46.267	79.64
28.5	22.063	16.69	42.39	41.68	30.816	40.13	46.270	82.59
Sept. 7.4	22.048	16.27	42.18	45.14	30.807	39.85	46.224	85.33
17.4	21.993	16.05	41.88	48.38	30.760	39.75	46.131	87.80
27.4	21.906	16.00	41.47	51.31	30.676	39.81	45.997	89.95
Oct. 7.4	21.790	16.11	41.01	53.86	30.564	40.03	45.830	91.74
17.3	21.656	16.36	40.49	55.99	30.433	40.36	45.639	93.14
27.3	21.510	16.70	39.92	57.64	30.289	40.77	45.429	94.12
Nov. 6.3	21.361	17.15	39.33	58.77	30.141	41.25	45.211	94.64
16.2	21.217	17.66	38.72	59.32	29.997	41.78	44.993	94.69
26.2	21.084	18.22	38.11	59.27	29.863	42.34	44.783	94.28
Dec. 6.2	20.970	18.82	37.53	58.65	29.746	42.90	44.586	93.39
16.2	20.875	19.45	36.99	57.43	29.650	43.47	44.409	92.06
26.1	20.807	20.08	36.50	55.66	29.579	44.01	44.261	90.32
36.1	20.766	20.70	36.10	53.39	29.534	44.52	44.144	88.23
Mean Place	17.762	41.62	37.302	17.78	26.480	65.17	42.098	56.72
Sec δ , Tan δ	1.005	-0.104	2.954	+2.779	1.010	-0.144	1.306	+0.841
$D\alpha$, $D_{\alpha\alpha}$	+0.06	+0.01	+0.02	-0.15	+0.06	+0.01	+0.05	-0.9A
$D\beta$, $D_{\beta\beta}$	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6	+0.3	-0.8

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Capricorni. Mag. 3.8			ϵ Pegasi. Mag. 2.5			11 Cephei. Mag. 4.8			δ Capricorni. Mag. 3.0		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h m	s	'	h m	s	'	h m	s	'	h m	s	'
	21	35	-17 1	21	40	+ 9 30	21	40	+70 56	21	42	-16 29
Jan. 1.1	36.380	25	41.67	12.506	40	19.26	42.31	40	38.36	34.401	31	41.88
11.1	36.355	4	41.67	12.466	10	18.00	41.91	31	36.00	34.370	2	41.92
21.1	36.359	4	41.54	12.456	20	16.72	41.60	19	33.25	34.368	2	41.84
31.0	36.395	36	41.27	12.476	20	15.45	41.41	7	30.20	34.396	28	41.60
Feb. 10.0	36.462	67	40.86	12.524	48	14.27	41.34	7	27.00	34.455	50	41.22
		97	57		81			4			80	54
20.0	36.559		40.29	12.605		13.23	41.38		23.77	34.544		40.68
Mar. 2.0	36.688	129	39.54	12.718	113	12.39	41.54	16	20.64	34.665	121	39.95
11.9	36.848	160	38.62	12.862	144	11.81	41.83	29	17.72	34.818	153	39.06
21.9	37.037	189	37.52	13.039	177	11.54	42.22	39	15.16	35.000	183	37.97
31.9	37.257	220	36.26	13.247	208	11.58	42.72	50	13.02	35.214	214	36.71
		247	141		235	42		58			241	141
Apr. 10.9	37.504		34.85	13.482		12.00	43.30		11.41	35.455		35.30
20.8	37.774	270	33.32	13.743	261	12.76	43.95	65	10.39	35.722	267	33.75
30.8	38.065	291	31.68	14.023	290	13.86	44.64	69	9.96	36.010	298	32.10
May 10.8	38.373	308	29.99	14.320	297	15.26	45.36	72	10.16	36.316	308	30.39
20.7	38.688	315	28.30	14.626	306	16.94	46.09	73	10.97	36.631	315	28.66
		319	166		306	191		71			319	166
30.7	39.007		26.64	14.932		18.85	46.80		12.37	36.950		26.97
June 9.7	39.321	314	25.06	15.232	300	20.92	47.47	67	14.31	37.265	315	25.36
19.7	39.620	299	23.60	15.520	288	23.10	48.09	62	16.73	37.566	301	23.85
29.6	39.900	260	22.30	15.785	265	25.33	48.63	54	19.56	37.850	284	22.51
July 9.6	40.151	251	21.20	16.023	238	27.56	49.09	46	22.72	38.105	255	21.37
		217	89		203	218		35			220	93
19.6	40.368	176	20.31	16.226	165	29.74	49.44	25	26.17	38.325	182	20.44
29.6	40.544	132	19.66	16.391	122	31.79	49.69	15	29.78	38.507	139	19.75
Aug. 8.5	40.676	87	19.24	16.513	78	33.71	49.84	4	33.51	38.646	78	19.28
18.5	40.763	38	19.06	16.591	34	35.45	49.88	8	37.25	38.739	23	19.07
28.5	40.801	6	19.08	16.625	8	36.97	49.80	19	40.93	38.785	0	19.06
			22		131			19				20
Sept. 7.4	40.795		19.30	16.617		38.28	49.61		44.47	38.785		19.26
17.4	40.748	47	19.67	16.571	46	39.34	49.33	28	47.81	38.744	41	19.61
27.4	40.664	84	20.17	16.489	82	40.15	48.96	37	50.87	38.666	78	20.10
Oct. 7.4	40.549	115	20.75	16.380	109	40.72	48.52	44	53.57	38.557	109	20.69
17.3	40.413	136	21.38	16.251	129	41.04	48.00	52	55.88	38.426	131	21.33
		149	63		143	9		58			145	65
27.3	40.264		22.01	16.108		41.13	47.42		57.71	38.281		21.98
Nov. 6.3	40.110	154	22.63	15.960	148	40.98	46.82	60	59.03	38.129	152	22.62
16.3	39.958	152	23.20	15.813	147	40.62	46.20	62	59.79	37.980	149	23.22
26.2	39.818	140	23.69	15.675	138	40.04	45.58	62	59.96	37.839	141	23.76
Dec. 6.2	39.695	123	24.11	15.551	124	39.25	44.98	60	59.53	37.716	123	24.21
		101	31		106	96		58			104	36
16.2	39.594		24.42	15.445		38.29	44.40		58.51	37.612		24.57
26.1	39.519	75	24.63	15.362	83	37.17	43.88	52	56.92	37.533	79	24.82
36.1	39.472	47	24.72	15.304	58	35.95	43.42	46	54.81	37.480	53	24.96
Mean Place	36.330		43.54	12.445		10.84	44.390		17.60	34.325		43.77
Sec δ , Tan δ	1.046		-0.306	1.014		+0.167	3.063		+2.895	1.043		-0.296
$D\alpha$, $D\omega$	+0.07		+0.02	+0.06		-0.01	+0.02		-0.16	+0.06		+0.02
δ , $D\omega\delta$	+0.3		-0.6	+0.3		-0.8	+0.3		-0.8	+0.3		-0.6

APPARENT PLACES OF STARS, 1919.

493

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	π^3 Cygni. Mag. 4.3		μ Capricorni. Mag. 5.2		γ Gruis. Mag. 3.2		16 Pegasi. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 21 43	° ' " +48 55	h m 21 48	° ' " -13 55	h m 21 49	° ' " -37 44	h m 21 49	° ' " +25 32
	s	"	s	"	s	"	s	"
Jan. 1.1	47.502	81.31	52.996	59.27	1.620	50.41	22.540	49.68
11.1	47.363	79.01	52.960	59.44	1.563	49.38	22.472	47.90
21.1	47.267	76.40	52.952	59.48	1.543	48.10	22.435	45.97
31.0	47.221	73.61	52.974	59.40	1.561	46.61	22.429	43.96
Feb. 10.0	47.225	70.74	53.026	59.15	1.617	44.92	22.458	41.97
20.0	47.284	67.90	53.107	58.75	1.710	43.07	22.523	40.07
Mar. 2.0	47.399	65.23	53.221	58.17	1.843	41.09	22.625	38.37
11.9	47.570	62.81	53.364	57.39	2.012	39.00	22.763	36.92
21.9	47.793	60.76	53.540	56.42	2.219	36.86	22.940	35.82
31.9	48.066	59.17	53.746	55.25	2.462	34.70	23.151	35.12
Apr. 10.9	48.384	58.09	53.979	53.91	2.737	32.54	23.396	34.86
20.8	48.738	57.56	54.240	52.41	3.044	30.45	23.669	35.04
30.8	49.120	57.62	54.523	50.77	3.375	28.44	23.966	35.68
May 10.8	49.521	58.25	54.823	49.06	3.728	26.58	24.279	36.77
20.7	49.928	59.43	55.134	47.29	4.093	24.91	24.602	38.26
30.7	50.332	61.13	55.450	45.53	4.463	23.47	24.927	40.11
June 9.7	50.721	63.29	55.763	43.82	4.831	22.31	25.245	42.28
19.7	51.085	65.85	56.064	42.22	5.185	21.42	25.548	44.69
29.6	51.417	68.74	56.347	40.75	5.518	20.88	25.829	47.30
July 9.6	51.705	71.89	56.603	39.45	5.820	20.66	26.079	50.02
19.6	51.943	75.21	56.826	38.36	6.084	20.77	26.292	52.78
29.6	52.125	78.64	57.012	37.49	6.303	21.20	26.465	55.54
Aug. 8.5	52.250	82.09	57.155	36.87	6.470	21.93	26.593	58.22
18.5	52.315	85.49	57.252	36.47	6.584	22.91	26.675	60.76
28.5	52.321	88.77	57.303	36.31	6.641	24.11	26.710	63.14
Sept. 7.4	52.269	91.85	57.310	36.34	6.643	25.46	26.701	65.29
17.4	52.165	94.70	57.275	36.57	6.594	26.91	26.651	67.20
27.4	52.013	97.23	57.203	36.93	6.499	28.38	26.563	68.82
Oct. 7.4	51.822	99.40	57.101	37.41	6.363	29.81	26.445	70.13
17.3	51.598	101.17	56.975	37.97	6.197	31.12	26.304	71.12
27.3	51.352	102.49	56.835	38.58	6.011	32.26	26.147	71.75
Nov. 6.3	51.091	103.33	56.688	39.19	5.815	33.19	25.980	72.03
16.3	50.826	103.67	56.542	39.79	5.619	33.83	25.813	71.96
26.2	50.565	103.48	56.404	40.35	5.432	34.19	25.653	71.52
Dec. 6.2	50.316	102.78	56.282	40.85	5.263	34.25	25.502	70.73
16.2	50.087	101.56	56.177	41.28	5.118	33.99	25.368	69.61
26.1	49.886	99.87	56.096	41.64	5.003	33.44	25.257	68.19
36.1	49.719	97.77	56.040	41.88	4.922	32.60	25.170	66.52
Mean Place	47.969	63.65	52.886	61.72	1.695	47.51	22.539	36.97
Sec δ , Tan δ	1.523	+1.148	1.030	-0.248	1.265	-0.774	1.108	+0.478
$D\psi\alpha$, $D\omega\alpha$	+0.04	-0.06	+0.06	+0.01	+0.07	+0.04	+0.05	-0.03
$D\psi\delta$, $D\omega\delta$	+0.3	-0.6	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	79 Draconis. Mag. 6.6		20 Pegasi. Mag. 5.7		ε Indi. Mag. 4.7		α Aquarii. Mag. 3.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 21 51	° ' " +73 19	h m 21 57	° ' " +12 43	h m 21 57	° ' " -57 6	h m 22 1	° ' " - 0 42
Jan. 1.1	48.41	29.72	8.692	62.43	9.803	76.62	37.639	43.89
11.1	47.92	27.49	8.637	61.12	9.682	74.79	37.592	44.66
21.1	47.53	24.84	8.610	59.74	9.618	72.63	37.570	45.40
31.1	47.26	21.86	8.611	58.36	9.611	70.20	37.574	46.05
Feb. 10.0	47.13	18.69	8.643	57.03	9.664	67.56	37.608	46.61
20.0	47.13	15.45	8.705	55.83	9.774	64.78	37.671	47.02
Mar. 2.0	47.27	12.27	8.799	54.82	9.942	61.92	37.764	47.22
11.9	47.56	9.29	8.928	54.06	10.166	59.03	37.890	47.20
21.9	47.97	6.60	9.090	53.59	10.445	56.18	38.048	46.93
31.9	48.50	4.33	9.284	53.47	10.775	53.42	38.236	46.39
Apr. 10.9	49.13	2.56	9.510	53.71	11.152	50.82	38.455	45.56
20.8	49.84	1.35	9.764	54.32	11.571	48.42	38.702	44.46
30.8	50.62	0.73	10.040	55.28	12.027	46.28	38.972	43.13
May 10.8	51.43	0.74	10.334	56.59	12.511	44.44	39.261	41.56
20.8	52.24	1.36	10.641	58.21	13.014	42.95	39.563	39.83
30.7	53.05	2.56	10.951	60.07	13.525	41.85	39.870	37.97
June 9.7	53.80	4.33	11.256	62.15	14.033	41.16	40.175	36.02
19.7	54.51	6.60	11.552	64.34	14.526	40.90	40.471	34.05
29.6	55.14	9.30	11.829	66.67	14.991	41.08	40.750	32.11
July 9.6	55.68	12.38	12.079	69.00	15.416	41.68	41.004	30.24
19.6	56.11	15.73	12.296	71.30	15.788	42.70	41.226	28.49
29.6	56.42	19.31	12.475	73.53	16.101	44.09	41.413	26.91
Aug. 8.5	56.60	23.01	12.614	75.62	16.343	45.82	41.559	25.50
18.5	56.67	26.76	12.708	77.55	16.511	47.81	41.662	24.32
28.5	56.62	30.49	12.758	79.27	16.599	50.01	41.721	23.34
Sept. 7.5	56.43	34.11	12.765	80.78	16.609	52.32	41.737	22.60
17.4	56.15	37.55	12.732	82.04	16.544	54.66	41.714	22.07
27.4	55.76	40.73	12.664	83.06	16.408	56.93	41.654	21.76
Oct. 7.4	55.27	43.60	12.567	83.81	16.211	59.03	41.565	21.64
17.3	54.71	46.07	12.446	84.31	15.966	60.90	41.453	21.69
27.3	54.08	48.09	12.311	84.54	15.686	62.43	41.325	21.92
Nov. 6.3	53.39	49.60	12.167	84.52	15.385	63.58	41.188	22.27
16.3	52.68	50.56	12.021	84.24	15.077	64.28	41.050	22.75
26.2	51.97	50.94	11.881	83.74	14.778	64.52	40.917	23.33
Dec. 6.2	51.26	50.72	11.751	82.99	14.499	64.28	40.796	24.01
16.2	50.58	49.89	11.638	82.05	14.253	63.56	40.689	24.74
26.2	49.96	48.47	11.543	80.91	14.048	62.39	40.601	25.51
36.1	49.42	46.52	11.471	79.64	13.891	60.83	40.536	26.31
Mean Place	50.682	8.01	8.560	52.90	10.319	70.29	37.459	49.76
Sec δ, Tan δ	3.485	+3.338	1.025	+0.226	1.842	-1.547	1.000	-0.012
$D\phi\alpha, D\omega\alpha$	+0.01	-0.19	+0.06	-0.01	+0.08	+0.09	+0.06	0.00
$\gamma_{\omega\delta}$	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5

APPARENT PLACES OF STARS, 1919.

495

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	Aquarii. Mag. 4.4		20 Cephei. Mag. 5.4		α Grus. Mag. 2.2		Pegasi. Mag. 4.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 22 2	° ' -14 15	h m 22 2	° ' +62 23	h m 22 3	° ' -47 20	h m 22 3	° ' +24 56
	s	"	s	"	s	"	s	"
Jan. 1.1	4.010	45.42 16	31.91 28	45.17 219	7.871 98	79.95 141	14.452 76	69.15 168
11.1	3.962 48	45.58 3	31.63 21	42.98 258	7.773 54	78.54 173	14.376 48	67.47 183
21.1	3.942 20	45.61 11	31.42 14	40.40 288	7.719 11	76.81 200	14.328 17	65.64 192
31.1	3.950 8	45.50 27	31.28 7	37.52 306	7.708 34	74.81 231	14.311 50	63.72 184
Feb. 10.0	3.987 37	45.23 44	31.21 1	34.46 312	7.742 79	72.60 238	14.328 17	61.80 184
20.0	4.054 96	44.79 63	31.22 9	31.34 303	7.821 125	70.22 251	14.378 87	59.96 167
Mar. 2.0	4.153 130	44.16 82	31.31 18	28.31 296	7.946 169	67.71 259	14.465 125	58.29 142
11.9	4.283 163	43.34 102	31.49 25	25.45 253	8.115 214	65.12 262	14.590 163	56.87 110
21.9	4.446 193	42.32 123	31.74 34	22.92 213	8.329 257	62.50 257	14.753 200	55.77 72
31.9	4.639 225	41.10 139	32.08 40	20.79 163	8.586 296	59.93 252	14.953 233	55.05 31
Apr. 10.9	4.864 253	39.71 155	32.48 46	19.16 108	8.882 333	57.41 240	15.186 264	54.74 14
20.8	5.117 276	38.16 169	32.94 50	18.08 49	9.215 365	55.01 232	15.450 289	54.88 58
30.8	5.393 295	36.47 177	33.44 82	17.59 11	9.580 391	52.79 199	15.739 310	55.46 101
May 10.8	5.688 310	34.70 181	33.96 85	17.70 72	9.971 407	50.80 173	16.049 322	56.47 142
20.8	5.998 316	32.89 180	34.51 84	18.42 128	10.378 417	49.07 141	16.371 326	57.89 179
30.7	6.314 315	31.09 176	35.05 82	19.70 182	10.795 416	47.66 107	16.697 322	59.68 210
June 9.7	6.629 305	29.33 165	35.57 49	21.52 231	11.211 404	46.59 69	17.019 309	61.78 234
19.7	6.934 280	27.68 151	36.06 45	23.83 272	11.615 383	45.90 31	17.328 289	64.12 255
29.6	7.224 253	26.17 132	36.51 39	26.55 307	11.998 351	45.59 10	17.618 262	66.67 266
July 9.6	7.487 234	24.85 112	36.90 32	29.62 333	12.349 310	45.69 46	17.880 227	69.33 273
19.6	7.721 196	23.73 89	37.22 25	32.95 353	12.659 259	46.15 85	18.107 188	72.06 272
29.6	7.917 154	22.84 63	37.47 18	36.48 364	12.918 204	47.00 118	18.295 143	74.78 265
Aug. 8.5	8.071 109	22.21 40	37.65 10	40.12 367	13.122 141	48.18 145	18.438 98	77.43 253
18.5	8.180 64	21.81 16	37.75 2	43.79 363	13.263 79	49.63 109	18.536 52	79.96 237
28.5	8.244 19	21.65 4	37.77 6	47.42 350	13.342 16	51.32 183	18.588 7	82.33 216
Sept. 7.5	8.263 23	21.69 26	37.71 13	50.92 332	13.358 47	53.15 192	18.595 35	84.49 192
17.4	8.240 61	21.95 40	37.58 21	54.24 305	13.311 103	55.07 192	18.560 72	86.41 164
27.4	8.179 91	22.35 52	37.37 26	57.29 273	13.208 151	56.99 183	18.488 103	88.05 135
Oct. 7.4	8.088 118	22.87 60	37.11 31	60.02 235	13.057 218	58.82 165	18.385 129	89.40 102
17.3	7.970 134	23.47 66	36.80 35	62.37 190	12.868 118	60.47 142	18.256 147	90.42 69
27.3	7.836 142	24.13 66	36.45 38	64.27 139	12.650 235	61.89 112	18.109 157	91.11 35
Nov. 6.3	7.694 144	24.79 65	36.07 40	65.66 87	12.415 240	63.01 76	17.952 160	91.46 1
16.3	7.550 139	25.44 60	35.67 40	66.53 30	12.175 234	63.77 38	17.792 158	91.47 36
26.2	7.411 109	26.04 54	35.27 40	68.83 27	11.941 193	64.15 43	17.634 135	91.11 70
Dec. 6.2	7.283 109	26.58 46	34.87 38	66.56 86	11.724 183	64.14 118	17.485 101	90.41 101
16.2	7.174 90	27.04 37	34.49 35	65.70 142	11.531 161	63.71 82	17.350 116	89.40 132
26.2	7.084 65	27.41 25	34.14 31	64.28 193	11.370 124	62.89 118	17.234 94	88.08 157
36.1	7.019	27.66	33.83	62.35	11.246	61.71	17.140	86.51
Mean Place	3.847	47.63	32.767	24.23	8.061	74.79	14.360	56.23
Sec δ, Tan δ	1.032	-0.254	2.158	+1.912	1.476	-1.086	1.103	+0.465
D _{pe} , D _{wa}	+0.06	+0.01	+0.04	-0.11	+0.08	+0.06	+0.05	-0.03
D _{ps} , D _{ws}	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Pegasi. Mag. 3.7		π Pegasi. Mag. 4.4		ζ Cephei. Mag. 3.6		24 Cephei. Mag. 5.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 22 6	° ' " + 5 47	h m 22 6	° ' " +32 46	h m 22 8	° ' " +57 47	h m 22 8	° ' " +71 34
	s	"	s	"	s	"	s	"
Jan. 1.1	7.055 54	63.86 102	23.355 06	64.11 185	1.983 227	86.54 214	13.52 48	53.54 185
11.1	7.001 29	62.84 104	23.259 66	62.26 208	1.756 179	84.40 252	13.04 38	51.47 208
21.1	6.972 3	61.80 101	23.193 33	60.18 221	1.577 122	81.88 279	12.66 28	48.96 221
31.1	6.969 27	60.79 93	23.160 3	57.97 226	1.455 58	79.09 302	12.38 17	46.70 226
Feb. 10.0	6.996 57	59.86 78	23.163 41	55.71 221	1.397 10	76.12 302	12.21 4	42.90 221
20.0	7.053 87	59.08 60	23.204 83	53.50 205	1.407 81	73.10 295	12.17 9	39.70 205
Mar. 2.0	7.140 120	58.48 37	23.287 83	51.45 182	1.488 154	70.15 275	12.26 22	36.80 182
12.0	7.260 154	58.11 8	23.411 167	49.63 148	1.642 223	67.40 244	12.48 34	33.57 148
21.9	7.414 185	58.03 22	23.578 207	48.15 109	1.865 291	64.96 204	12.82 45	30.86 109
31.9	7.599 217	58.25 53	23.785 244	47.06 65	2.156 249	62.92 156	13.27 57	28.45 65
Apr. 10.9	7.816 246	58.78 85	24.029 277	46.41 17	2.505 401	61.36 102	13.84 64	26.51 17
20.8	8.062 269	59.63 115	24.306 306	46.24 32	2.906 440	60.34 43	14.48 70	23.15 32
30.8	8.331 289	60.78 144	24.612 326	46.56 80	3.346 467	59.91 16	15.18 75	20.36 80
May 10.8	8.620 302	62.22 108	24.938 340	47.36 127	3.813 483	60.07 74	15.93 76	17.18 127
20.8	8.922 309	63.90 186	25.278 342	48.63 169	4.296 484	60.81 131	16.69 77	14.63 169
30.7	9.231 306	65.76 201	25.620 339	50.32 207	4.780 471	62.12 183	17.46 73	11.66 207
June 9.7	9.537 297	67.77 211	25.959 325	52.39 238	5.251 446	63.95 229	18.19 69	8.75 238
19.7	9.834 281	69.88 213	26.284 302	54.77 264	5.697 410	66.24 270	18.88 63	5.96 264
29.7	10.115 255	72.01 209	26.586 272	57.41 281	6.107 362	68.94 304	19.51 53	3.12 281
July 9.6	10.370 224	74.10 204	26.858 237	60.22 293	6.469 306	71.98 328	20.04 46	34.88 293
19.6	10.594 189	76.14 191	27.095 194	63.15 297	6.775 244	75.26 348	20.50 35	38.14 297
29.6	10.783 149	78.05 175	27.289 148	66.12 296	7.019 176	78.74 358	20.85 24	41.65 296
Aug. 8.5	10.932 105	79.80 157	27.437 100	69.08 287	7.195 107	82.32 360	21.09 12	45.32 287
18.5	11.037 61	81.37 136	27.537 51	71.95 273	7.302 35	85.92 353	21.21 0	49.06 273
28.5	11.098 20	82.73 112	27.588 4	74.68 253	7.337 32	89.45 343	21.21 10	52.81 253
Sept. 7.5	11.118 21	83.85 91	27.592 41	77.21 231	7.305 98	92.88 324	21.11 20	56.48 231
17.4	11.097 56	84.76 66	27.551 80	79.52 202	7.207 157	96.12 296	20.91 31	59.99 202
27.4	11.041 86	85.42 44	27.471 114	81.54 171	7.050 210	99.08 264	20.60 40	63.28 171
Oct. 7.4	10.955 110	85.86 22	27.357 140	83.25 136	6.840 254	101.72 226	20.20 48	66.27 136
17.4	10.845 126	86.08 1	27.217 162	84.61 100	6.586 288	103.98 183	19.72 55	68.89 100
27.3	10.719 135	86.09 19	27.055 173	85.61 60	6.298 316	105.81 135	19.17 59	71.09 60
Nov. 6.3	10.584 138	85.90 36	26.882 179	86.21 20	5.982 330	107.16 82	18.58 62	72.79 20
16.3	10.446 134	85.54 54	26.703 179	86.41 22	5.652 336	107.98 28	17.96 65	73.96 22
26.2	10.312 109	85.00 70	26.524 157	86.19 102	5.316 332	108.26 85	17.31 64	74.54 102
Dec. 6.2	10.188 93	84.30 83	26.354 102	85.56 138	4.984 317	107.98 85	16.67 63	74.52 138
16.2	10.079 70	83.47 93	26.197 115	84.54 172	4.667 290	107.13 139	16.04 59	73.90 172
26.2	9.986 70	82.54 101	26.058 115	83.16 172	4.377 257	105.74 188	15.45 52	72.68 172
36.1	9.916 70	81.53 101	25.943 115	81.44 172	4.120 257	103.86 188	14.93 52	70.91 172
Mean Place	6.859	56.15	23.322	49.08	2.522	66.07	15.199	31.04
Sec δ , Tan δ	1.005	+0.102	1.189	+0.644	1.877	+1.588	3.227	+3.068
$D\psi\alpha$, $D\omega\alpha$	+0.06	-0.01	+0.05	-0.04	+0.04	-0.09	+0.02	-0.18
$D\psi\delta$, $D\omega\delta$	+0.3	-0.5	+0.3	-0.5	+0.4	-0.5	+0.4	-0.5

APPARENT PLACES OF STARS, 1919.

497

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington in Time.	θ Aquarii. Mag. 4.3			α Tucanae. Mag. 2.9			γ Aquarii. Mag. 4.0			β Pegasi. Mag. 4.9		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h m	s	'	h m	s	'	h m	s	'	h m	s	'
	22 12		- 8 10	22 12		-60 39	22 17		- 1 47	22 17		+11 47
			"			"			"			"
n. 1.1	33.854	54	69.65	57.16	18	56.83	28.639	58	39.49	32.108	66	57.18
11.1	33.800	20	70.09	56.98	13	54.89	28.581	34	40.19	32.042	44	55.98
21.1	33.771	3	70.44	56.85	7	52.59	28.547	10	40.85	31.998	16	54.71
31.1	33.768	25	70.67	56.78	0	49.97	28.537	19	41.43	31.982	12	53.43
ab. 10.0	33.793	54	70.76	56.78	7	47.13	28.556	47	41.90	31.994	42	52.21
20.0	33.847	86	70.69	56.85	13	44.10	28.603	13	42.21	32.036	74	51.10
ar. 2.0	33.933	117	70.42	56.98	20	40.98	28.681	110	42.34	32.110	108	50.15
12.0	34.050	149	69.95	57.18	25	37.82	28.791	142	42.24	32.218	142	49.45
21.9	34.199	181	69.24	57.43	32	34.69	28.933	176	41.89	32.360	177	49.02
31.9	34.380	213	68.31	57.75	37	31.67	29.109	208	41.28	32.537	211	48.92
x. 10.9	34.593	241	67.14	58.12	42	28.78	29.317	236	40.41	32.748	230	49.16
20.8	34.834	268	65.77	58.54	46	26.12	29.553	264	39.26	32.987	267	49.76
30.8	35.102	287	64.22	59.00	50	23.72	29.817	283	37.89	33.254	288	50.69
ay 10.8	35.389	310	62.51	59.50	54	21.64	30.100	308	36.30	33.542	310	51.97
20.8	35.693	311	60.70	60.02	54	19.93	30.400	308	34.55	33.845	310	53.54
30.7	36.003	302	58.84	60.56	54	18.63	30.708	308	32.67	34.155	311	55.36
ne 9.7	36.314	302	56.96	61.10	53	17.77	31.016	301	30.72	34.466	301	57.38
19.7	36.616	289	55.13	61.63	50	17.36	31.317	287	28.75	34.767	287	59.56
29.7	36.905	264	53.38	62.13	46	17.42	31.604	263	26.82	35.054	263	61.82
ly 9.6	37.169	236	51.78	62.59	41	17.94	31.867	236	24.96	35.317	234	64.10
19.6	37.405	199	50.34	63.00	35	18.89	32.103	199	23.22	35.551	197	66.37
29.6	37.604	160	49.12	63.35	27	20.27	32.302	161	21.67	35.748	157	68.56
ag. 8.5	37.764	115	48.10	63.62	18	22.00	32.463	118	20.30	35.905	114	70.61
18.5	37.879	73	47.33	63.80	11	24.04	32.581	75	19.15	36.019	71	72.51
28.5	37.952	20	46.79	63.91	2	26.29	32.656	22	18.22	36.090	28	74.21
opt. 7.5	37.981	13	46.48	63.93	0	28.68	32.688	8	17.53	36.118	12	75.70
17.4	37.968	48	46.38	63.87	14	31.12	32.680	44	17.05	36.106	48	76.94
27.4	37.920	83	46.46	63.73	23	33.51	32.636	76	16.80	36.058	80	77.95
ct. 7.4	37.838	105	46.72	63.50	27	35.75	32.560	101	16.73	35.978	103	78.70
17.4	37.733	124	47.10	63.23	31	37.74	32.459	119	16.84	35.875	123	79.21
27.3	37.609	134	47.59	62.92	35	39.40	32.340	129	17.10	35.752	134	79.46
ov. 6.3	37.475	137	48.14	62.57	36	40.66	32.211	134	17.49	35.618	138	79.48
16.3	37.338	134	48.73	62.21	34	41.46	32.077	131	17.99	35.480	137	79.25
26.2	37.204	110	49.35	61.85	32	41.77	31.946	123	18.58	35.343	117	78.80
ec. 6.2	37.080	92	49.97	61.51	27	41.56	31.823	110	19.23	35.213	102	78.13
16.2	36.970	71	50.58	61.19	21	40.85	31.713	73	19.95	35.096	73	77.28
26.2	36.878	51	51.14	60.92	16	39.64	31.618	51	20.68	34.994	51	76.25
36.1	36.807	31	51.65	60.71	10	37.98	31.545	31	21.42	34.911	31	75.08
n Place	33.629		73.41	57.760		49.32	28.383		45.05	31.866		47.67
B, Tan δ	1.010		-0.144	2.041		-1.779	1.000		-0.081	1.022		+0.209
. Dec	+0.06		+0.01	+0.08		+0.11	+0.06		0.00	+0.06		-0.01
Dec	+0.4		-0.5	+0.4		-0.5	+0.4		-0.4	+0.4		-0.4

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	δ Lacerta. Mag. 4.6		π Aquarii. Mag. 4.6		ϵ Aquarii. Mag. 4.9		α Lacerta. Mag. 3.8	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 22 20	° ' +51 49	h m 22 21	° ' + 0 57	h m 22 26	° ' -11 5	h m 22 27	° ' +49 5
	s "	"	s "	"	s "	"	s "	"
Jan. 1.2	22.157 ¹⁹⁰	42.21 ¹⁹⁰	8.691 ⁶⁰	68.47 ⁸¹	22.023 ⁶³	31.33 ³³	57.076 ¹⁸⁴	76.10 ¹⁸
11.1	21.967 ¹⁵¹	40.22 ¹⁹⁰	8.631 ³⁰	62.66 ⁷⁸	21.961 ⁴¹	31.65 ²⁰	56.893 ¹⁴⁶	74.21 ²²
21.1	21.816 ¹⁰⁵	37.87 ²⁸⁵	8.592 ¹³	61.88 ⁷³	21.920 ¹⁵	31.85 ⁶	56.746 ¹⁰⁵	71.94 ²⁵
31.1	21.711 ⁵⁵	35.23 ²⁸⁰	8.579 ⁴³	61.16 ⁶³	21.905 ⁴⁰	31.91 ²⁷	56.640 ⁵⁵	69.39 ²⁷
Feb. 10.0	21.656 ⁵	32.43 ²⁸⁵	8.568 ⁴³	60.54 ⁴³	21.917 ⁴⁰	31.82 ²⁷	56.582 ⁵	66.68 ²⁷
20.0	21.659 ⁶¹	29.58 ²⁷⁹	8.635 ⁷⁴	60.06 ²⁶	21.957 ⁷³	31.55 ⁴⁶	56.577 ⁸³	63.91 ²²
Mar. 2.0	21.720 ¹²³	26.79 ²⁸¹	8.709 ¹⁰⁶	59.78 ⁷	22.020 ¹⁰⁴	31.09 ⁶⁵	56.639 ¹¹⁰	61.19 ²⁸
12.0	21.843 ¹⁸⁴	24.18 ²⁸³	8.815 ¹³³	59.71 ¹⁹	22.133 ¹³⁵	30.41 ⁸³	56.739 ¹⁶⁹	58.64 ²⁸
21.9	22.027 ²⁴²	21.86 ¹⁹³	8.953 ¹⁷³	59.90 ⁴⁶	22.268 ¹⁷⁰	29.53 ¹¹¹	56.906 ²³⁵	56.33 ²⁸
31.9	22.269 ²⁰⁶	19.93 ¹⁴⁷	9.125 ²⁰³	60.36 ⁷⁵	22.433 ²³³	28.42 ¹²¹	57.133 ²⁷⁵	54.47 ¹⁴
Apr. 10.9	22.565 ³⁴³	18.46 ⁹⁴	9.328 ²³⁴	61.11 ¹⁰³	22.641 ²⁸³	27.11 ¹⁶⁹	57.411 ²⁹⁵	53.02 ²⁸
20.9	22.908 ³⁸³	17.52 ⁴⁰	9.562 ²⁶¹	62.13 ¹²⁹	22.874 ²⁶¹	25.62 ¹⁸⁷	57.737 ³⁰⁴	52.08 ²⁸
30.8	23.290 ⁴¹⁰	17.12 ¹⁷	9.823 ²⁸²	63.42 ¹⁸³	23.135 ²⁸²	23.95 ¹⁷⁹	58.101 ³⁰⁵	51.67 ²⁸
May 10.8	23.700 ⁴³⁷	17.29 ⁷³	10.105 ²⁸⁶	64.94 ¹⁷³	23.418 ³⁰¹	22.16 ¹⁸³	58.496 ⁴¹²	51.88 ²⁸
20.8	24.127 ⁴³³	18.02 ¹²³	10.403 ³⁰⁷	66.67 ¹⁸⁷	23.719 ³¹¹	20.30 ¹⁹⁰	58.903 ⁴²¹	52.53 ¹²
30.7	24.560 ⁴³⁷	19.30 ¹⁷⁷	10.710 ³⁰⁸	68.54 ¹⁹⁷	24.030 ³¹³	18.40 ¹⁸⁹	59.339 ⁴¹⁷	53.77 ¹⁷
June 9.7	24.987 ⁴⁰⁶	21.07 ²²³	11.018 ³⁰¹	70.51 ²⁰¹	24.343 ³⁰⁸	16.51 ¹⁸¹	59.746 ⁴⁰³	55.56 ²¹
19.7	25.395 ³⁸³	23.30 ²⁶¹	11.319 ²⁸⁷	72.52 ²⁰²	24.651 ²⁹⁶	14.70 ¹⁸⁰	60.143 ³⁷⁷	57.63 ²⁵
29.7	25.777 ³⁴²	25.91 ²⁹³	11.606 ²⁶⁵	74.54 ¹⁹⁵	24.947 ²⁷⁵	13.01 ¹⁵⁵	60.525 ³⁴¹	60.24 ²¹
July 9.6	26.119 ²⁹⁶	28.84 ³¹³	11.871 ²³⁶	76.49 ¹⁸⁵	25.222 ²⁴⁷	11.46 ¹³⁵	60.866 ³⁰⁰	63.10 ²¹
19.6	26.415 ²⁴³	32.02 ³³⁴	12.107 ²⁰³	78.34 ¹⁶⁰	25.469 ²¹³	10.11 ¹¹³	61.166 ²⁴⁵	66.23 ²¹
29.6	26.658 ¹⁸⁴	35.36 ³⁴⁴	12.309 ¹⁶³	80.03 ¹³³	25.681 ¹⁷³	8.99 ⁸³	61.414 ¹⁹³	69.52 ²¹
Aug. 8.6	26.842 ¹²⁵	38.80 ³⁴⁶	12.472 ¹²⁰	81.55 ¹⁰⁰	25.854 ¹³⁰	8.11 ⁶³	61.607 ¹³⁵	72.91 ²⁴
18.5	26.967 ⁶⁴	42.26 ³⁴¹	12.592 ⁷⁸	82.87 ⁸⁷	25.984 ⁸⁷	7.48 ³⁰	61.742 ⁷⁶	76.32 ²¹
28.5	27.031 ¹	45.67 ³²⁹	12.670 ³⁵	83.96 ⁸⁷	26.071 ⁴³	7.09 ¹⁴	61.818 ¹³	79.63 ²¹
Sept. 7.5	27.032 ⁵⁵	48.96 ³⁰⁹	12.705 ⁶	84.83 ⁶²	26.114 ¹	6.95 ⁷	61.836 ³⁷	82.93 ²⁶
17.4	26.977 ¹⁰⁶	52.05 ²⁸⁵	12.699 ⁴¹	85.45 ⁴²	26.115 ³³	7.02 ²⁶	61.799 ⁸⁹	85.99 ²⁶
27.4	26.869 ¹⁵⁴	54.90 ²⁸⁴	12.658 ⁷⁴	85.87 ²⁰	26.077 ⁷¹	7.28 ⁴³	61.710 ¹³⁵	88.82 ²⁶
Oct. 7.4	26.715 ¹⁹⁴	57.44 ¹⁷⁶	12.584 ¹¹⁸	86.07 ¹⁷	26.006 ¹¹⁸	7.70 ⁶¹	61.575 ²⁰⁵	91.34 ¹⁷
17.4	26.521 ²²⁶	59.61 ¹³⁰	12.487 ¹²⁸	86.09 ³¹	25.909 ¹³⁹	8.23 ⁶⁶	61.401 ²²⁸	93.50 ¹¹
27.3	26.295 ²⁶⁵	61.37 ⁸¹	12.369 ¹³³	85.92 ⁴⁵	25.791 ¹³⁵	8.84 ⁶⁸	61.196 ²⁴⁵	95.27 ¹¹
Nov. 6.3	26.045 ²⁷¹	62.67 ²⁰	12.241 ¹³¹	85.61 ⁵⁶	25.662 ¹³⁴	9.50 ⁶⁷	60.968 ²⁶³	96.59 ¹¹
16.3	25.780 ²⁷⁰	63.48 ⁷⁷	12.109 ¹¹¹	85.16 ⁷⁴	25.527 ¹¹⁴	10.18 ⁵³	60.723 ²⁴³	97.44 ¹¹
26.3	25.509 ²³⁸	63.77 ¹⁷⁵	11.978 ¹²³	84.60 ¹¹¹	25.393 ¹²⁷	10.85 ⁵⁸	60.471 ²⁴³	97.77 ¹¹
Dec. 6.2	25.239 ²⁴¹	63.53 ¹³⁰	11.855 ⁹⁷	83.93 ⁷⁹	25.266 ⁹⁰	11.48 ⁴⁰	60.219 ²²⁸	97.59 ¹¹
16.2	24.981 ²¹²	62.76 ¹⁷⁵	11.744 ⁷⁶	83.19 ⁸¹	25.152 ⁸⁰	12.06 ⁴¹	59.976 ²⁰⁴	96.89 ¹¹
26.2	24.740 ²¹²	61.47 ¹⁷⁵	11.647 ⁷⁶	82.40 ⁸¹	25.053 ⁸⁰	12.55 ⁴¹	59.748 ²⁰⁴	95.69 ¹¹
36.1	24.528 ²¹²	59.72 ¹⁷⁵	11.571 ⁷⁶	81.59 ⁸¹	24.973 ⁸⁰	12.96 ⁴¹	59.544 ²⁰⁴	94.02 ¹¹
Mean Place	22.348	22.35	8.418	57.11	21.744	34.13	57.137	56.36
Sec δ , Tan δ	1.618	+1.272	1.000	+0.017	1.019	-0.196	1.552	+1.186
$D\alpha$, $D_{\alpha\alpha}$	+0.05	-0.08	+0.06	0.00	+0.06	+0.01	+0.05	-0.07
$D\delta$, $D_{\delta\delta}$	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4

APPARENT PLACES OF STARS, 1919.499

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington on Time.	α Aquarii. Mag. 5.3		β B. Cephei. Mag. 5.7		γ Aquarii. Mag. 4.1		10 Lacertæ. Mag. 4.9	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 22 30	° ' -21 6	h m 22 30	° ' +75 48	h m 22 31	° ' - 0 31	h m 22 35	° ' +38 37
	s 16.123	" 85.40	s 49.61	" 56.08	s 11.993	" 61.39	s 37.670	" 59.15
a. 1.2	71 16.052	9 85.31	68 48.93	175 54.33	67 11.926	75 62.14	134 37.536	173 57.42
11.1	47 16.005	30 85.01	56 48.37	225 52.08	46 11.880	60 62.83	106 37.430	203 55.39
21.1	20 15.985	49 84.52	46 47.91	267 49.41	21 11.859	64 63.47	75 37.355	223 53.16
b. 10.1	9 15.994	60 83.83	31 47.60	297 46.44	4 11.863	52 63.99	38 37.317	235 50.81
	38	80	15	314	34	38	2	238
20.0	16.032	82.94	47.45	43.30	11.897	64.37	37.319	48.43
r. 2.0	71 16.103	100 81.85	0 47.45	321 40.09	64 11.961	19 64.56	46 37.365	220 46.14
12.0	104 16.207	127 80.58	17 47.62	312 36.97	95 12.056	3 64.53	92 37.457	211 44.03
21.9	137 16.344	145 79.13	35 47.97	293 34.04	120 12.185	28 64.25	142 37.599	184 42.19
31.9	173 16.517	162 77.51	48 48.45	261 31.43	164 12.349	54 63.71	186 37.785	148 40.71
	207	176	63	219	106	82	232	106
r. 10.9	16.724	75.75	49.08	29.24	12.545	62.89	38.017	39.65
20.9	238 16.962	187 73.88	74 49.82	170 27.54	227 12.772	109 61.80	273 38.290	50 39.06
30.8	268 17.230	195 71.93	85 50.67	115 26.39	256 13.028	134 60.46	308 38.598	9 38.97
y 10.8	291 17.521	198 69.95	90 51.67	56 25.83	278 13.306	156 58.90	334 38.932	41 39.38
20.8	311 17.832	196 67.99	94 52.51	6 25.89	206 13.602	174 57.16	355 39.287	92 40.30
	323	190	95	66	307	187	364	137
30.8	18.155	66.09	53.46	26.55	13.909	55.29	39.651	41.67
ne 9.7	326 18.481	179 64.30	94 54.40	123 27.78	310 14.219	197 53.32	365 40.016	181 43.48
19.7	323 18.804	162 62.68	88 55.28	177 29.55	303 14.522	200 51.32	354 40.370	218 45.66
29.7	300 19.113	142 61.26	82 56.10	227 31.82	292 14.814	198 49.34	336 40.706	250 48.16
y 9.6	290 19.403	118 60.08	72 56.82	270 34.52	272 15.086	191 47.43	308 41.014	275 50.91
	261	92	62	307	243	180	273	293
19.6	19.664	59.16	57.44	37.59	15.329	45.63	41.287	53.84
29.6	225 19.889	62 58.54	50 57.94	335 40.94	209 15.538	164 43.99	234 41.521	306 56.90
g. 8.6	187 20.076	34 58.20	38 58.32	358 44.52	172 15.710	145 42.54	185 41.706	309 59.99
18.5	141 20.217	6 58.14	22 58.54	371 48.23	131 15.841	124 41.90	137 41.843	306 63.05
28.5	95 20.312	21 58.35	9 58.63	378 52.01	88 15.929	101 40.29	87 41.930	299 66.04
	49	45	5	375	46	78	38	284
rt. 7.5	20.361	58.80	58.58	55.76	15.975	39.51	41.968	68.88
17.4	4 20.365	66 59.46	18 58.40	366 59.42	5 15.980	56 38.95	10 41.958	264 71.52
27.4	38 20.327	80 60.26	31 58.09	349 62.91	33 15.947	33 38.62	53 41.905	240 73.92
7.4	73 20.254	93 61.19	43 57.66	324 66.15	64 15.883	12 38.50	92 41.813	211 76.03
17.4	102 20.152	97 62.16	54 57.12	292 69.07	90 15.793	5 38.55	126 41.687	178 77.81
	125	97	64	252	109	23	151	142
27.3	20.027	63.13	56.48	71.59	15.684	38.78	41.536	79.23
v. 6.3	138 19.889	95 64.08	71 55.77	207 73.66	124 15.560	36 39.14	171 41.365	101 80.24
16.3	145 19.744	85 64.93	77 55.00	156 75.22	120 15.431	48 39.62	183 41.182	50 80.83
26.3	145 19.599	73 65.66	81 54.19	100 76.22	120 15.302	58 40.20	180 40.993	15 80.98
c. 6.2	138 19.461	58 66.24	82 53.37	38 76.60	123 15.179	65 40.85	180 40.804	30 80.68
	125	42	82	22	113	73	182	74
16.2	19.336	66.66	52.55	76.38	15.066	41.58	40.622	79.94
26.2	108 19.228	23 66.89	79 51.76	84 75.54	99 14.967	76 42.34	168 40.454	115 78.79
36.1	80 19.139	6 66.95	73 51.03	144 74.10	83 14.884	76 43.10	151 40.303	155 77.24
Place	15.869	85.34	51.359	32.11	11.670	67.29	37.482	41.82
Tan δ	1.072	-0.386	4.081	+3.956	1.000	-0.009	1.280	+0.799
D _{ns}	+0.06	+0.02	+0.02	-0.24	+0.06	0.00	+0.05	-0.05
D _{ns}	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ϵ Piscis Australis. Mag. 4.2		ζ Pegasi. Mag. 3.6		β Gruis. Mag. 2.2		η Pegasi. Mag. 3.1	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 22 36	° ' " -27 27	h m 22 37	° ' " +10 24	h m 22 37	° ' " -47 18	h m 22 39	° ' " +29 47
	s	"	s	"	s	"	s	"
Jan. 1.2	10.927 83	61.96 35	25.662 77	38.41 109	50.207 137	37.94 119	12.477 109	64.64 157
11.1	10.844 57	61.61 60	25.585 57	37.32 115	50.070 100	36.75 156	12.368 86	63.07 179
21.1	10.787 30	61.01 83	25.528 33	36.17 116	49.970 62	35.19 187	12.282 58	61.28 194
31.1	10.757 1	60.18 107	25.495 7	35.01 112	49.908 19	33.32 216	12.224 27	59.34 208
Feb. 10.1	10.756 32	59.11 127	25.488 24	33.89 101	49.889 23	31.16 238	12.197 8	57.33 200
20.0	10.788 65	57.84 147	25.512 53	32.88 85	49.912 69	28.78 257	12.205 45	55.33 190
Mar. 2.0	10.853 100	56.37 167	25.565 89	32.03 61	49.981 114	26.21 269	12.250 87	53.43 160
12.0	10.953 135	54.70 181	25.654 124	31.42 36	50.095 161	23.52 277	12.337 129	51.74 143
21.9	11.088 173	52.89 195	25.778 159	31.06 6	50.256 207	20.75 280	12.466 171	50.31 107
31.9	11.261 208	50.94 205	25.937 193	31.00 27	50.463 252	17.95 276	12.637 211	49.24 68
Apr. 10.9	11.469 242	48.89 213	26.130 227	31.27 61	50.715 294	15.19 268	12.848 249	48.56 25
20.9	11.711 272	46.76 214	26.357 256	31.88 94	51.009 332	12.51 253	13.097 280	48.31 21
30.8	11.983 299	44.62 210	26.613 280	32.82 126	51.341 365	9.98 234	13.377 308	48.52 66
May 10.8	12.282 319	42.52 204	26.893 299	34.08 155	51.706 391	7.64 207	13.685 327	49.18 110
20.8	12.601 333	40.48 192	27.192 309	35.63 178	52.097 407	5.57 178	14.012 337	50.28 151
30.8	12.934 338	38.56 175	27.501 312	37.41 198	52.504 414	3.79 145	14.349 339	51.79 188
June 9.7	13.272 335	36.81 152	27.813 307	39.39 212	52.918 411	2.34 106	14.688 333	53.65 214
19.7	13.607 324	35.29 126	28.120 295	41.51 221	53.329 397	1.29 65	15.021 316	55.83 240
29.7	13.931 303	34.03 97	28.415 274	43.72 220	53.726 339	0.64 19	15.337 292	58.26 271
July 9.6	14.234 275	33.06 67	28.689 216	45.95 220	54.099 339	0.41 19	15.629 262	60.89 271
19.6	14.509 240	32.39 34	28.935 213	48.15 212	54.438 295	0.60 61	15.891 224	63.63 281
29.6	14.749 198	32.05 3	29.148 175	50.27 200	54.733 243	1.21 97	16.115 182	66.44 281
Aug. 8.6	14.947 152	32.02 29	29.323 134	52.27 184	54.976 185	2.18 134	16.297 138	69.24 271
18.5	15.099 104	32.31 56	29.457 92	54.11 164	55.161 125	3.52 162	16.435 91	71.98 261
28.5	15.203 56	32.87 81	29.549 50	55.75 143	55.286 62	5.14 184	16.526 46	74.59 241
Sept. 7.5	15.259 8	33.68 101	29.599 8	57.18 119	55.348 1	6.98 199	16.572 2	77.05 221
17.5	15.267 36	34.69 115	29.607 28	58.37 96	55.347 58	8.97 205	16.574 39	79.30 191
27.4	15.231 74	35.84 122	29.579 61	59.33 71	55.289 111	11.02 203	16.535 74	81.29 171
Oct. 7.4	15.157 107	37.06 125	29.518 87	60.04 48	55.178 156	13.05 192	16.461 103	82.99 141
17.4	15.050 130	38.31 120	29.431 107	60.52 23	55.022 191	14.97 172	16.358 128	84.40 107
27.3	14.920 147	39.51 111	29.324 123	60.75 2	54.831 216	16.69 146	16.230 144	85.47 71
Nov. 6.3	14.773 156	40.62 97	29.201 129	60.77 22	54.615 230	18.15 112	16.086 155	86.19 31
16.3	14.617 157	41.59 77	29.072 131	60.55 41	54.385 232	19.27 74	15.931 160	86.54 1
26.3	14.460 150	42.36 57	28.941 127	60.14 79	54.153 227	20.01 33	15.771 159	86.53 7
Dec. 6.2	14.310 138	42.93 32	28.814 119	59.53 61	53.926 209	20.34 9	15.612 152	86.13 1
16.2	14.172 121	43.25 8	28.695 108	58.74 94	53.717 189	20.25 52	15.460 141	85.36 11
26.2	14.051 101	43.33 17	28.587 91	57.80 106	53.528 159	19.73 92	15.319 124	84.24 11
36.2	13.950	43.16	28.496	56.74	53.369	18.81	15.195	82.83 14
Mean Place	10.690	60.09	25.309	29.16	50.229	31.48	12.185	49.60 7
Sec δ , Tan δ	1.127	-0.520	1.017	+0.184	1.475	-1.084	1.152	+0.573
$D\phi a$, $D\omega a$	+0.07	+0.03	+0.06	-0.01	+0.07	+0.07	+0.06	-0.04
$D\phi \delta$, $D\omega \delta$	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.3

APPARENT PLACES OF STARS, 1919.

501

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	λ Pegasi. Mag. 4.1		ε Grus. Mag. 3.7		τ Aquarii. Mag. 4.2		μ Pegasi. Mag. 3.7	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 22 42	° ' s +23 8	h m 22 43	° ' s -51 44	h m 22 45	° ' s -14 0	h m 22 46	° ' s +24 10
	s	"	s	"	s	"	s	"
Jan. 1.2	38.008 97	33.75 141	40.014 165	42.49 132	18.675 77	71.80 22	5.908 101	38.28 140
11.1	37.911 75	32.34 159	39.849 126	41.17 172	18.598 56	72.02 8	5.807 78	36.86 159
21.1	37.836 51	30.75 168	39.723 83	39.45 207	18.542 32	72.10 9	5.729 55	35.27 171
31.1	37.785 22	29.07 172	39.640 38	37.38 235	18.510 7	72.01 27	5.674 26	33.56 175
Feb. 10.1	37.763 10	27.35 166	39.602 10	35.03 260	18.503 21	71.74 46	5.648 6	31.81 171
20.0	37.773	25.69	39.612	32.43	18.524	71.28	5.654	30.10
Mar. 2.0	37.817 44	24.13 156	39.671 59	29.66 277	18.575 51	70.61 67	5.695 41	28.51 159
12.0	37.900 83	22.78 135	39.781 110	26.76 260	18.660 85	69.75 86	5.774 79	27.10 141
21.9	38.022 122	21.71 107	39.942 161	23.79 297	18.778 118	68.66 109	5.893 119	25.97 113
31.9	38.183 161	20.96 75	40.155 213	20.82 297	18.931 153	67.37 129	6.051 158	25.16 81
	200	37	261	292	187	147	198	44
Apr. 10.9	38.383	20.59	40.416	17.90	19.118	65.90	6.249	24.72
20.9	38.617 234	20.61 2	40.723 307	15.08 282	19.337 219	64.24 166	6.482 233	24.68 4
30.8	38.884 267	21.05 44	41.074 351	12.45 263	19.589 252	62.45 179	6.748 266	25.06 38
May 10.8	39.177 293	21.90 85	41.460 386	10.03 242	19.865 276	60.55 190	7.040 292	25.86 80
20.8	39.489 312	23.14 124	41.874 414	7.91 212	20.161 296	58.60 195	7.353 313	27.05 119
	324	160	433	179	311	196	325	156
30.8	39.813	24.74	42.307	6.12	20.472	56.64	7.678	28.61
June 9.7	40.140 327	26.64 190	42.750 443	4.70 142	20.789 317	54.72 192	8.007 329	30.48 187
19.7	40.461 321	28.81 217	43.192 442	3.69 101	21.104 315	52.89 183	8.331 324	32.63 215
29.7	40.768 307	31.17 236	43.621 429	3.12 57	21.408 304	51.21 168	8.641 310	34.98 235
July 9.6	41.054 286	33.67 250	44.023 402	3.00 12	21.695 287	49.70 151	8.931 290	37.48 250
	257	258	368	33	261	129	261	258
19.6	41.311	36.25	44.391	3.33	21.956	48.41	9.192	40.06
29.6	41.532 221	38.84 259	44.713 322	4.08 75	22.186 320	47.38 103	9.418 226	42.70 264
Aug. 8.6	41.714 182	41.38 254	44.980 267	5.25 117	22.377 191	46.61 77	9.605 187	45.27 257
18.5	41.855 141	43.83 245	45.186 206	6.76 151	22.526 149	46.10 51	9.749 144	47.76 249
28.5	41.960 95	46.14 231	45.325 139	8.57 181	22.632 106	45.87 23	9.848 99	50.12 236
	52	212	72	206	62	1	56	218
Sept. 7.5	42.002	48.26	45.397	10.62	22.694	45.88	9.904	52.30
17.5	42.011 9	50.17 191	45.400 3	12.80 218	22.713 19	46.13 25	9.916 12	54.27 197
27.4	41.982 29	51.83 166	45.339 61	15.04 224	22.693 20	46.56 43	9.890 26	55.99 172
Oct. 7.4	41.918 64	53.23 140	45.220 119	17.25 221	22.637 56	47.15 59	9.829 61	57.44 145
17.4	41.827 91	54.33 110	45.051 169	19.32 207	22.554 83	47.87 72	9.740 89	58.60 116
	115	80	211	186	107	78	113	87
27.3	41.712	55.13 50	44.840	21.18	22.447	48.65	9.627	59.47
Nov. 6.3	41.582 130	55.63 17	44.601 239	22.73 155	22.324 123	49.45 80	9.498 129	60.01 54
16.3	41.442 140	55.80 17	44.343 258	23.92 119	22.193 131	50.25 80	9.358 140	60.23 22
26.3	41.297 145	55.65 15	44.080 263	24.70 78	22.059 134	51.00 75	9.213 145	60.12 11
Dec. 6.2	41.153 144	55.19 46	43.823 257	25.03 33	21.930 129	51.67 67	9.069 144	59.69 43
	137	77	244	14	120	58	139	74
16.2	41.016	54.42	43.579	24.89	21.810	52.25	8.930	58.95
26.2	40.890 126	53.36 106	43.360 219	24.29 60	21.702 108	52.72 47	8.801 129	57.92 103
36.2	40.779 111	52.07 129	43.170 190	23.25 104	21.609 93	53.06 34	8.687 114	56.62 130
Mean Place	37.657	20.58	40.108	35.00	18.314	73.51	5.536	24.76
Sec δ, Tan δ	1.087	+0.427	1.615	-1.268	1.031	-0.250	1.096	+0.449
D ₂₀ , D ₂₀	+0.06	-0.03	+0.07	+0.08	+0.06	+0.02	+0.06	-0.03
D ₂₀ , D ₂₀	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.		ϵ Cephei. Mag. 3.7		λ Aquarii. Mag. 3.8		ρ Indi. Mag. 6.1		δ Aquarii. Mag. 3.		I
		Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.		
		h m 22 46	° ' " +65 46	h m 22 48	° ' " - 8 0	h m 22 49	° ' " -70 29	h m 22 50		
		s	"	s	"	s	"	s		
Jan.	1.2	47.21	50.12	23.769	35.99	1.33	94.85	21.553	82	6
	11.1	46.83 38	48.44 168	23.693 76	36.45 46	0.93 40	92.86 199	21.471 82	61	6
	21.1	46.52 31	46.28 216	23.635 58	36.80 35	0.60 33	90.44 242	21.410 61	6	6
	31.1	46.26 26	43.73 255	23.599 36	37.02 22	0.36 24	87.63 281	21.372 38	6	6
Feb.	10.1	46.07 19	40.88 285	23.590 9	37.10 8	0.21 15	84.50 313	21.360 12	12	6
		10	304	17	9	6	335	16		
	20.0	45.97	37.84	23.607	37.01	0.15	81.15	21.376		6
Mar.	2.0	45.97 0	34.76 306	23.653 46	36.72 20	0.20 5	77.64 351	21.421 45		6
	12.0	46.06 9	31.74 302	23.733 80	36.21 51	0.34 14	74.08 356	21.501 80		6
	22.0	46.26 20	28.94 280	23.847 114	35.47 74	0.58 24	70.52 366	21.614 113		6
	31.9	46.54 28	26.44 250	23.995 148	34.51 96	0.91 33	67.05 347	21.764 150		6
		37	211	182	120	41	332	183		
Apr.	10.9	46.91	24.33	24.177	33.31	1.32	63.73	21.947		5
	20.9	47.36 45	22.71 162	24.393 216	31.90 141	1.82 50	60.65 308	22.165 218		5
	30.8	47.87 51	21.63 108	24.639 246	30.29 161	2.40 58	57.85 280	22.415 250		5
May	10.8	48.43 56	21.13 50	24.911 272	28.53 176	3.04 64	55.40 245	22.690 275		5
	20.8	49.02 59	21.22 9	25.203 292	26.66 187	3.72 68	53.37 203	22.988 298		5
		61	67	307	194	72	158	312		
	30.8	49.63	21.89	25.510	24.72	4.44	51.78	23.300		4
June	9.7	50.24 61	23.12 123	25.822 312	22.75 197	5.17 73	50.67 111	23.619 319		4
	19.7	50.82 58	24.88 176	26.131 309	20.83 192	5.91 74	50.07 60	23.937 318		4
	29.7	51.37 55	27.13 225	26.432 301	18.98 185	6.62 71	50.00 7	24.245 308		4
July	9.7	51.87 50	29.79 266	26.716 284	17.28 170	7.29 67	50.45 45	24.536 291		4
		45	302	257	154	61	97	266		
	19.6	52.32	32.81	26.973	15.74	7.90	51.42	24.802		4
	29.6	52.69 37	36.09 328	27.199 226	14.41 133	8.44 54	52.86 144	25.037 235		4
Aug.	8.6	52.98 29	39.60 351	27.390 191	13.32 109	8.89 45	54.72 186	25.234 197		3
	18.5	53.20 22	43.23 363	27.539 149	12.46 86	9.23 34	56.94 222	25.390 156		3
	28.5	53.31 11	46.91 368	27.645 106	11.88 58	9.45 22	59.46 262	25.502 112		3
		4	365	64	36	9	270	67		
Sept.	7.5	53.35	50.56	27.709	11.52	9.54	62.16	25.569		3
	17.5	53.31 4	54.11 355	27.731 22	11.41 11	9.53 1	64.96 280	25.593 24		3
	27.4	53.19 12	57.49 338	27.715 16	11.50 9	9.39 14	67.75 279	25.577 16		4
Oct.	7.4	52.99 20	60.62 313	27.665 50	11.79 29	9.13 26	70.41 266	25.526 51		4
	17.4	52.73 26	63.45 283	27.586 79	12.21 42	8.78 35	72.85 244	25.443 83		4
		33	244	100	54	45	209	105		
	27.4	52.40	65.89	27.486	12.75	8.33	74.94	25.338		4
Nov.	6.3	52.03 37	67.89 200	27.369 117	13.37 62	7.83 50	76.62 168	25.216 122		4
	16.3	51.62 41	69.39 150	27.245 124	14.04 67	7.28 55	77.80 118	25.084 132		4
	26.3	51.19 43	70.33 94	27.117 128	14.73 69	6.72 56	78.43 63	24.950 134		4
Dec.	6.2	50.75 44	70.72 39	26.992 125	15.42 69	6.15 57	78.47 4	24.818 132		4
		45	22	117	65	55	53	125		
	16.2	50.30	70.50	26.875	16.07	5.60	77.94	24.693		4
	26.2	49.87 43	69.70 80	26.769 106	16.68 61	5.10 50	76.84 110	24.582 111		4
	36.2	49.47 40	68.33 137	26.678 91	17.21 53	4.65 45	75.19 165	24.486 96		4
Mean Place		47.566	26.79	23.374	39.48	2.372	84.74	21.179		6
Sec δ , Tan δ		2.437	+2.223	1.010	-0.141	2.996	-2.824	1.042		-
$D\psi a$, $D\omega a$		+0.04	-0.14	+0.06	+0.01	+0.08	+0.18	+0.06		+
$D\psi \delta$, $D\omega \delta$		+0.4	-0.3	+0.4	-0.3	+0.4	-0.3	+0.4		+

APPARENT PLACES OF STARS, 1919.

503

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Piscis Australis. (Fomalhaut.) Mag. 1.3		α Andromedæ. Mag. 3.6		β Pegasi. Var. 2.2-2.7		α Pegasi. (Markab.) Mag. 2.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 22 53	° ' " -30 2	h m 22 58	° ' " +41 53	h m 22 59	° ' " +27 38	h m 23 0	° ' " +14 46
	s	"	s	"	s	"	s	"
Jan. 1.2	10.986 ¹⁰⁰	69.92 ³⁷	11.777 ¹⁵⁹	43.99 ¹⁵⁷	51.170 ¹¹⁴	49.93 ¹³⁸	43.961 ⁹⁴	19.81 ¹¹³
11.1	10.886 ⁷⁶	69.55 ⁶⁷	11.618 ¹³⁶	42.42 ¹⁹⁰	51.056 ⁹⁵	48.55 ¹⁶¹	43.867 ⁷⁶	18.68 ¹²³
21.1	10.810 ⁵⁰	68.88 ⁹²	11.482 ¹⁰⁶	40.52 ²¹⁷	50.961 ⁷²	46.94 ¹⁷⁵	43.791 ⁵⁶	17.45 ¹²⁸
31.1	10.760 ²⁰	67.96 ¹¹⁸	11.376 ⁷¹	38.35 ²³⁴	50.889 ⁴⁵	45.19 ¹⁸⁴	43.735 ³⁰	16.17 ¹²⁷
Feb. 10.1	10.740 ¹¹	66.78 ¹⁴¹	11.305 ³⁰	36.01 ²⁴²	50.844 ¹¹	43.35 ¹⁸⁴	43.705 ³	14.90 ¹²⁰
20.0	10.751 ⁴⁴	65.37 ¹⁶⁴	11.275 ¹⁶	33.59 ²³⁹	50.833 ²⁵	41.51 ¹⁷⁵	43.702 ²⁹	13.70 ¹⁰⁸
Mar. 2.0	10.795 ⁸¹	63.73 ¹⁸²	11.291 ⁶⁵	31.20 ²²⁶	50.858 ⁶⁵	39.76 ¹⁵⁸	43.731 ⁶⁴	12.62 ⁸⁸
12.0	10.876 ¹¹⁹	61.91 ¹⁹⁸	11.356 ¹¹⁷	28.94 ²⁰³	50.923 ¹⁰⁵	38.18 ¹³⁵	43.795 ¹⁰¹	11.74 ⁶²
22.0	10.995 ¹⁵⁶	59.93 ²¹⁴	11.473 ¹⁶⁸	26.91 ¹⁷²	51.028 ¹⁴⁸	36.83 ¹⁰²	43.896 ¹³⁹	11.12 ³³
31.9	11.151 ¹⁹⁵	57.79 ²²²	11.641 ²¹⁷	25.19 ¹³²	51.176 ¹⁸⁹	35.81 ⁶⁵	44.035 ¹⁷⁶	10.79 ⁰
Apr. 10.9	11.346 ²³¹	55.57 ²²⁸	11.858 ²⁶⁴	23.87 ⁸⁷	51.365 ²³⁰	35.16 ²⁵	44.211 ²¹³	10.79 ³⁵
20.9	11.577 ²⁶⁶	53.29 ²³⁰	12.122 ³⁰⁴	23.00 ³⁹	51.595 ²⁶⁴	34.91 ¹⁷	44.424 ²⁴⁶	11.14 ⁷¹
30.8	11.843 ²⁹⁵	50.99 ²²⁵	12.426 ³³⁷	22.61 ¹²	51.859 ²⁹⁴	35.08 ⁶¹	44.670 ²⁷³	11.85 ¹⁰⁴
May 10.8	12.138 ³¹⁷	48.74 ²¹⁵	12.763 ³⁶²	22.73 ⁶¹	52.153 ³¹⁶	35.69 ¹⁰³	44.943 ²⁹⁴	12.89 ¹³⁷
20.8	12.455 ³³⁶	46.59 ²⁰²	13.125 ³⁷⁶	23.34 ¹¹¹	52.469 ³³¹	36.72 ¹⁴⁰	45.237 ³¹¹	14.26 ¹⁶⁵
30.8	12.791 ³⁴⁴	44.57 ¹⁸²	13.501 ³⁸¹	24.45 ¹⁵⁷	52.800 ³³⁷	38.12 ¹⁷⁷	45.548 ³¹⁷	15.91 ¹⁸⁹
June 9.7	13.135 ³⁴³	42.75 ¹⁵⁷	13.882 ³⁷⁷	26.02 ¹⁹⁷	53.137 ³³⁴	39.89 ²⁰⁷	45.865 ³¹⁵	17.80 ²⁰⁹
19.7	13.478 ³³⁶	41.18 ¹³⁰	14.259 ³⁶⁰	27.99 ²³²	53.471 ³²³	41.96 ²³¹	46.180 ³⁰⁶	19.89 ²²¹
29.7	13.814 ³¹⁷	39.88 ⁹⁹	14.619 ³³⁶	30.31 ²⁶³	53.794 ³⁰²	44.27 ²⁴⁹	46.486 ²⁸⁸	22.10 ²²⁹
July 9.7	14.131 ²⁹¹	38.89 ⁶⁵	14.955 ³⁰³	32.94 ²⁸⁵	54.096 ²⁷⁵	46.76 ²⁶³	46.774 ²⁶³	24.39 ²³⁰
19.6	14.422 ²⁵⁷	38.24 ³⁰	15.258 ²⁶³	35.79 ³⁰²	54.371 ²⁴¹	49.39 ²⁶⁹	47.037 ²³³	26.69 ²²⁷
29.6	14.679 ²¹⁷	37.94 ⁴	15.521 ²¹⁹	38.81 ³¹¹	54.612 ²⁰²	52.08 ²⁶⁸	47.270 ¹⁹⁶	28.96 ²¹⁹
Aug. 8.6	14.896 ¹⁷³	37.98 ³⁸	15.740 ¹⁶⁹	41.92 ³¹³	54.814 ¹⁶⁰	54.76 ²⁶³	47.466 ¹⁵⁶	31.15 ²⁰⁴
18.5	15.069 ¹²⁴	38.36 ⁶⁸	15.909 ¹¹⁹	45.05 ³⁰⁹	54.974 ¹¹⁵	57.39 ²⁵²	47.622 ¹¹⁴	33.19 ¹⁸⁹
28.5	15.193 ⁷⁵	39.04 ⁹⁵	16.028 ⁶⁸	48.14 ²⁹⁸	55.089 ⁷¹	59.91 ²³⁷	47.736 ⁷³	35.08 ¹⁶⁹
Sept. 7.5	15.268 ²⁶	39.99 ¹¹⁶	16.096 ¹⁸	51.12 ²⁸³	55.160 ²⁷	62.28 ²¹⁶	47.809 ³²	36.77 ¹⁴⁷
17.5	15.294 ¹⁹	41.15 ¹³²	16.114 ²⁸	53.95 ²⁶¹	55.187 ¹²	64.44 ¹⁹⁴	47.841 ⁷	38.24 ¹²²
27.4	15.275 ⁶⁰	42.47 ¹⁴¹	16.086 ⁷⁰	56.56 ²³⁵	55.175 ⁴⁸	66.38 ¹⁶⁷	47.834 ³⁹	39.46 ⁹⁹
Oct. 7.4	15.215 ⁹⁴	43.88 ¹⁴³	16.016 ¹⁰⁷	58.91 ²⁰⁴	55.127 ⁸⁰	68.05 ¹³⁹	47.795 ⁶⁹	40.45 ⁷²
17.4	15.121 ¹²³	45.31 ¹³⁹	15.909 ¹³⁷	60.95 ¹⁶⁹	55.047 ¹⁰⁵	69.44 ¹⁰⁸	47.726 ⁹²	41.17 ⁴⁸
27.4	14.998 ¹⁴³	46.70 ¹²⁸	15.772 ¹⁶²	62.64 ¹³⁰	54.942 ¹²⁵	70.52 ⁷⁵	47.634 ¹⁰⁹	41.65 ²²
Nov. 6.3	14.855 ¹⁵⁴	47.98 ¹¹¹	15.610 ¹⁷⁹	63.94 ⁸⁸	54.817 ¹³⁸	71.27 ⁴²	47.525 ¹²²	41.87 ¹
16.3	14.701 ¹⁵⁰	49.09 ⁹¹	15.431 ¹⁹¹	64.82 ⁴³	54.679 ¹⁴⁶	71.69 ⁶	47.403 ¹²⁷	41.86 ²⁷
26.3	14.542 ¹⁵⁶	50.00 ⁶⁶	15.240 ¹⁹⁷	65.25 ²	54.533 ¹⁴⁹	71.75 ²⁹	47.276 ¹²⁵	41.59 ⁴⁹
Dec. 6.2	14.386 ¹⁴⁸	50.66 ⁴⁰	15.043 ¹⁹⁵	65.23 ⁴⁷	54.384 ¹⁴⁶	71.46 ⁶³	47.148 ¹²⁵	41.10 ⁷¹
16.2	14.238 ¹³⁴	51.06 ¹¹	14.848 ¹⁸⁸	64.76 ⁹³	54.238 ¹³⁹	70.83 ⁹⁵	47.023 ¹¹⁷	40.39 ⁹⁰
26.2	14.104 ¹¹⁵	51.17 ¹⁷	14.660 ¹⁷⁵	63.83 ¹³⁵	54.099 ¹²⁷	69.88 ¹²⁴	46.906 ¹⁰⁶	39.49 ¹⁰⁶
36.2	13.989	51.00	14.485	62.48	53.972	68.64	46.800	38.43
Mean Place	10.690	66.93	11.426	25.32	50.719	35.22	43.476	9.09
Sec δ , Tan δ	1.155	-0.579	1.343	+0.897	1.129	+0.524	1.034	+0.264
$D_{\phi\alpha}$, $D_{\omega\alpha}$	+0.06	+0.04	+0.05	-0.06	+0.06	-0.03	+0.06	-0.02
$D_{\phi\delta}$, $D_{\omega\delta}$	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ing Pos- itions	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declina- tion.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
NEW MOON.											
τ Capricorni	5.2	-0.13	+2.8	-15 14.3	3 20 30.5	-5 12.6	+0.9597	0.5572	+0.1752	+75	+17
84 B. Capricorni	6.0	0.10	3.1	12 50.7	4 1 43.8	-0 9.9	-0.6024	0.5558	0.1821	+1	-80
ν Aquarii	4.5	0.05	3.2	11 42.0	10 23.4	+8 12.2	-0.1679	0.5537	0.1926	+25	-43
51 G. Aquarii	6.5	-0.03	+3.3	-10 56.4	12 33.3	+10 17.7	-0.5363	0.5532	+0.1949	+6	-74
17 Aquarii	6.3	-0.01	3.5	9 39.9	16 33.5	-9 50.2	-1.0689	0.5522	0.1991	-27	-90
19 Aquarii	5.6	0.00	3.4	10 5.6	17 36.3	-8 49.5	-0.4155	0.5520	0.2002	+13	-64
ξ Aquarii	4.8	+0.04	3.8	8 13.0	23 25.1	-3 12.3	-1.1758	0.5508	0.2056	-35	-90
c^1 Capricorni	5.3	0.07	3.5	9 27.2	5 2 46.6	+0 2.5	+0.7982	0.5501	0.2085	+81	+5
c^2 Capricorni	6.3	+0.08	+3.4	-9 39.0	3 21.8	+0 36.5	+1.1225	0.5500	+0.2090	+81	+28
30 Aquarii	5.6	0.14	4.0	6 54.8	11 18.1	+8 17.1	-0.0190	0.5488	0.2148	+36	-40
138 B. Aquarii	6.4	0.18	4.4	5 7.2	15 44.0	-11 25.8	-0.9078	0.5482	0.2175	-12	-90
44 Aquarii	5.7	0.20	4.2	5 47.5	17 46.3	-9 27.6	+0.2283	0.5480	0.2187	+51	-26
51 Aquarii	5.8	0.23	4.2	5 14.8	21 3.1	-6 17.2	+0.3875	0.5477	0.2203	+61	-18
187 B. Aquarii	6.3	+0.26	+4.8	-3 19.5	6 0 25.8	-3 1.1	-0.8397	0.5475	+0.2217	-8	-90
κ Aquarii	5.2	0.29	4.4	4 38.7	3 26.7	-0 6.2	+1.1858	0.5473	0.2228	+86	+33
207 B. Aquarii	6.3	0.31	4.5	3 58.5	4 52.2	+1 16.5	+0.8156	0.5472	0.2234	+87	+6
3 Piscium	6.3	0.41	5.5	-0 14.9	14 10.0	+10 15.9	-0.9163	0.5473	0.2254	-11	-90
κ Piscium	4.9	0.54	5.6	+0 48.8	7 2 26.5	-1 51.9	+0.7698	0.5484	0.2256	+90	+3
9 Piscium	6.4	+0.54	+5.6	+0 40.7	2 35.3	-1 43.4	+0.9404	0.5484	+0.2256	+90	+14
16 Piscium	5.7	0.60	5.8	1 39.3	6 50.7	+2 23.5	+0.9031	0.5491	0.2249	+90	+12
19 Piscium	5.4	0.65	6.1	3 2.3	11 28.7	+6 52.3	+0.5294	0.5499	0.2238	+73	-10
36 Piscium	6.2	0.84	7.3	7 47.6	8 1 20.4	-3 43.9	-1.2459	0.5535	0.2177	-39	-83
d Piscium	5.4	0.86	7.2	7 44.6	3 10.5	-1 57.5	-0.7961	0.5541	0.2166	-5	-83
136 B. Piscium	6.5	+0.99	+7.3	+8 54.9	12 29.7	+7 2.6	+0.0020	0.5573	+0.2099	+39	-36
101 Piscium	6.2	1.36	7.9	14 15.0	9 12 32.6	+6 15.1	-0.6420	0.5681	0.1842	+3	-73
20 H ¹ . Arietis	6.4	1.59	7.7	16 50.8	10 2 52.1	-3 56.6	-0.7770	0.5754	0.1631	-5	-74
27 Arietis	6.4	1.73	7.1	17 20.9	11 52.2	+4 43.5	+0.1153	0.5801	0.1476	+45	-23
36 Arietis	6.5	1.81	6.6	17 25.4	17 24.6	+10 3.5	+0.8281	0.5829	0.1372	+90	+18
40 Arietis	6.0	+1.84	+6.5	+17 56.9	19 8.1	+11 43.0	+0.5306	0.5837	+0.1339	+75	+1
45 Arietis	6.0	1.88	6.2	18 0.4	22 6.7	-9 25.2	+0.8625	0.5852	0.1280	+90	+21
ρ Arietis	5.6	1.88	6.1	17 42.2	22 21.6	-9 10.9	+1.2010	0.5852	0.1275	+90	+48
54 Arietis	6.5	1.96	5.8	18 29.2	11 3 12.2	-4 31.3	+1.0018	0.5875	0.1176	+90	+31
δ Arietis	4.5	1.99	5.9	19 25.4	4 30.9	-3 15.6	+0.2074	0.5881	0.1147	+50	-15
ζ Arietis	5.0	+2.03	+6.2	+20 44.8	5 49.8	-1 59.7	-0.9823	0.5887	+0.1119	-20	-70
τ Arietis	5.2	2.07	5.9	20 51.5	8 22.4	+0 26.9	-0.8166	0.5897	0.1065	-9	-70
63 Arietis	5.2	2.07	5.7	20 27.3	8 59.6	+1 2.9	-0.3439	0.5900	0.1051	+19	-44
65 Arietis	6.0	2.08	5.6	20 31.1	9 40.0	+1 41.5	-0.3380	0.5903	0.1036	+20	-44
14 H ¹ . Tauri	6.5	2.16	4.9	20 39.2	15 29.4	+7 17.4	+0.0901	0.5925	0.0905	+44	-18
22 H ¹ . Tauri	6.1	+2.19	+4.6	+20 40.5	17 39.9	+9 22.8	+0.2603	0.5933	+0.0855	+55	-9
133 B. Tauri	5.9	2.24	4.7	22 0.0	19 48.8	+11 26.7	-0.9019	0.5940	0.0805	-15	-68
32 Tauri	5.8	2.28	4.4	22 14.8	22 33.7	-9 54.9	-0.9398	0.5948	0.0740	-18	-68
A Tauri	4.5	2.31	3.9	21 51.8	12 1 39.5	-6 56.4	-0.3334	0.5957	0.0666	+20	-40
39 Tauri	6.1	2.31	3.8	21 47.5	1 54.6	-6 42.0	-0.2456	0.5958	0.0660	+25	-35
192 B. Tauri	6.1	+2.35	+3.5	+22 12.4	4 52.4	-3 51.2	-0.4808	0.5965	+0.0588	+11	-49
51 Tauri	5.6	2.36	3.0	21 23.0	7 3.4	-1 45.3	+0.4763	0.5969	0.0534	+71	+6
53 Tauri	5.3	2.36	2.8	20 56.9	7 28.6	-1 21.2	+0.9391	0.5970	0.0524	+90	+33
56 Tauri	5.2	2.37	2.9	21 34.8	7 32.3	-1 17.7	+0.3026	0.5970	0.0522	+58	-4
227 B. Tauri	5.9	2.38	2.5	20 47.7	9 5.6	+0 12.0	+1.1759	0.5973	0.0485	+90	+53
Tauri	4.1	+2.41	+2.7	+22 6.6	9 47.4	+0 52.1	-0.1236	0.5974	+0.0467	+32	-28

APPARENT PLACES OF STARS, 1919.

505

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	59 Pegasi. Mag. 5.2		5 H ¹ Cassiopeiae. Mag. 5.6		φ Aquarii. Mag. 4.4		ψ Aquarii. Mag. 4.5	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 23 7	° ' " + 8 16	h m 23 9	° ' " +56 43	h m 23 10	° ' " - 6 28	h m 23 11	° ' " - 9 31
	s	"	s	"	s	"	s	"
Jan. 1.2	39.303	56.83	22.940	38.02	8.178	65.59	39.466	42.08
11.2	39.212 ⁹¹	55.89 ⁹⁴	22.682 ²⁵⁸	36.56 ¹⁴⁶	8.090 ⁸⁸	66.12 ⁵³	39.376 ⁹⁰	42.51 ⁴³
21.1	39.137 ⁷⁵	54.90 ⁹⁹	22.452 ²³⁰	34.65 ¹⁹¹	8.015 ⁷⁵	66.54 ⁴²	39.304 ⁷²	42.81 ³⁰
31.1	39.081 ⁵⁶	53.92 ⁹⁸	22.263 ¹⁸⁹	32.35 ²³⁰	7.963 ⁵²	66.86 ³²	39.250 ⁵⁴	42.96 ¹⁵
Feb. 10.1	39.049 ³²	52.98 ⁹⁴	22.125 ¹³⁸	29.76 ²⁵⁹	7.931 ³²	67.03 ¹⁷	39.219 ³¹	42.96 ⁰
	6	84	81	276	4	2	5	20
20.0	39.043	52.14	22.044	27.00	7.927	67.01	39.214	42.76
Mar. 2.0	39.068 ²⁵	51.46 ⁶⁸	22.027 ¹⁷	24.17 ²⁸³	7.951 ²⁴	66.81 ²⁰	39.238 ²⁴	42.37 ³⁹
12.0	39.125 ⁵⁷	50.97 ⁴⁹	22.081 ⁵⁴	21.39 ²⁷⁸	8.008 ⁵⁷	66.38 ⁴³	39.294 ⁵⁶	41.75 ⁶²
22.0	39.217 ⁹²	50.73 ²⁴	22.207 ¹²⁶	18.78 ²⁶¹	8.099 ⁹¹	65.74 ⁶⁴	39.384 ⁹⁰	40.91 ⁸⁴
31.9	39.347 ¹³⁰	50.76 ³	22.405 ¹⁹⁸	16.44 ²³⁴	8.226 ¹²⁷	64.84 ⁹⁰	39.510 ¹²⁶	39.84 ¹⁰⁷
	167	34	266	197	162	112	162	129
Apr. 10.9	39.514	51.10	22.671	14.47	8.388	63.72	39.672	38.55
20.9	39.717 ²⁰³	51.75 ⁶⁵	23.002 ³³¹	12.95 ¹⁵²	8.588 ²⁰⁰	62.36 ¹³⁶	39.870 ¹⁹⁸	37.06 ¹⁴⁹
30.9	39.952 ²³⁵	52.70 ⁹⁵	23.388 ³⁸⁶	11.93 ¹⁰²	8.818 ²³⁰	60.78 ¹⁵⁸	40.100 ²³⁰	35.37 ¹⁶⁹
May 10.8	40.216 ²⁶⁴	53.96 ¹²⁶	23.818 ⁴³⁰	11.46 ⁴⁷	9.077 ²⁵⁹	59.08 ¹⁷⁰	40.361 ²⁶¹	33.54 ¹⁸³
20.8	40.502 ²⁸⁶	55.47 ¹⁵¹	24.280 ⁴⁶²	11.54 ⁸	9.361 ²⁸⁴	57.22 ¹⁸⁶	40.645 ²⁸⁴	31.61 ¹⁹³
	304	175	484	63	300	196	302	200
30.8	40.806	57.22	24.764	12.17	9.661	55.26	40.947	29.61
June 9.7	41.118 ³¹²	59.14 ¹⁹²	25.254 ⁴⁹⁰	13.33 ¹¹⁶	9.971 ³¹⁰	53.27 ¹⁹⁹	41.259 ³¹²	27.60 ²⁰¹
19.7	41.430 ³¹²	61.19 ²⁰⁵	25.739 ⁴⁸⁵	15.00 ¹⁶⁷	10.282 ³¹¹	51.28 ¹⁹⁹	41.573 ³¹⁴	25.64 ¹⁹⁶
29.7	41.733 ³⁰³	63.33 ²¹⁴	26.205 ⁴⁶⁶	17.13 ²¹³	10.587 ³⁰⁵	49.37 ¹⁹¹	41.880 ³⁰⁷	23.77 ¹⁸⁷
July 9.7	42.021 ²⁸⁸	65.49 ²¹⁶	26.639 ⁴³⁴	19.65 ²⁵²	10.877 ²⁹⁰	47.58 ¹⁷⁹	42.175 ²⁹⁵	22.04 ¹⁷³
	265	210	394	285	269	162	273	153
19.6	42.286	67.59	27.033	22.50	11.146	45.96	42.448	20.51
29.6	42.522 ²³⁶	69.62 ²⁰³	27.378 ³⁴⁵	25.63 ³¹³	11.387 ²⁴¹	44.51 ¹⁴⁵	42.691 ²⁴³	19.19 ¹³²
Aug. 8.6	42.723 ²⁰¹	71.53 ¹⁹¹	27.664 ²⁸⁶	28.95 ³³²	11.592 ²⁰⁵	43.29 ¹²²	42.900 ²⁰⁹	18.13 ¹⁰⁶
18.6	42.885 ¹⁶²	73.27 ¹⁷⁴	27.892 ²²⁸	32.39 ³⁴⁴	11.759 ¹⁶⁷	42.34 ⁹⁵	43.071 ¹⁷¹	17.32 ⁸¹
28.5	43.006 ¹²¹	74.80 ¹⁵³	28.054 ¹⁶²	35.89 ³⁵⁰	11.887 ¹²⁸	41.65 ⁶⁹	43.201 ¹³⁰	16.77 ⁵⁵
	80	133	96	347	85	45	88	27
Sept. 7.5	43.086	76.13	28.150	39.36	11.972	41.20	43.289	16.50
17.5	43.126 ⁴⁰	77.22 ¹⁰⁹	28.183 ³³	42.74 ³³⁸	12.017 ⁴⁵	40.97 ²³	43.336 ⁴⁷	16.47 ³
27.4	43.129 ³	78.08 ⁸⁶	28.155 ²⁸	45.96 ³²²	12.021 ⁴	40.98 ¹	43.342 ⁶	16.68 ²¹
Oct. 7.4	43.097 ³²	78.70 ⁶²	28.070 ⁸⁵	48.95 ²⁹⁹	11.993 ²⁸	41.19 ²¹	43.313 ²⁹	17.06 ³⁸
17.4	43.036 ⁶¹	79.10 ⁴⁰	27.933 ¹³⁷	51.65 ²⁷⁰	11.933 ⁶⁰	41.60 ⁴¹	43.254 ⁵⁹	17.60 ⁵⁴
	84	17	183	235	81	52	83	66
27.4	42.952	79.27	27.750	54.00	11.852	42.12	43.171	18.26
Nov. 6.3	42.850 ¹⁰²	79.25 ²	27.530 ²²⁰	55.95 ¹⁹⁵	11.748 ¹⁰⁴	42.73 ⁶¹	43.069 ¹⁰²	19.00 ⁷⁴
16.3	42.735 ¹¹⁵	79.02 ²³	27.278 ²⁵²	57.43 ¹⁴⁸	11.634 ¹¹⁴	43.42 ⁶⁹	42.954 ¹¹⁵	19.77 ⁷⁷
26.3	42.615 ¹²⁰	78.62 ⁴⁰	27.004 ²⁷⁴	58.42 ⁹⁹	11.515 ¹¹⁹	44.13 ⁷¹	42.833 ¹²¹	20.54 ⁷⁷
Dec. 6.3	42.493 ¹²²	78.06 ⁵⁶	26.717 ²⁸⁷	58.87 ⁴⁵	11.393 ¹²²	44.85 ⁷²	42.710 ¹²³	21.29 ⁷⁵
	118	71	294	9	119	71	118	68
16.2	42.375	77.35	26.423	58.78	11.274	45.56	42.592	21.97
26.2	42.263 ¹¹²	76.53 ⁸²	26.133 ²⁹⁰	58.14 ⁶⁴	11.165 ¹⁰⁹	46.24 ⁶⁸	42.480 ¹¹²	22.59 ⁶²
36.2	42.161 ¹⁰²	75.61 ⁹²	25.856 ²⁷⁷	56.97 ¹¹⁷	11.064 ¹⁰¹	46.85 ⁶¹	42.379 ¹⁰¹	23.11 ⁵²
Mean Place	38.776	48.23	22.656	15.70	7.664	69.31	38.956	44.80
Sec δ, Tan δ	1.011	+0.146	1.823	+1.524	1.006	-0.114	1.014	-0.168
Dψα, Dωα	+0.06	-0.01	+0.05	-0.10	+0.06	+0.01	+0.06	+0.01
Dψδ, Dωδ	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Tucanæ. Mag. 4.1			γ Piscium. Mag. 3.8			γ Sculptoris. Mag. 4.5			α Cephei. Mag. 4.9		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h m	s	"	h m	s	"	h m	s	"	h m	s	"
	23 12		-58 40	23 12		+ 2 50	23 14		-32 57	23 15		+67 40
Jan. 1.2	42.463	59.09	58.502	29.01	27.548	89.03	17.67	29.81				
11.2	42.210	57.77	58.412	28.22	27.426	88.66	17.23	28.50				
21.1	41.997	55.98	58.339	27.44	27.326	87.96	16.84	26.67				
31.1	41.830	53.78	58.284	26.71	27.250	86.97	16.50	24.39				
Feb. 10.1	41.715	51.23	58.251	26.06	27.201	85.68	16.24	21.74				
20.1	41.654	48.40	58.244	25.54	27.185	84.13	16.07	18.85				
Mar. 2.0	41.653	45.34	58.265	25.18	27.202	82.34	15.99	15.81				
12.0	41.711	42.12	58.320	25.03	27.256	80.34	16.01	12.78				
22.0	41.832	38.82	58.408	25.11	27.348	78.15	16.15	9.85				
31.9	42.016	35.52	58.533	25.47	27.481	75.83	16.38	7.16				
Apr. 10.9	42.260	32.25	58.695	26.10	27.655	73.40	16.72	4.80				
20.9	42.564	29.10	58.893	27.00	27.870	70.93	17.15	2.88				
30.9	42.922	26.14	59.123	28.18	28.121	68.45	17.66	1.45				
May 10.8	43.329	23.43	59.783	29.60	28.406	66.02	18.23	0.57				
20.8	43.777	21.02	59.666	31.26	28.719	63.70	18.85	0.25				
30.8	44.255	18.98	59.967	33.08	29.052	61.54	19.50	0.52				
June 9.8	44.753	17.36	60.277	35.03	29.399	59.58	20.15	1.36				
19.7	45.257	16.19	60.589	37.07	29.750	57.89	20.80	2.76				
29.7	45.755	15.49	60.894	39.13	30.096	56.51	21.42	4.63				
July 9.7	46.233	15.30	61.185	41.16	30.429	55.48	22.00	6.99				
19.6	46.678	15.60	61.454	43.11	30.738	54.81	22.53	9.74				
29.6	47.078	16.38	61.695	44.94	31.016	54.51	22.99	12.82				
Aug. 8.6	47.421	17.63	61.901	46.59	31.255	54.60	23.37	16.16				
18.6	47.697	19.28	62.070	48.06	31.451	55.04	23.66	19.69				
28.5	47.901	21.29	62.199	49.29	31.600	55.82	23.87	23.33				
Sept. 7.5	48.025	23.58	62.286	50.31	31.699	56.91	23.99	27.01				
17.5	48.070	26.04	62.334	51.08	31.748	58.22	24.02	30.65				
27.5	48.038	28.60	62.342	51.62	31.750	59.72	23.96	34.16				
Oct. 7.4	47.932	31.15	62.317	51.93	31.707	61.33	23.82	37.50				
17.4	47.760	33.59	62.265	52.04	31.627	62.97	23.60	40.57				
27.4	47.531	35.80	62.187	51.97	31.514	64.57	23.32	43.31				
Nov. 6.3	47.258	37.72	62.091	51.71	31.378	66.07	22.97	45.66				
16.3	46.952	39.23	61.982	51.32	31.226	67.39	22.57	47.54				
26.3	46.629	40.30	61.867	50.80	31.064	68.47	22.14	48.89				
Dec. 6.3	46.300	40.87	61.748	50.18	30.900	69.28	21.68	49.70				
16.2	45.977	40.92	61.633	49.46	30.740	69.79	21.20	49.92				
26.2	45.673	40.42	61.523	48.69	30.590	69.98	20.73	49.54				
36.2	45.396	39.43	61.421	47.89	30.454	69.83	20.27	48.57				
Mean Place	42.587	49.40	57.950	22.23	27.173	84.71	17.576	5.43				
Sec δ , Tan δ	1.924	-1.643	1.001	+0.050	1.192	-0.649	2.632	+2.435				
$D\psi\alpha$, $D\omega\alpha$	+0.07	+0.11	+0.06	0.00	+0.06	+0.04	+0.05	-0.16				
$D\psi\delta$, $D\omega\delta$	+0.4	-0.2	+0.1	-0.2	+0.4	-0.2	+0.4	-0.2				

APPARENT PLACES OF STARS, 1919.

507

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	τ Pegasi. Mag. 4.6		δ^1 Aquarii. Mag. 4.2		ϵ Cassiopeiæ. Mag. 5.2		ν Pegasi. Mag. 4.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 23 16	° ' " +23 17	h m 23 18	° ' " -20 32	h m 23 21	° ' " +61 50	h m 23 21	° ' " +22 57
	s	"	s	"	s	"	s	"
Jan. 1.2	38.099	61.70	43.559	35.66	14.25	40.23	20.663	41.90
11.2	37.986	60.48	43.456	35.75	13.92	38.93	20.550	40.72
21.1	37.888	59.08	43.371	35.61	13.61	37.13	20.451	39.36
31.1	37.810	57.55	43.306	35.25	13.35	34.91	20.371	37.87
Feb. 10.1	37.756	55.96	43.264	34.64	13.15	32.34	20.314	36.31
20.1	37.732	54.37	43.249	33.81	13.02	29.55	20.286	34.76
Mar. 2.0	37.741	52.86	43.264	32.74	12.96	26.63	20.290	33.28
12.0	37.786	51.50	43.311	31.46	12.98	23.71	20.332	31.95
22.0	37.872	50.38	43.395	29.97	13.08	20.92	20.413	30.85
31.9	38.000	49.56	43.516	28.27	13.27	18.37	20.535	30.03
Apr. 10.9	38.169	49.05	43.675	26.42	13.54	16.15	20.700	29.54
20.9	38.377	48.93	43.871	24.42	13.89	14.35	20.904	29.42
30.9	38.623	49.21	44.101	22.31	14.32	13.04	21.144	29.68
May 10.8	38.898	49.88	44.363	20.15	14.78	12.26	21.417	30.34
20.8	39.200	50.93	44.651	17.98	15.29	12.05	21.717	31.37
30.8	39.519	52.32	44.960	15.87	15.83	12.39	22.034	32.75
June 9.8	39.847	54.05	45.279	13.84	16.38	13.29	22.361	34.45
19.7	40.176	56.03	45.603	11.95	16.92	14.73	22.690	36.42
29.7	40.497	58.25	45.924	10.28	17.45	16.65	23.013	38.61
July 9.7	40.801	60.61	46.231	8.84	17.94	18.99	23.318	40.94
19.6	41.083	63.07	46.518	7.67	18.43	21.72	23.602	43.38
29.6	41.332	65.58	46.776	6.80	18.79	24.77	23.855	45.86
Aug. 8.6	41.546	68.07	46.999	6.26	19.12	28.05	24.074	48.33
18.6	41.720	70.49	47.184	6.03	19.38	31.49	24.253	50.73
28.5	41.852	72.79	47.326	6.11	19.58	35.05	24.391	53.01
Sept. 7.5	41.942	74.93	47.423	6.49	19.70	38.61	24.486	55.13
17.5	41.990	76.88	47.476	7.12	19.75	42.12	24.539	57.06
27.5	41.999	78.60	47.487	7.96	19.73	45.52	24.553	58.77
Oct. 7.4	41.971	80.08	47.459	8.96	19.64	48.72	24.531	60.24
17.4	41.912	81.28	47.397	10.06	19.48	51.65	24.478	61.45
27.4	41.828	82.22	47.309	11.22	19.28	54.25	24.398	62.37
Nov. 6.3	41.723	82.85	47.198	12.37	19.02	56.47	24.297	63.00
16.3	41.601	83.18	47.074	13.46	18.73	58.23	24.180	63.34
26.3	41.471	83.22	46.942	14.44	18.40	59.49	24.052	63.39
Dec. 6.3	41.335	82.94	46.807	15.28	18.05	60.22	23.919	63.13
16.2	41.199	82.37	46.674	15.93	17.69	60.38	23.785	62.59
26.2	41.067	81.52	46.549	16.40	17.33	59.96	23.654	61.77
36.2	40.942	80.42	46.436	16.64	16.98	58.97	23.529	60.71
Mean Place	37.518	48.21	43.066	34.81	13.896	16.69	20.049	28.51
Sec δ , Tan δ	1.089	+0.431	1.068	-0.375	2.119	+1.868	1.086	+0.424
D_{α} , $D_{\alpha\alpha}$	+0.06	-0.03	+0.06	+0.02	+0.05	-0.12	+0.06	-0.08
D_{δ} , $D_{\delta\delta}$	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	κ Piscium. Mag. 4.9			θ Piscium. Mag. 4.4			70 Pegasi. Mag. 4.7			β Sculptoris. Mag. 4.5		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h m 23 22	s + 0 48	' 73	h m 23 23	s + 5 56	' 85	h m 23 25	s +12 18	' 103	h m 23 28	s -38 15	' 146
Jan. 1.2	47.410	49.46	52.121	10.00	4.039	58.69	38.299	65.70	45			
11.2	47.316	48.73	52.024	9.15	3.936	57.71	38.153	65.25	43			
21.1	47.235	48.04	51.940	8.28	3.848	56.65	38.029	64.42	41			
31.1	47.172	47.40	51.875	7.42	3.777	55.54	37.928	63.23	39			
Feb. 10.1	47.129	46.86	51.829	6.63	3.726	54.45	37.857	61.72	37			
20.1	47.112	46.45	51.809	5.95	3.702	53.43	37.816	59.92	35			
Mar. 2.0	47.123	46.22	51.818	5.42	3.707	52.53	37.812	57.85	33			
12.0	47.165	46.19	51.858	5.09	3.747	51.81	37.847	55.58	31			
22.0	47.243	46.40	51.934	4.98	3.823	51.32	37.923	53.11	29			
31.9	47.358	46.86	52.048	5.14	3.937	51.11	38.042	50.51	27			
Apr. 10.9	47.509	47.59	52.198	5.58	4.090	51.20	38.206	47.83	25			
20.9	47.697	48.59	52.386	6.32	4.281	51.00	38.413	45.11	23			
30.9	47.920	49.85	52.609	7.34	4.508	52.34	38.661	42.42	21			
May 10.8	48.173	51.33	52.863	8.64	4.766	53.40	38.945	39.81	19			
20.8	48.450	53.03	53.141	10.19	5.049	54.75	39.262	37.34	17			
30.8	48.747	54.88	53.438	11.94	5.352	56.37	39.604	35.06	15			
June 9.8	49.055	56.84	53.748	13.85	5.665	58.21	39.963	33.04	13			
19.7	49.366	58.86	54.060	15.88	5.982	60.21	40.330	31.32	11			
29.7	49.672	60.89	54.366	17.96	6.293	62.35	40.694	29.95	9			
July 9.7	49.966	62.88	54.660	20.05	6.589	64.54	41.047	28.97	7			
19.6	50.239	64.77	54.934	22.08	6.866	66.74	41.380	28.38	5			
29.6	50.485	66.52	55.180	24.02	7.114	68.90	41.682	28.22	3			
Aug. 8.6	50.697	68.08	55.393	25.82	7.329	70.95	41.946	28.46	1			
18.6	50.873	69.45	55.569	27.43	7.508	72.88	42.166	29.11	0			
28.5	51.011	70.58	55.707	28.85	7.647	74.64	42.337	30.11	0			
Sept. 7.5	51.107	71.47	55.803	30.04	7.745	76.19	42.456	31.44	0			
17.5	51.163	72.12	55.859	31.00	7.802	77.53	42.522	33.03	0			
27.5	51.181	72.54	55.877	31.72	7.822	78.64	42.538	34.80	0			
Oct. 7.4	51.165	72.73	55.861	32.22	7.807	79.51	42.505	36.69	0			
17.4	51.119	72.72	55.816	32.49	7.762	80.14	42.430	38.60	0			
27.4	51.047	72.54	55.745	32.56	7.692	80.54	42.318	40.46	0			
Nov. 6.3	50.957	72.20	55.655	32.44	7.602	80.70	42.178	42.18	0			
16.3	50.852	71.73	55.551	32.15	7.497	80.65	42.015	43.70	0			
26.3	50.739	71.16	55.438	31.71	7.381	80.39	41.840	44.93	0			
Dec. 6.3	50.621	70.51	55.319	31.14	7.261	79.94	41.660	45.86	0			
16.2	50.505	69.78	55.202	30.45	7.139	79.29	41.480	46.42	0			
26.2	50.393	69.04	55.089	29.67	7.022	78.49	41.308	46.60	0			
36.2	50.289	68.27	54.983	28.83	6.911	77.56	41.150	46.41	0			
Mean Place	46.809	43.44	51.502	2.26	3.403	48.80	37.903	59.68				
Sec δ , Tan δ	1.000	+0.014	1.005	+0.104	1.024	+0.218	1.274	-0.789				
$D\phi\alpha$, $D\omega\alpha$	+0.06	0.00	+0.06	-0.01	+0.06	-0.01	+0.06	+0.05				
$D\delta\delta$, $D\omega\delta$	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.1				

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	72 Pegasi (mean). Mag. 5.2		λ Andromedæ. Mag. 4.0		ι Andromedæ. Mag. 4.3		ι Piscium. Mag. 4.3	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 23 29 s	° ' " +30 52 "	h m 23 33 s	° ' " +46 1 "	h m 23 34 s	° ' " +42 49 "	h m 23 35 s	° ' " + 5 11 "
Jan. 1.2	56.544	57.46	36.358	29.36	10.224	29.76	47.682	21.15
11.2	56.409 135	56.25 121	36.163 195	28.12 124	10.044 180	28.52 124	47.581 101	20.33 82
21.1	56.289 120	54.78 147	35.985 178	26.48 164	9.881 163	26.92 160	47.492 89	19.49 84
31.1	56.187 102	53.09 169	35.832 153	24.50 198	9.739 142	25.01 191	47.419 73	18.67 82
Feb. 10.1	56.111 76	51.28 181	35.712 120	22.27 223	9.629 110	22.85 216	47.365 54	17.94 73
	46	187	81	238	74	228	31	65
20.1	56.065	49.41	35.631	19.89	9.555	20.57	47.334	17.29
Mar. 2.0	56.054 11	47.56 185	35.596 35	17.43 246	9.525 30	18.23 234	47.331 3	16.80 49
12.0	56.084 30	45.83 173	35.613 17	15.02 241	9.543 18	15.96 227	47.361 30	16.51 29
22.0	56.157 73	44.30 153	35.686 73	12.76 226	9.614 71	13.84 212	47.427 66	16.43 8
Apr. 1.0	56.275 118	43.03 127	35.816 130	10.75 201	9.739 125	11.97 187	47.529 102	16.62 19
	186	94	188	170	179	153	140	45
10.9	56.440	42.09	36.004	9.05	9.918	10.44	47.669	17.07
20.9	56.647 207	41.54 55	36.245 241	7.77 128	10.149 231	9.30 114	47.849 180	17.83 76
30.9	56.895 248	41.40 14	36.536 201	6.93 84	10.428 279	8.60 70	48.064 215	18.85 102
May 10.8	57.178 283	41.69 29	36.867 331	6.58 35	10.746 318	8.38 22	48.311 247	20.16 131
20.8	57.490 312	42.40 71	37.234 367	6.72 14	11.097 351	8.65 27	48.585 274	21.69 153
	332	112	391	65	374	74	294	174
30.8	57.822	43.52	37.625	7.37	11.471	9.39	48.879	23.43
June 9.8	58.166 344	45.03 151	38.029 404	8.49 112	11.857 386	10.60 121	49.188 309	25.32 189
19.7	58.513 347	46.86 183	38.434 405	10.07 158	12.247 390	12.24 164	49.501 313	27.32 200
29.7	58.854 341	48.99 213	38.831 397	12.05 198	12.629 382	14.26 202	49.811 310	29.37 205
July 9.7	59.178 324	51.34 235	39.209 378	14.37 232	12.993 364	16.59 232	50.108 297	31.42 205
	301	264	350	262	337	263	281	200
19.7	59.479	53.88	39.559	16.99	13.330	19.21	50.389	33.42
29.6	59.749 270	56.52 264	39.873 314	19.83 284	13.633 303	22.03 282	50.643 254	35.32 190
Aug. 8.6	59.985 236	59.20 268	40.145 272	22.85 302	13.895 262	24.98 295	50.865 222	37.08 176
18.6	60.179 194	61.89 260	40.370 225	25.95 310	14.112 217	28.02 304	51.053 188	38.64 156
28.5	60.329 180	64.49 260	40.543 173	29.08 313	14.281 169	31.06 304	51.202 149	40.01 137
	107	250	122	310	119	299	109	113
Sept. 7.5	60.436	66.99	40.665	32.18	14.400	34.05	51.311	41.14
17.5	60.499 63	69.33 234	40.736 71	35.17 299	14.471 71	36.93 288	51.381 70	42.05 91
27.5	60.520 21	71.47 214	40.756 20	38.01 284	14.494 23	39.66 273	51.412 31	42.72 67
Oct. 7.4	60.503 17	73.38 191	40.730 26	40.64 263	14.472 22	42.15 249	51.410 2	43.16 44
17.4	60.453 60	75.01 163	40.662 68	43.01 237	14.411 61	44.39 224	51.376 34	43.38 22
	80	135	106	206	96	193	59	3
27.4	60.373	76.36	40.556	45.06	14.315	46.32	51.317	43.41
Nov. 6.4	60.268 106	77.38 102	40.419 137	46.76 170	14.188 127	47.90 158	51.236 81	43.24 17
16.3	60.145 123	78.07 69	40.255 164	48.06 130	14.037 151	49.09 119	51.141 95	42.92 32
26.3	60.007 138	78.41 34	40.071 184	48.92 86	13.866 171	49.86 77	51.034 107	42.46 46
Dec. 6.3	59.862 145	78.40 1	39.871 200	49.33 41	13.682 184	50.20 34	50.921 113	41.87 59
	151	28	207	6	192	12	116	70
16.2	59.711	78.02	39.664	49.27	13.490	50.08	50.805	41.17
26.2	59.562 149	77.29 73	39.454 210	48.73 54	13.296 194	49.51 87	50.691 114	40.40 77
36.2	59.417 145	76.24 106	39.248 206	47.73 100	13.106 190	48.52 99	50.582 109	39.58 82
Mean Place	55.872	41.59	35.687	9.20	9.538	10.40	46.994	13.77
Sec δ, Tan δ	1.165	+0.598	1.440	+1.036	1.363	+0.927	1.004	+0.091
Δα, Δα	+0.06	-0.04	+0.06	-0.07	+0.06	-0.06	+0.06	-0.01
Δδ, Δδ	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Cephei. Mag. 3.4			κ Andromedæ. Mag. 4.3			ω^2 Aquarii. Mag. 4.6			ζ^1 Aquarii. Mag. 5.3		
	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.	Right Ascension.		Declina- tion.
	h 23	m 35	° +77 10	h 23	m 36	° +43 53	h 23	m 38	° -14 59	h 23	m 40	° -18 43
	s		"	s		"	s		"	s		"
Jan. 1.2	60.90		74.94	25.535		26.60	31.096		33.45	0.740		36.70
11.2	60.05	85	74.04	25.350	185	25.38	31.890	106	33.78	0.690	110	36.92
21.2	59.26	79	72.57	25.181	169	23.79	31.796	94	33.91	0.532	98	36.93
31.1	58.56	70	70.57	25.034	147	21.88	31.719	77	33.86	0.451	81	36.69
Feb. 10.1	57.99	57	68.11	24.918	116	19.72	31.662	57	33.58	0.391	60	36.23
		42	270		78	230		33			35	
20.1	57.57		65.32	24.840		17.42	31.629		33.09	0.356		35.52
Mar. 2.0	57.30	27	62.29	24.805	35	15.06	31.624	5	32.37	0.347	9	34.58
12.0	57.22	8	59.16	24.820	15	12.74	31.650	26	31.42	0.372	25	33.40
22.0	57.32	10	56.04	24.888	68	10.59	31.712	62	30.24	0.432	60	32.00
Apr. 1.0	57.60	28	53.09	25.011	123	8.66	31.811	99	28.85	0.529	97	30.39
		47	270		178	150		136			136	
10.9	58.07		50.39	25.189		7.07	31.947		27.24	0.665		28.60
20.9	58.70	63	48.05	25.420	231	5.87	32.122	175	25.46	0.840	175	26.64
30.9	59.46	76	46.17	25.700	280	5.11	32.334	212	23.53	1.052	212	24.54
May 10.8	60.35	89	44.80	26.021	321	4.82	32.579	245	21.48	1.298	246	22.37
20.8	61.32	97	43.98	26.376	355	5.03	32.852	273	19.96	1.572	274	20.17
		103	24		378	69		295			299	
30.8	62.35		43.74	26.754		5.72	33.147		17.23	1.871		17.98
June 9.8	63.40	105	44.08	27.146	392	6.88	33.458	311	15.14	2.184	312	15.87
19.7	64.46	106	45.00	27.541	395	8.48	33.776	318	13.14	2.505	321	13.88
29.7	65.48	102	46.45	27.929	388	10.47	34.092	316	11.28	2.825	320	12.06
July 9.7	66.45	97	48.42	28.299	370	12.78	34.398	306	9.62	3.136	311	10.47
		88	242		343	261		280			294	
19.7	67.33		50.84	28.642		15.39	34.687		8.17	3.430		9.14
29.6	68.12	79	53.65	28.951	309	18.20	34.951	264	7.01	3.698	268	8.11
Aug. 8.6	68.79	67	56.81	29.219	268	21.16	35.184	233	6.13	3.936	238	7.40
18.6	69.34	55	60.24	29.442	223	24.22	35.380	196	5.55	4.137	201	7.01
28.5	69.74	40	63.85	29.616	174	27.28	35.537	157	5.28	4.297	160	6.95
		26	373		123	302		114			117	
Sept. 7.5	70.00		67.58	29.739		30.30	35.651		5.30	4.414		7.18
17.5	70.12	12	71.36	29.812	73	33.22	35.724	73	5.60	4.489	75	7.68
27.5	70.08	4	75.10	29.838	26	35.99	35.757	33	6.13	4.522	33	8.44
Oct. 7.4	69.90	18	78.72	29.819	19	38.54	35.753	255	6.87	4.518	4	9.38
17.4	69.59	31	82.14	29.759	60	40.84	35.715	38	7.75	4.478	40	10.45
		45	315		96	198		67			69	
27.4	69.14		85.29	29.663		42.82	35.648		8.72	4.409		11.61
Nov. 6.4	68.57	57	88.10	29.535	128	44.45	35.560	88	9.75	4.318	91	12.79
16.3	67.91	66	90.48	29.383	152	45.70	35.455	105	10.77	4.209	100	13.93
26.3	67.16	75	92.35	29.209	174	46.52	35.337	118	11.75	4.087	122	14.99
Dec. 6.3	66.33	83	93.68	29.022	187	46.90	35.214	123	12.64	3.959	128	15.92
		87	74		195	7		124			129	
16.2	65.46		94.42	28.827		46.83	35.090		13.40	3.830		16.68
26.2	64.57	89	94.53	28.629	198	46.30	34.968	122	14.03	3.703	127	17.27
36.2	63.70	87	94.00	28.434	195	45.34	34.854	114	14.49	3.585	118	17.66
Mean Place	60.740		49.01	24.830		6.96	31.368		33.97	0.125		35.99
Sec δ , Tan δ	4.509		+4.397	1.388		+0.962	1.035		-0.268	1.056		-0.339
$D\psi_a, D\omega_a$	+0.05		-0.29	+0.06		-0.06	+0.06		+0.02	+0.06		+0.02
$D\psi_\delta, D\omega_\delta$	+0.4		-0.1	+0.4		-0.1	+0.4		-0.1	+0.4		-0.1

APPARENT PLACES OF STARS, 1919. 511

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ψ Andromedæ. Mag. 5.1		41 H. Cephei. Mag. 5.0		δ Sculptoris. Mag. 4.6		φ Pegasi. Mag. 5.2	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 23 42	° ' " +45 58	h m 23 44	° ' " +67 21	h m 23 44	° ' " -28 34	h m 23 48	° ' " +18 40
	s	"	s	"	s	"	s	"
Jan. 1.2	1.653	33.76	2.34	48.60	43.070	46.96	22.674	25.27
11.2	1.455	32.60	1.90	47.64	42.941	46.94	22.558	24.28
21.2	1.272	31.05	1.48	46.15	42.827	46.59	22.450	23.14
31.1	1.112	29.16	1.11	44.16	42.730	45.93	22.356	21.90
Feb. 10.1	0.982	26.99	0.80	41.76	42.656	44.99	22.281	20.61
20.1	0.891	24.66	0.56	39.05	42.607	43.75	22.232	19.33
Mar. 2.0	0.845	22.25	0.43	36.13	42.590	42.25	22.211	18.13
12.0	0.850	19.86	0.38	33.14	42.607	40.52	22.224	17.05
22.0	0.911	17.60	0.44	30.19	42.661	38.56	22.276	16.18
Apr. 1.0	1.029	15.58	0.61	27.41	42.754	36.41	22.368	15.57
10.9	1.205	13.87	0.88	24.91	42.890	34.11	22.503	15.25
20.9	1.437	12.54	1.26	22.76	43.067	31.71	22.679	15.25
30.9	1.719	11.65	1.71	21.06	43.284	29.24	22.894	15.61
May 10.9	2.045	11.24	2.24	19.86	43.536	26.77	23.145	16.31
20.8	2.407	11.32	2.83	19.21	43.820	24.34	23.424	17.36
30.8	2.794	11.90	3.46	19.12	44.130	22.02	23.727	18.71
June 9.8	3.197	12.95	4.11	19.61	44.457	19.86	24.044	20.35
19.7	3.604	14.45	4.76	20.63	44.794	17.91	24.368	22.22
29.7	4.003	16.35	5.40	22.18	45.131	16.24	24.690	24.28
July 9.7	4.386	18.63	6.02	24.21	45.461	14.86	25.001	26.46
19.7	4.743	21.19	6.58	26.66	45.773	13.84	25.295	28.73
29.6	5.065	23.99	7.09	29.48	46.061	13.19	25.562	31.01
Aug. 8.6	5.347	26.95	7.54	32.61	46.315	12.91	25.800	33.26
18.6	5.582	30.03	7.89	35.96	46.531	13.00	26.001	35.43
28.6	5.766	33.14	8.18	39.49	46.705	13.45	26.163	37.46
Sept. 7.5	5.900	36.23	8.38	43.10	46.833	14.23	26.286	39.35
17.5	5.983	39.22	8.49	46.72	46.915	15.31	26.369	41.04
27.5	6.015	42.08	8.52	50.28	46.952	16.61	26.414	42.52
Oct. 7.4	6.001	44.74	8.47	53.71	46.946	18.08	26.422	43.76
17.4	5.945	47.15	8.32	56.94	46.903	19.65	26.398	44.77
27.4	5.852	49.25	8.11	59.87	46.826	21.24	26.347	45.53
Nov. 6.4	5.724	51.01	7.83	62.46	46.723	22.80	26.272	46.04
16.3	5.568	52.39	7.50	64.62	46.599	24.24	26.179	46.29
26.3	5.391	53.33	7.11	66.30	46.461	25.50	26.071	46.30
Dec. 6.3	5.197	53.83	6.69	67.46	46.315	26.55	25.952	46.06
16.3	4.992	53.86	6.24	68.05	46.167	27.32	25.828	45.58
26.2	4.783	53.42	5.78	68.03	46.021	27.82	25.703	44.88
36.2	4.576	52.52	5.32	67.42	45.882	28.00	25.578	43.98
Mean Place	0.896	13.55	1.674	23.86	42.495	43.15	21.877	13.36
Sec δ, Tan δ	1.439	+1.035	2.598	+2.398	1.139	-0.545	1.056	+0.338
Dψα, Dμα	+0.06	-0.07	+0.06	-0.16	+0.06	+0.04	+0.06	-0.02
Dψδ, Dμδ	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1

APPARENT PLACES OF STARS, 1919.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ρ Cassiopeiæ. Mag. 4.8		Groombridge 4163. Mag. 6.6		ω Piscium. Mag. 4.0	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 23 50	° ' s +57 2	h m 23 50	° ' s +73 57	h m 23 55	° ' s + 6 24
	s	"	s	"	s	"
Jan. 1.2	20.513 ₂₈₆	78.36 ₉₉	52.99 ₆₉	59.94 ₇₄	9.865 ₁₀₇	61.40 ₈₁
11.2	20.227 ₂₆₈	77.37 ₁₄₈	52.30 ₆₃	59.20 ₁₃₃	9.758 ₁₀₀	60.59 ₈₃
21.2	19.959 ₂₄₁	75.89 ₁₉₀	51.67 ₅₇	57.87 ₁₈₇	9.658 ₈₈	59.76 ₈₁
31.1	19.718 ₂₀₁	73.99 ₂₂₇	51.10 ₄₈	56.00 ₂₃₃	9.570 ₆₉	58.95 ₇₇
Feb. 10.1	19.517 ₁₅₀	71.72 ₂₅₄	50.62 ₃₆	53.67 ₂₇₀	9.501 ₄₉	58.18 ₆₆
20.1	19.367 ₉₀	69.18 ₂₆₈	50.26 ₂₅	50.97 ₂₉₃	9.452 ₂₂	57.52 ₅₄
Mar. 2.0	19.277 ₂₄	66.50 ₂₇₄	50.01 ₁₁	48.04 ₃₀₈	9.430 ₁₀	56.98 ₃₆
12.0	19.253 ₄₉	63.76 ₂₆₆	49.90 ₅	44.96 ₃₀₆	9.440 ₄₄	56.62 ₁₄
22.0	19.302 ₁₂₃	61.10 ₂₄₈	49.95 ₁₉	41.90 ₂₉₅	9.484 ₈₄	56.48 ₁₂
Apr. 1.0	19.425 ₁₉₈	58.62 ₂₂₀	50.14 ₃₄	38.95 ₂₇₁	9.568 ₁₂₂	56.60 ₃₇
10.9	19.623 ₂₆₉	56.42 ₁₈₃	50.48 ₄₇	36.24 ₂₃₈	9.690 ₁₆₂	56.97 ₆₆
20.9	19.892 ₃₃₄	54.59 ₁₄₁	50.95 ₆₀	33.86 ₁₉₅	9.852 ₂₀₁	57.63 ₉₄
30.9	20.226 ₃₈₉	53.18 ₉₀	51.55 ₆₉	31.91 ₁₄₆	10.053 ₂₃₄	58.57 ₁₂₂
May 10.9	20.615 ₄₃₅	52.28 ₃₉	52.24 ₇₈	30.45 ₉₂	10.287 ₂₆₅	59.79 ₁₄₆
20.8	21.050 ₄₆₇	51.89 ₁₅	53.02 ₈₃	29.53 ₃₆	10.552 ₂₈₇	61.25 ₁₆₉
30.8	21.517 ₄₈₇	52.04 ₆₇	53.85 ₈₇	29.17 ₂₂	10.839 ₃₀₅	62.94 ₁₈₄
June 9.8	22.004 ₄₉₄	52.71 ₁₁₈	54.72 ₈₇	29.39 ₇₈	11.144 ₃₁₂	64.78 ₁₉₇
19.7	22.498 ₄₈₅	53.89 ₁₆₆	55.59 ₈₆	30.17 ₁₃₃	11.456 ₃₁₃	66.75 ₂₀₄
29.7	22.983 ₄₆₇	55.55 ₂₁₀	56.45 ₈₂	31.50 ₁₈₂	11.769 ₃₀₃	68.79 ₂₀₅
July 9.7	23.450 ₄₃₆	57.65 ₂₄₇	57.27 ₇₇	33.32 ₂₃₁	12.072 ₂₈₉	70.84 ₂₀₂
19.7	23.886 ₃₉₅	60.12 ₂₇₈	58.04 ₆₉	35.63 ₂₇₀	12.361 ₂₆₄	72.86 ₁₉₄
29.6	24.281 ₃₄₈	62.90 ₃₀₄	58.73 ₅₉	38.33 ₃₀₅	12.625 ₂₃₇	74.80 ₁₈₀
Aug. 8.6	24.629 ₂₉₁	65.94 ₃₂₂	59.32 ₅₁	41.38 ₃₃₂	12.862 ₂₀₃	76.60 ₁₆₃
18.6	24.920 ₂₃₁	69.16 ₃₃₄	59.83 ₃₉	44.70 ₃₅₃	13.065 ₁₆₆	78.23 ₁₄₄
28.6	25.151 ₁₇₀	72.50 ₃₃₈	60.22 ₂₈	48.23 ₃₆₆	13.231 ₁₂₈	79.67 ₁₂₁
Sept. 7.5	25.321 ₁₀₇	75.88 ₃₃₇	60.50 ₁₅	51.89 ₃₇₁	13.359 ₈₉	80.88 ₉₉
17.5	25.428 ₄₅	79.25 ₃₂₈	60.65 ₅	55.60 ₃₇₀	13.448 ₅₁	81.87 ₇₄
27.5	25.473 ₁₃	82.53 ₃₁₂	60.70 ₇	59.30 ₃₆₀	13.499 ₁₆	82.61 ₅₂
Oct. 7.4	25.460 ₇₁	85.65 ₂₉₀	60.63 ₁₉	62.90 ₃₄₁	13.515 ₁₅	83.13 ₃₀
17.4	25.389 ₁₁₉	88.55 ₂₆₁	60.44 ₂₉	66.31 ₃₁₆	13.500 ₄₂	83.43 ₁₀
27.4	25.270 ₁₆₇	91.16 ₂₂₆	60.15 ₃₉	69.47 ₂₈₄	13.458 ₆₇	83.53 ₉
Nov. 6.4	25.103 ₂₀₆	93.42 ₁₈₇	59.76 ₄₈	72.31 ₂₄₃	13.391 ₈₃	83.44 ₂₇
16.3	24.897 ₂₄₀	95.29 ₁₄₁	59.28 ₅₅	74.74 ₁₉₆	13.308 ₉₇	83.17 ₄₁
26.3	24.657 ₂₆₆	96.70 ₉₁	58.73 ₆₁	76.70 ₁₄₁	13.211 ₁₀₇	82.76 ₅₃
Dec. 6.3	24.391 ₂₈₅	97.61 ₄₀	58.12 ₆₆	78.11 ₈₅	13.104 ₁₁₃	82.23 ₆₅
16.3	24.106 ₂₉₅	98.01 ₁₅	57.46 ₆₈	78.96 ₂₄	12.991 ₁₁₅	81.58 ₇₅
26.2	23.811 ₂₉₅	97.86 ₆₉	56.78 ₆₉	79.20 ₃₈	12.876 ₁₁₄	80.83 ₈₀
36.2	23.516	97.17	56.09	78.82	12.762	80.03
Mean Place	19.677	55.54	52.230	34.27	9.057	53.79
Sec δ , Tan δ	1.839	+1.543	3.620	+3.479	1.006	+0.113
$D\mu\alpha$, $D\omega\alpha$	+0.06	-0.10	+0.06	-0.23	+0.06	-0.01
$D\mu\delta$, $D\omega\delta$	+0.4	0.0	+0.4	0.0	+0.4	0.0

APPARENT PLACES OF STARS, 1919.

513

FOR THE UPPER TRANSIT AT WASHINGTON

Washington Mean Time.	ε Tucanæ. Mag. 4.7		30 Piscium. Mag. 4.7		2 Ceti. Mag. 4.6	
	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.	Right Ascension.	Declina- tion.
	h m 23 55	s ' -66 1	h m 23 57	s ' -6 27	h m 23 59	s ' -17 46
	s	"	s	"	s	"
Jan. 1.2	42.95	51.04	49.142	48.12	36.216	73.92
11.2	42.54 41	49.98 106	49.034 108	48.70 58	36.098 118	74.25 33
21.2	42.16 38	48.37 161	48.934 100	49.16 46	35.992 106	74.36 11
31.1	41.84 32	46.27 210	48.847 87	49.49 33	35.897 95	74.22 14
Feb. 10.1	41.57 27	43.74 253	48.777 70	49.65 16	35.821 76	73.85 37
	21	288	49	0	55	62
20.1	41.36	40.86	48.728	49.65	35.766	73.23
Mar. 2.1	41.23 13	37.67 319	48.705 23	49.43 22	35.739 27	72.37 86
12.0	41.17 6	34.26 341	48.712 7	49.01 42	35.741 2	71.26 111
22.0	41.20 3	30.72 354	48.753 41	48.35 66	35.779 38	69.93 133
Apr. 1.0	41.30 10	27.10 362	48.831 78	47.46 89	35.855 76	68.37 156
	18	360	117	114	116	176
10.9	41.48	23.50	48.948	46.32	35.971	66.61
20.9	41.76 28	20.01 349	49.104 156	44.97 135	36.126 155	64.68 193
30.9	42.10 34	16.66 335	49.298 194	43.40 157	36.320 194	62.59 209
May 10.9	42.51 41	13.56 310	49.526 228	41.65 175	36.549 229	60.41 218
20.8	42.99 48	10.76 280	49.785 259	39.76 189	36.811 262	58.18 223
	53	243	283	200	287	223
30.8	43.52	8.33	50.068	37.76	37.098	55.95
June 9.8	44.09 57	6.33 200	50.369 301	35.71 205	37.405 307	53.77 218
19.8	44.69 60	4.80 153	50.679 310	33.67 204	37.722 317	51.71 206
29.7	45.29 60	3.79 101	50.991 312	31.67 200	38.042 320	49.80 191
July 9.7	45.89 60	3.32 47	51.295 304	29.79 188	38.357 315	48.11 169
	58	6	290	173	299	144
19.7	46.47	3.38	51.585	28.06	38.656	46.67
29.6	47.01 54	3.99 61	51.853 268	26.53 153	38.935 279	45.53 114
Aug. 8.6	47.49 48	5.12 113	52.093 240	25.23 130	39.184 249	44.70 83
18.6	47.90 41	6.72 160	52.299 206	24.19 104	39.399 215	44.20 50
28.6	48.23 33	8.77 205	52.469 170	23.43 76	39.575 176	44.03 17
	23	240	130	49	137	16
Sept. 7.5	48.46	11.17	52.599	22.94	39.712	44.19
17.5	48.60 14	13.84 267	52.691 92	22.72 22	39.807 95	44.62 43
27.5	48.64 4	16.67 283	52.744 53	22.75 3	39.860 53	45.33 71
Oct. 7.5	48.59 5	19.56 289	52.760 16	23.01 26	39.875 15	46.25 92
17.4	48.43 16	22.40 284	52.744 16	23.45 44	39.875 19	47.32 107
	23	265	43	60	50	118
27.4	48.20	25.05	52.701	24.05	39.806	48.50
Nov. 6.4	47.89 31	27.45 240	52.633 68	24.77 72	39.730 76	49.72 122
16.3	47.52 37	29.46 201	52.547 86	25.55 78	39.634 96	50.92 120
26.3	47.11 41	31.01 155	52.447 100	26.37 82	39.524 110	52.05 113
Dec. 6.3	46.67 44	32.04 103	52.338 109	27.19 82	39.402 122	53.07 102
	45	46	115	79	125	87
16.3	46.22	32.50	52.223	27.98	39.277	53.94
26.2	45.77 45	32.38 12	52.107 116	28.72 74	39.150 127	54.62 68
36.2	45.35 42	31.68 70	51.994 113	29.37 65	39.026 124	55.11 49
Mean Place	43.016	38.95	48.368	51.19	35.489	73.16
Sec δ, Tan δ	2.461	-2.249	1.006	-0.113	1.050	-0.321
D _φ α, D _ω α	+0.06	+0.15	+0.06	+0.01	+0.06	+0.02
D _φ δ, D _ω δ	+0.4	0.0	+0.4	0.0	+0.4	0.0

FOR WASHINGTON APPARENT NOON.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi- diameter.	S. T. of Sem. Pam. Merid.	$\frac{E}{M}$
	h m s	s	° ' "	"	m s	s	' "	m s	h
Jan. 1	18 44 37.57	11.052	-23 3 8.6	+11.79	+ 3 25.29	+1.192	16 17.82	1 11.06	18
2	18 49 2.67	11.039	22 58 12.0	12.93	3 53.76	1.179	16 17.82	1 11.02	18
3	18 53 27.44	11.024	22 52 47.8	14.07	4 21.89	1.165	16 17.83	1 10.97	18
4	18 57 51.83	11.007	22 46 56.3	15.21	4 49.65	1.149	16 17.82	1 10.92	18
5	19 2 15.81	10.990	22 40 37.7	16.34	5 17.00	1.131	16 17.82	1 10.87	18
6	19 6 39.35	10.971	-22 33 52.2	+17.45	+ 5 43.91	+1.112	16 17.81	1 10.81	19
7	19 11 2.42	10.951	22 26 40.0	18.56	6 10.35	1.092	16 17.80	1 10.74	19
8	19 15 24.98	10.929	22 19 1.2	19.66	6 36.28	1.069	16 17.77	1 10.68	19
9	19 19 47.01	10.906	22 10 56.2	20.75	7 1.68	1.047	16 17.74	1 10.60	19
10	19 24 8.49	10.883	22 2 25.1	21.83	7 26.53	1.023	16 17.71	1 10.52	19
11	19 28 29.38	10.858	-21 53 28.3	+22.90	+ 7 50.79	+0.999	16 17.68	1 10.45	19
12	19 32 49.67	10.832	21 44 6.0	23.95	8 14.46	0.973	16 17.64	1 10.37	19
13	19 37 9.33	10.806	21 34 18.4	25.00	8 37.51	0.947	16 17.59	1 10.29	19
14	19 41 28.35	10.779	21 24 5.9	26.04	8 59.91	0.920	16 17.54	1 10.20	19
15	19 45 46.72	10.751	21 13 28.6	27.07	9 21.67	0.893	16 17.48	1 10.11	19
16	19 50 4.43	10.723	-21 2 26.9	+28.08	+ 9 42.76	+0.864	16 17.42	1 10.02	19
17	19 54 21.44	10.696	20 51 1.1	29.07	10 3.16	0.836	16 17.34	1 9.93	19
18	19 58 37.76	10.665	20 39 11.4	30.06	10 22.86	0.807	16 17.26	1 9.83	19
19	20 2 53.37	10.636	20 26 58.2	31.04	10 41.87	0.777	16 17.18	1 9.73	19
20	20 7 8.26	10.606	20 14 21.7	32.00	11 0.15	0.746	16 17.09	1 9.63	19
21	20 11 22.42	10.574	-20 1 22.5	+32.94	+11 17.70	+0.715	16 16.99	1 9.53	20
22	20 15 35.83	10.543	19 48 0.7	33.87	11 34.51	0.684	16 16.89	1 9.42	20
23	20 19 48.49	10.511	19 34 16.8	34.78	11 50.57	0.653	16 16.79	1 9.31	20
24	20 24 0.39	10.479	19 20 11.0	35.69	12 5.87	0.621	16 16.67	1 9.21	20
25	20 28 11.51	10.447	19 5 43.7	36.58	12 20.40	0.589	16 16.55	1 9.10	20
26	20 32 21.87	10.415	-18 50 55.5	+37.44	+12 34.15	+0.557	16 16.43	1 8.98	20
27	20 36 31.42	10.382	18 35 46.6	38.29	12 47.11	0.523	16 16.31	1 8.87	20
28	20 40 40.17	10.348	18 20 17.4	39.13	12 59.27	0.490	16 16.18	1 8.76	20
29	20 44 48.13	10.315	18 4 28.3	39.95	13 10.64	0.457	16 16.05	1 8.64	20
30	20 48 55.27	10.281	17 48 19.8	40.75	13 21.21	0.423	16 15.92	1 8.53	20
31	20 53 1.59	10.247	-17 31 52.1	+41.53	+13 30.95	+0.389	16 15.78	1 8.41	20
Feb. 1	20 57 7.10	10.213	17 15 5.9	42.30	13 39.88	0.355	16 15.64	1 8.30	20
2	21 1 11.78	10.178	16 58 1.4	43.06	13 47.97	0.320	16 15.50	1 8.18	20
3	21 5 15.63	10.143	16 40 39.1	43.79	13 55.24	0.286	16 15.35	1 8.07	20
4	21 9 18.64	10.109	16 22 59.5	44.50	14 1.69	0.252	16 15.19	1 7.95	20
5	21 13 20.82	10.074	-16 5 3.1	+45.20	+14 7.30	+0.217	16 15.04	1 7.84	20
6	21 17 22.16	10.039	15 46 50.1	45.88	14 12.08	0.182	16 14.89	1 7.73	21
7	21 21 22.68	10.005	15 28 20.9	46.54	14 16.03	0.148	16 14.73	1 7.61	21
8	21 25 22.37	9.970	15 9 36.2	47.19	14 19.15	0.114	16 14.56	1 7.50	21
9	21 29 21.25	9.936	14 50 36.2	47.81	14 21.47	0.080	16 14.39	1 7.39	21
10	21 33 19.30	9.903	-14 31 21.4	+48.42	+14 22.96	+0.046	16 14.21	1 7.28	21
11	21 37 16.56	9.869	14 11 52.1	49.02	14 23.67	+0.013	16 14.04	1 7.17	21
12	21 41 13.04	9.837	13 52 8.7	49.59	14 23.59	-0.020	16 13.86	1 7.06	21
13	21 45 8.73	9.805	13 32 11.8	50.15	14 22.73	0.052	16 13.67	1 6.95	21
14	21 49 3.67	9.773	13 12 1.5	50.69	14 21.12	0.083	16 13.48	1 6.84	21
15	21 52 57.86	9.743	-12 51 38.4	+51.22	+14 18.76	-0.113	16 13.29	1 6.74	21
16	21 56 51.32	9.713	-12 31 2.8	+51.74	+14 15.67	-0.143	16 13.08	1 6.63	21

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.10 from the sidereal interval

FOR WASHINGTON APPARENT NOON.

ate.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi- diameter.	S. T. of Sem. Pass. Merid.	Sidereal Time of Mean Noon.
	h m s	s	° ' "	"	m s	s	' "	m s	h m s
16	21 56 51.32	9.713	-12 31 2.8	+51.74	+14 15.67	-0.143	16 13.08	1 6.63	21 42 33.90
17	22 0 44.05	9.683	12 10 15.1	52.23	14 11.87	0.173	16 12.88	1 6.53	21 46 29.85
18	22 4 36.09	9.654	11 49 15.7	52.71	14 7.37	0.202	16 12.67	1 6.43	21 50 26.41
19	22 8 27.45	9.626	11 28 5.2	53.17	14 2.18	0.230	16 12.45	1 6.33	21 54 22.96
20	22 12 18.14	9.598	11 6 43.7	53.61	13 56.33	0.258	16 12.23	1 6.23	21 58 19.52
21	22 16 8.17	9.571	-10 45 11.8	+54.04	+13 49.82	-0.285	16 12.01	1 6.13	22 2 16.07
22	22 19 57.57	9.545	10 23 29.8	54.48	13 42.69	0.311	16 11.78	1 6.04	22 6 12.62
23	22 23 46.33	9.520	10 1 38.1	54.84	13 34.93	0.336	16 11.56	1 5.95	22 10 9.18
24	22 27 34.50	9.495	9 39 37.2	55.22	13 26.56	0.361	16 11.32	1 5.86	22 14 5.73
25	22 31 22.08	9.470	9 17 27.5	55.58	13 17.61	0.385	16 11.09	1 5.77	22 18 2.28
26	22 35 9.08	9.447	-8 55 9.4	+55.92	+13 8.09	-0.408	16 10.86	1 5.69	22 21 58.84
27	22 38 55.53	9.424	8 32 43.2	56.26	12 58.01	0.431	16 10.62	1 5.60	22 25 55.39
28	22 42 41.42	9.401	8 10 9.4	56.55	12 47.38	0.454	16 10.38	1 5.52	22 29 51.94
1	22 46 26.80	9.380	7 47 28.5	56.84	12 36.23	0.475	16 10.14	1 5.45	22 33 48.50
2	22 50 11.65	9.359	7 24 40.9	57.12	12 24.56	0.496	16 9.90	1 5.38	22 37 45.05
3	22 53 56.00	9.338	-7 1 47.0	+57.37	+12 12.39	-0.517	16 9.65	1 5.31	22 41 41.60
4	22 57 39.86	9.318	6 38 47.1	57.61	11 59.74	0.537	16 9.41	1 5.24	22 45 38.16
5	23 1 23.26	9.299	6 15 41.9	57.83	11 46.61	0.556	16 9.17	1 5.17	22 49 34.71
6	23 5 6.19	9.280	5 52 31.6	58.08	11 33.03	0.575	16 8.92	1 5.11	22 53 31.26
7	23 8 48.67	9.261	5 29 16.5	58.22	11 19.00	0.593	16 8.68	1 5.05	22 57 27.81
8	23 12 30.73	9.244	-5 5 57.2	+58.39	+11 4.55	-0.611	16 8.43	1 4.99	23 1 24.37
9	23 16 12.39	9.228	4 42 34.1	58.54	10 49.69	0.627	16 8.18	1 4.93	23 5 20.92
10	23 19 53.66	9.212	4 19 7.4	58.68	10 34.45	0.642	16 7.92	1 4.88	23 9 17.47
11	23 23 34.56	9.197	3 55 37.5	58.80	10 18.84	0.657	16 7.67	1 4.83	23 13 14.02
12	23 27 15.12	9.183	3 32 5.0	58.91	10 2.89	0.671	16 7.41	1 4.78	23 17 10.58
13	23 30 55.36	9.170	-3 8 30.0	+59.00	+9 46.63	-0.684	16 7.15	1 4.74	23 21 7.13
14	23 34 35.30	9.159	2 44 52.9	59.06	9 30.07	0.695	16 6.89	1 4.70	23 25 3.68
15	23 38 14.97	9.148	2 21 14.0	59.15	9 13.23	0.706	16 6.63	1 4.66	23 29 0.23
16	23 41 54.39	9.138	1 57 33.8	59.20	8 56.14	0.717	16 6.36	1 4.62	23 32 56.79
17	23 45 33.59	9.129	1 33 52.5	59.23	8 38.82	0.726	16 6.09	1 4.59	23 36 53.34
18	23 49 12.57	9.121	-1 10 10.6	+59.25	+8 21.31	-0.733	16 5.82	1 4.56	23 40 49.89
19	23 52 51.39	9.114	0 46 28.3	59.26	8 3.62	0.740	16 5.55	1 4.54	23 44 46.44
20	23 56 30.05	9.108	-0 22 46.1	59.26	7 45.78	0.746	16 5.27	1 4.52	23 48 43.00
21	0 0 8.57	9.103	+0 0 55.7	59.23	7 27.80	0.751	16 5.00	1 4.50	23 52 39.55
22	0 3 46.99	9.099	0 24 36.8	59.19	7 9.71	0.756	16 4.72	1 4.48	23 56 36.10
23	0 7 25.31	9.095	+0 48 16.9	+59.14	+6 51.53	-0.759	16 4.44	1 4.47	0 0 32.65
24	0 11 3.57	9.093	1 11 55.4	59.07	6 33.29	0.761	16 4.16	1 4.45	0 4 29.20
25	0 14 41.78	9.092	1 35 32.2	58.99	6 15.00	0.762	16 3.88	1 4.44	0 8 25.76
26	0 18 19.98	9.091	1 59 6.8	58.89	5 56.69	0.763	16 3.60	1 4.44	0 12 22.31
27	0 21 58.17	9.091	2 22 38.9	58.77	5 38.38	0.763	16 3.31	1 4.44	0 16 18.86
28	0 25 36.37	9.092	+2 46 8.2	+58.65	+5 20.08	-0.762	16 3.03	1 4.44	0 20 15.41
29	0 29 14.61	9.094	3 9 34.2	58.51	5 1.81	0.760	16 2.75	1 4.44	0 24 11.97
30	0 32 52.89	9.097	3 32 56.5	58.35	4 43.59	0.757	16 2.47	1 4.45	0 28 8.52
31	0 36 31.25	9.100	3 56 14.9	58.17	4 25.45	0.754	16 2.19	1 4.46	0 32 5.07
1	0 40 9.68	9.108	4 19 28.8	57.98	4 7.38	0.751	16 1.92	1 4.47	0 36 1.62
2	0 43 48.20	9.107	+4 42 37.9	+57.77	+3 49.40	-0.747	16 1.64	1 4.48	0 39 58.18
3	0 47 26.82	9.112	+5 5 42.0	+57.55	+3 31.52	-0.742	16 1.37	1 4.50	0 43 54.73

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval.

FOR WASHINGTON APPARENT NOON.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi- diameter.	S. T. of Sem. Pass. Merid.	M.
	h m s	s	° ' "	"	m s	s	' "	m s	h
Apr. 1	0 40 9.68	9.103	+ 4 19 28.8	+57.98	+4 7.38	-0.751	16 1.92	1 4.47	0
2	0 43 48.20	9.107	4 42 37.9	57.77	3 49.40	0.747	16 1.64	1 4.48	0
3	0 47 26.82	9.112	5 5 42.0	57.55	3 31.52	0.743	16 1.37	1 4.50	0
4	0 51 5.58	9.118	5 28 40.5	57.33	3 13.77	0.737	16 1.10	1 4.53	0
5	0 54 44.48	9.124	5 51 33.2	57.07	2 56.16	0.731	16 0.83	1 4.56	0
6	0 58 23.53	9.130	+ 6 14 19.8	+56.80	+2 38.71	-0.724	16 0.56	1 4.58	0
7	1 2 2.75	9.138	6 36 59.6	56.52	2 21.43	0.716	16 0.29	1 4.61	0
8	1 5 42.16	9.147	6 59 32.7	56.23	2 4.33	0.708	16 0.02	1 4.65	1
9	1 9 21.79	9.156	7 21 58.7	55.92	1 47.44	0.699	15 59.75	1 4.68	1
10	1 13 1.64	9.165	7 44 17.0	55.60	1 30.78	0.689	15 59.49	1 4.72	1
11	1 16 41.73	9.176	+ 8 6 27.5	+55.27	+1 14.38	-0.678	15 59.22	1 4.76	1
12	1 20 22.10	9.188	8 28 29.9	54.93	0 58.24	0.668	15 58.95	1 4.80	1
13	1 24 2.75	9.200	8 50 23.7	54.56	0 42.38	0.654	15 58.68	1 4.84	1
14	1 27 43.71	9.214	9 12 8.7	54.19	0 26.83	0.641	15 58.42	1 4.89	1
15	1 31 25.00	9.227	9 33 44.6	53.79	+0 11.60	0.627	15 58.15	1 4.94	1
16	1 35 6.63	9.242	+ 9 55 10.9	+53.39	-0 3.27	-0.613	15 57.88	1 4.99	1
17	1 38 48.63	9.258	10 16 27.6	52.98	0 17.79	0.597	15 57.61	1 5.04	1
18	1 42 31.01	9.274	10 37 34.2	52.56	0 31.93	0.580	15 57.35	1 5.10	1
19	1 46 13.79	9.291	10 58 30.3	52.12	0 45.66	0.563	15 57.08	1 5.16	1
20	1 49 56.98	9.309	11 19 15.7	51.66	0 58.99	0.546	15 56.81	1 5.22	1
21	1 53 40.60	9.327	+11 39 49.9	+51.19	-1 11.89	-0.528	15 56.55	1 5.28	1
22	1 57 24.67	9.346	12 0 12.8	50.71	1 24.34	0.509	15 56.28	1 5.34	1
23	2 1 9.21	9.365	12 20 23.9	50.21	1 36.33	0.490	15 56.02	1 5.41	2
24	2 4 54.21	9.385	12 40 23.0	49.70	1 47.84	0.470	15 55.76	1 5.47	2
25	2 8 39.71	9.406	13 0 9.6	49.18	1 58.87	0.450	15 55.51	1 5.54	2
26	2 12 25.70	9.427	+13 19 43.6	+48.64	-2 9.40	-0.428	15 55.26	1 5.61	2
27	2 16 12.20	9.448	13 39 4.5	48.09	2 19.42	0.407	15 55.00	1 5.68	2
28	2 19 59.22	9.470	13 58 11.9	47.58	2 28.93	0.386	15 54.75	1 5.76	2
29	2 23 46.75	9.491	14 17 5.6	46.94	2 37.93	0.364	15 54.51	1 5.84	2
30	2 27 34.80	9.513	14 35 45.1	46.34	2 46.41	0.342	15 54.26	1 5.91	2
May 1	2 31 23.38	9.535	+14 54 10.2	+45.74	-2 54.37	-0.320	15 54.02	1 5.99	2
2	2 35 12.49	9.557	15 12 20.5	45.12	3 1.79	0.298	15 53.79	1 6.07	2
3	2 39 2.12	9.579	15 30 15.8	44.48	3 8.69	0.276	15 53.56	1 6.15	2
4	2 42 52.29	9.602	15 47 55.5	43.83	3 15.06	0.254	15 53.33	1 6.23	2
5	2 46 42.99	9.624	16 5 19.6	43.17	3 20.89	0.232	15 53.10	1 6.31	2
6	2 50 34.24	9.647	+16 22 27.7	+42.49	-3 26.19	-0.209	15 52.88	1 6.39	2
7	2 54 26.03	9.670	16 39 19.3	41.80	3 30.94	0.186	15 52.66	1 6.47	2
8	2 58 18.37	9.692	16 55 54.4	41.11	3 35.15	0.164	15 52.45	1 6.55	3
9	3 2 11.26	9.715	17 12 12.4	40.39	3 38.80	0.141	15 52.24	1 6.64	3
10	3 6 4.71	9.739	17 28 13.2	39.66	3 41.90	0.117	15 52.03	1 6.72	3
11	3 9 58.72	9.762	+17 43 56.5	+38.93	-3 44.44	-0.094	15 51.82	1 6.80	3
12	3 13 53.30	9.786	17 59 22.1	38.19	3 46.40	0.070	15 51.61	1 6.88	3
13	3 17 48.44	9.809	18 14 29.5	37.43	3 47.81	0.047	15 51.41	1 6.97	3
14	3 21 44.16	9.833	18 29 18.5	36.65	3 48.65	-0.023	15 51.20	1 7.05	3
15	3 25 40.45	9.857	18 43 49.0	35.87	3 48.92	+0.001	15 51.00	1 7.13	3
16	3 29 37.31	9.881	+18 58 0.6	+35.08	-3 48.61	+0.025	15 50.80	1 7.21	3
17	3 33 34.75	9.905	+19 11 52.9	+34.27	-3 47.73	+0.019	15 50.60	1 7.29	3

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval

SUN, 1919.

517

FOR WASHINGTON APPARENT NOON.

date.	Apparent Right Ascension.			Var. per Hour.	Apparent Declination.			Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi-diameter.	S. T. of Sem. Pass. Merid.	Sidereal Time of Mean Noon.
	h	m	s	s	°	'	"	"	m	s	'	m	s
17	3	33	34.75	9.905	+19	11	52.9	+34.27	-3	47.73	+0.049	15 50.60	1 7.29
18	3	37	32.76	9.929	19	25	25.7	33.45	3	46.28	0.072	15 50.40	1 7.37
19	3	41	31.34	9.953	19	38	38.9	32.63	3	44.26	0.096	15 50.21	1 7.45
20	3	45	30.49	9.976	19	51	32.1	31.80	3	41.67	0.120	15 50.02	1 7.53
21	3	49	30.21	10.000	20	4	5.0	30.96	3	38.52	0.143	15 49.83	1 7.60
22	3	53	30.49	10.023	+20	16	17.5	+30.08	-3	34.80	+0.166	15 49.64	1 7.68
23	3	57	31.33	10.046	20	28	9.3	29.21	3	30.53	0.189	15 49.46	1 7.75
24	4	1	32.72	10.069	20	39	40.0	28.34	3	25.71	0.212	15 49.28	1 7.82
25	4	5	34.63	10.091	20	50	49.4	27.45	3	20.37	0.234	15 49.11	1 7.89
26	4	9	37.07	10.112	21	1	37.4	26.56	3	14.50	0.255	15 48.94	1 7.96
27	4	13	40.03	10.133	+21	12	3.6	+25.64	-3	8.12	+0.276	15 48.78	1 8.03
28	4	17	43.47	10.153	21	22	7.9	24.72	3	1.25	0.296	15 48.62	1 8.09
29	4	21	47.40	10.173	21	31	50.1	23.79	2	53.90	0.315	15 48.47	1 8.16
30	4	25	51.78	10.192	21	41	9.9	22.85	2	46.10	0.334	15 48.32	1 8.22
31	4	29	56.59	10.209	21	50	7.1	21.91	2	37.87	0.352	15 48.18	1 8.28
1	4	34	1.82	10.226	+21	58	41.5	+20.95	-2	29.21	+0.368	15 48.04	1 8.34
2	4	38	7.45	10.242	22	6	52.9	19.99	2	20.17	0.384	15 47.90	1 8.40
3	4	42	13.45	10.257	22	14	41.3	19.08	2	10.75	0.400	15 47.77	1 8.46
4	4	46	19.81	10.272	22	22	6.4	18.06	2	0.98	0.414	15 47.65	1 8.51
5	4	50	26.51	10.286	22	29	7.9	17.07	1	50.87	0.428	15 47.53	1 8.56
6	4	54	33.54	10.299	+22	35	45.9	+16.09	-1	40.43	+0.442	15 47.41	1 8.61
7	4	58	40.86	10.311	22	42	0.2	15.10	1	29.69	0.454	15 47.30	1 8.65
8	5	2	48.47	10.322	22	47	50.6	14.10	1	18.66	0.465	15 47.19	1 8.69
9	5	6	56.35	10.333	22	53	16.9	13.10	1	7.36	0.476	15 47.09	1 8.73
10	5	11	4.49	10.344	22	58	19.2	12.09	0	55.82	0.486	15 46.98	1 8.77
11	5	15	12.86	10.353	+23	2	57.3	+11.06	-0	44.04	+0.495	15 46.88	1 8.80
12	5	19	21.44	10.362	23	7	10.9	10.06	0	32.06	0.504	15 46.79	1 8.83
13	5	23	30.21	10.369	23	11	0.3	9.04	0	19.87	0.511	15 46.69	1 8.85
14	5	27	39.17	10.376	23	14	25.1	8.02	-0	7.51	0.518	15 46.60	1 8.87
15	5	31	48.27	10.382	23	17	25.3	7.00	+0	5.01	0.524	15 46.51	1 8.89
16	5	35	57.52	10.388	+23	20	0.9	+5.97	+0	17.67	+0.530	15 46.43	1 8.91
17	5	40	6.89	10.393	23	22	11.8	4.94	0	30.44	0.534	15 46.35	1 8.92
18	5	44	16.36	10.396	23	23	58.0	3.91	0	43.31	0.538	15 46.28	1 8.93
19	5	48	25.91	10.400	23	25	19.3	2.87	0	56.27	0.541	15 46.21	1 8.94
20	5	52	35.52	10.401	23	26	15.9	1.84	1	9.29	0.543	15 46.14	1 8.94
21	5	56	45.15	10.402	+23	26	47.7	+0.81	+1	22.34	+0.544	15 46.07	1 8.94
22	6	0	54.80	10.402	23	26	54.5	-0.23	1	35.39	0.544	15 46.01	1 8.94
23	6	5	4.44	10.401	23	26	36.4	1.27	1	48.45	0.543	15 45.95	1 8.94
24	6	9	14.05	10.398	23	25	53.6	2.30	2	1.46	0.540	15 45.90	1 8.93
25	6	13	23.59	10.395	23	24	46.0	3.33	2	14.40	0.537	15 45.85	1 8.91
26	6	17	33.04	10.391	+23	23	13.7	-4.36	+2	27.25	+0.533	15 45.81	1 8.90
27	6	21	42.36	10.386	23	21	16.7	5.39	2	39.98	0.528	15 45.78	1 8.88
28	6	25	51.53	10.379	23	18	55.0	6.42	2	52.57	0.521	15 45.75	1 8.85
29	6	30	0.53	10.370	23	16	8.7	7.44	3	4.98	0.512	15 45.73	1 8.82
30	6	34	9.32	10.361	23	12	58.0	8.46	3	17.17	0.503	15 45.71	1 8.79
1	6	38	17.88	10.351	+23	9	22.8	-9.47	+3	29.13	+0.493	15 45.70	1 8.76
2	6	42	26.17	10.339	+23	5	23.4	-10.48	+3	40.84	+0.482	15 45.69	1 8.73

Note.—For mean time interval of semidiameter passing meridian, subtract 0.19 from the sidereal interval.

FOR WASHINGTON APPARENT NOON.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi- diameter.	S. T. of Sun. Pass. Merid.	Sidereal Time of Mean No
	h m s	s	° ' "	"	m s	s	' "	m s	h m
July 1	6 38 17.88	10.351	+23 9 22.8	-9.47	+3 29.13	+0.493	15 45.70	1 8.76	6 34 48
2	6 42 26.17	10.339	23 5 23.4	10.48	3 40.84	0.493	15 45.69	1 8.73	6 38 44
3	6 46 34.19	10.327	23 0 59.8	11.48	3 52.27	0.470	15 45.69	1 8.69	6 42 41
4	6 50 41.90	10.314	22 56 12.2	12.48	4 3.40	0.457	15 45.69	1 8.65	6 46 37
5	6 54 49.29	10.301	22 51 0.6	13.48	4 14.20	0.443	15 45.70	1 8.61	6 50 34
6	6 58 56.32	10.286	+22 45 25.1	-14.47	+4 24.65	+0.428	15 45.71	1 8.56	6 54 30
7	7 3 3.00	10.271	22 39 26.0	15.45	4 34.75	0.413	15 45.73	1 8.51	6 58 27
8	7 7 9.31	10.254	22 33 3.4	16.43	4 44.46	0.397	15 45.76	1 8.46	7 2 24
9	7 11 15.22	10.237	22 26 17.4	17.40	4 53.79	0.380	15 45.79	1 8.41	7 6 20
10	7 15 20.71	10.220	22 19 8.2	18.37	5 2.70	0.363	15 45.81	1 8.35	7 10 17
11	7 19 25.78	10.202	+22 11 35.8	-19.32	+5 11.18	+0.344	15 45.84	1 8.29	7 14 13
12	7 23 30.40	10.183	22 3 40.6	20.27	5 19.22	0.326	15 45.88	1 8.23	7 18 10
13	7 27 34.57	10.164	21 55 22.7	21.22	5 26.83	0.307	15 45.91	1 8.17	7 22 6
14	7 31 38.28	10.145	21 46 42.2	22.15	5 33.95	0.287	15 45.95	1 8.10	7 26 3
15	7 35 41.51	10.125	21 37 39.3	23.06	5 40.61	0.268	15 46.00	1 8.03	7 29 59
16	7 39 44.27	10.105	+21 28 14.3	-24.00	+5 46.79	+0.247	15 46.04	1 7.96	7 33 56
17	7 43 46.52	10.084	21 18 27.3	24.91	5 52.48	0.227	15 46.09	1 7.89	7 37 53
18	7 47 48.27	10.063	21 8 18.6	25.81	5 57.66	0.206	15 46.15	1 7.82	7 41 49
19	7 51 49.51	10.041	20 57 48.1	26.71	6 2.33	0.184	15 46.21	1 7.74	7 45 46
20	7 55 50.24	10.019	20 46 56.5	27.59	6 6.49	0.163	15 46.27	1 7.66	7 49 42
21	7 59 50.44	9.997	+20 35 43.8	-28.47	+6 10.11	+0.140	15 46.33	1 7.58	7 53 39
22	8 3 50.09	9.974	20 24 10.1	29.33	6 13.20	0.117	15 46.41	1 7.50	7 57 35
23	8 7 49.19	9.951	20 12 16.0	30.18	6 15.74	0.094	15 46.49	1 7.42	8 1 32
24	8 11 47.73	9.927	20 0 1.5	31.02	6 17.72	0.071	15 46.57	1 7.33	8 5 28
25	8 15 45.70	9.904	19 47 26.9	31.86	6 19.13	0.047	15 46.65	1 7.25	8 9 25
26	8 19 43.09	9.879	+19 34 32.5	-32.67	+6 19.97	+0.023	15 46.74	1 7.17	8 13 22
27	8 23 39.88	9.854	19 21 18.6	33.48	6 20.20	-0.002	15 46.84	1 7.08	8 17 18
28	8 27 36.08	9.829	19 7 45.6	34.27	6 19.84	0.027	15 46.94	1 7.00	8 21 15
29	8 31 31.67	9.803	18 53 53.6	35.06	6 18.88	0.053	15 47.05	1 6.91	8 25 11
30	8 35 26.64	9.777	18 39 43.0	35.82	6 17.30	0.079	15 47.17	1 6.83	8 29 8
31	8 39 20.99	9.751	+18 25 14.1	-36.58	+6 15.11	-0.105	15 47.29	1 6.74	8 33 4
Aug. 1	8 43 14.73	9.725	18 10 27.1	37.33	6 12.29	0.131	15 47.41	1 6.65	8 37 1
2	8 47 7.84	9.699	17 55 22.4	38.06	6 8.85	0.157	15 47.54	1 6.57	8 40 57
3	8 51 0.32	9.674	17 40 0.2	38.78	6 4.79	0.183	15 47.67	1 6.48	8 44 54
4	8 54 52.18	9.648	17 24 20.9	39.49	6 0.11	0.208	15 47.81	1 6.39	8 48 51
5	8 58 43.42	9.622	+17 8 24.6	-40.19	+5 54.80	-0.234	15 47.95	1 6.31	8 52 47
6	9 2 34.04	9.596	16 52 11.8	40.87	5 48.89	0.259	15 48.09	1 6.22	8 56 44
7	9 6 24.05	9.571	16 35 42.7	41.54	5 42.36	0.284	15 48.24	1 6.14	9 0 40
8	9 10 13.45	9.546	16 18 57.5	42.21	5 35.22	0.309	15 48.39	1 6.05	9 4 37
9	9 14 2.24	9.521	16 1 56.7	42.86	5 27.49	0.334	15 48.54	1 5.96	9 8 33
10	9 17 50.45	9.497	+15 44 40.5	-43.49	+5 19.17	-0.359	15 48.70	1 5.88	9 12 30
11	9 21 38.08	9.473	15 27 9.0	44.12	5 10.27	0.383	15 48.85	1 5.80	9 16 26
12	9 25 25.14	9.449	15 9 22.8	44.78	5 0.80	0.406	15 49.01	1 5.72	9 20 23
13	9 29 11.64	9.426	14 51 22.0	45.33	4 50.77	0.429	15 49.18	1 5.63	9 24 20
14	9 32 57.58	9.403	14 33 6.9	45.91	4 40.19	0.452	15 49.35	1 5.55	9 28 16
15	9 36 43.00	9.382	+14 14 37.8	-46.49	+4 29.09	-0.474	15 49.52	1 5.47	9 32 13
16	9 40 27.90	9.360	+13 55 55.0	-47.06	+4 17.46	-0.495	15 49.69	1 5.40	9 36 9

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.13 from the sidereal interval.

FOR WASHINGTON APPARENT NOON.

date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi- diameter.	S. T. of Sem. Pass. Merid.	Sidereal Time of Mean Noon.
	h m s	s	° ' "	"	m s	s	' "	m s	h m s
16	9 40 27.90	9.380	+13 55 55.0	-47.08	+ 4 17.46	-0.495	15 49.69	1 5.40	9 36 9.74
17	9 44 12.28	9.339	13 36 58.9	47.63	4 5.32	0.516	15 49.86	1 5.32	9 40 6.29
18	9 47 56.17	9.319	13 17 49.6	48.15	3 52.67	0.536	15 50.03	1 5.25	9 44 2.85
19	9 51 39.56	9.299	12 58 27.6	48.67	3 39.56	0.556	15 50.21	1 5.18	9 47 59.40
20	9 55 22.48	9.279	12 38 53.2	49.19	3 25.97	0.576	15 50.40	1 5.11	9 51 55.95
21	9 59 4.95	9.260	+12 19 6.6	-49.68	+ 3 11.91	-0.596	15 50.58	1 5.04	9 55 52.51
22	10 2 46.94	9.241	11 59 8.3	50.16	2 57.40	0.614	15 50.77	1 4.97	9 59 49.06
23	10 6 28.49	9.222	11 38 58.6	50.64	2 42.43	0.633	15 50.97	1 4.90	10 3 45.61
24	10 10 9.61	9.204	11 18 37.7	51.09	2 27.04	0.650	15 51.17	1 4.83	10 7 42.17
25	10 13 50.30	9.186	10 58 6.2	51.53	2 11.22	0.668	15 51.37	1 4.77	10 11 38.72
26	10 17 30.57	9.169	+10 37 24.2	-51.96	+ 1 54.98	-0.685	15 51.58	1 4.71	10 15 35.27
27	10 21 10.43	9.153	10 16 32.2	52.37	1 38.34	0.702	15 51.79	1 4.65	10 19 31.83
28	10 24 49.91	9.137	9 55 30.4	52.78	1 21.30	0.718	15 52.01	1 4.60	10 23 28.38
29	10 28 28.99	9.121	9 34 19.2	53.16	1 3.88	0.733	15 52.23	1 4.54	10 27 24.93
30	10 32 7.71	9.106	9 12 58.9	53.53	0 46.09	0.748	15 52.46	1 4.49	10 31 21.49
31	10 35 46.07	9.091	+ 8 51 29.9	-53.88	+ 0 27.96	-0.763	15 52.69	1 4.44	10 35 18.04
1	10 39 24.09	9.077	8 29 52.6	54.22	+ 0 9.48	0.777	15 52.92	1 4.39	10 39 14.59
2	10 43 1.80	9.064	8 8 7.1	54.56	- 0 9.33	0.790	15 53.15	1 4.35	10 43 11.15
3	10 46 39.18	9.052	7 46 13.8	54.88	0 28.44	0.802	15 53.39	1 4.31	10 47 7.70
4	10 50 16.28	9.041	7 24 13.2	55.17	0 47.83	0.813	15 53.62	1 4.27	10 51 4.25
5	10 53 53.12	9.030	+ 7 2 5.4	-55.47	- 1 7.50	-0.824	15 53.86	1 4.23	10 55 0.80
6	10 57 29.69	9.019	6 39 50.7	55.75	1 27.43	0.835	15 54.11	1 4.20	10 58 57.36
7	11 1 6.04	9.010	6 17 29.7	56.01	1 47.58	0.844	15 54.35	1 4.16	11 2 53.91
8	11 4 42.16	9.001	5 55 2.3	56.26	2 7.95	0.853	15 54.59	1 4.14	11 6 50.46
9	11 8 18.10	8.994	5 32 29.0	56.50	2 28.51	0.860	15 54.84	1 4.12	11 10 47.02
10	11 11 53.87	8.988	+ 5 9 50.3	-56.73	- 2 49.23	-0.866	15 55.09	1 4.10	11 14 43.57
11	11 15 29.50	8.982	4 47 6.1	56.94	3 10.10	0.872	15 55.33	1 4.07	11 18 40.12
12	11 19 5.01	8.977	4 24 17.1	57.14	3 31.08	0.877	15 55.58	1 4.06	11 22 36.67
13	11 22 40.42	8.974	4 1 23.4	57.33	3 52.17	0.880	15 55.83	1 4.04	11 26 33.22
14	11 26 15.75	8.972	3 38 25.1	57.51	4 13.32	0.882	15 56.08	1 4.03	11 30 29.78
15	11 29 51.04	8.970	+ 3 15 22.9	-57.67	- 4 34.53	-0.884	15 56.33	1 4.02	11 34 26.33
16	11 33 26.30	8.969	2 52 17.0	57.82	4 55.77	0.885	15 56.58	1 4.01	11 38 22.88
17	11 37 1.55	8.969	2 29 7.6	57.96	5 17.02	0.885	15 56.84	1 4.01	11 42 19.43
18	11 40 36.80	8.969	2 5 55.3	58.08	5 38.26	0.885	15 57.09	1 4.01	11 46 15.99
19	11 44 12.09	8.971	1 42 40.2	58.18	5 59.47	0.883	15 57.35	1 4.01	11 50 12.54
20	11 47 47.42	8.974	+ 1 19 22.8	-58.27	- 6 20.63	-0.880	15 57.61	1 4.01	11 54 9.09
21	11 51 22.82	8.977	0 56 3.3	58.34	6 41.72	0.877	15 57.87	1 4.02	11 58 5.64
22	11 54 58.30	8.981	0 32 42.3	58.40	7 2.73	0.873	15 58.14	1 4.03	12 2 2.20
23	11 58 33.88	8.985	+ 0 9 19.9	-58.45	7 23.65	0.869	15 58.40	1 4.05	12 5 58.75
24	12 2 9.58	8.990	- 0 14 3.4	58.48	7 44.45	0.864	15 58.67	1 4.07	12 9 55.30
25	12 5 45.41	8.996	- 0 37 27.2	-58.50	- 8 5.12	-0.858	15 58.94	1 4.09	12 13 51.85
26	12 9 21.88	9.002	1 0 51.2	58.50	8 25.64	0.852	15 59.21	1 4.12	12 17 48.40
27	12 12 57.52	9.010	1 24 15.0	58.48	8 45.99	0.844	15 59.49	1 4.15	12 21 44.96
28	12 16 33.85	9.018	1 47 38.2	58.45	9 6.16	0.836	15 59.77	1 4.18	12 25 41.51
29	12 20 10.88	9.027	2 11 0.6	58.41	9 26.12	0.827	16 0.05	1 4.21	12 29 38.06
30	12 23 47.14	9.036	- 2 34 21.8	-58.35	- 9 45.87	-0.818	16 0.33	1 4.25	12 33 34.61
1	12 27 24.14	9.047	- 2 57 41.4	-58.27	-10 5.38	-0.807	16 0.61	1 4.29	12 37 31.17

Note.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval.

FOR WASHINGTON APPARENT NOON.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi- diameter.	S. T. of Semi-Pass. Merid.	Sidereal Time of Mean No.
	h m s	s	° ' "	"	m s	s	' "	m s	h m s
Oct. 1	12 27 24.14	9.047	— 2 57 41.4	—58.27	—10 5.38	—0.807	16 0.61	1 4.29	12 37 31.
2	12 31 1.40	9.069	3 20 59.1	58.19	10 24.62	0.795	16 0.89	1 4.33	12 41 27.
3	12 34 38.94	9.071	3 44 14.5	58.09	10 43.57	0.783	16 1.17	1 4.37	12 45 24.
4	12 38 16.77	9.063	4 7 27.3	57.97	11 2.24	0.771	16 1.45	1 4.42	12 49 20.
5	12 41 54.93	9.067	4 30 37.0	57.84	11 20.58	0.757	16 1.74	1 4.48	12 53 17.
6	12 45 33.44	9.112	— 4 53 43.5	—57.69	—11 38.57	—0.743	16 2.02	1 4.53	12 57 14.
7	12 49 12.31	9.128	5 16 46.1	57.52	11 56.21	0.727	16 2.30	1 4.59	13 1 11.
8	12 52 51.57	9.145	5 39 44.8	57.35	12 13.46	0.710	16 2.57	1 4.65	13 5 8.
9	12 56 31.24	9.162	6 2 39.2	57.17	12 30.29	0.692	16 2.85	1 4.71	13 9 3.
10	13 0 11.35	9.181	6 25 28.9	56.97	12 46.68	0.674	16 3.13	1 4.77	13 13 0.
11	13 3 51.92	9.200	— 6 48 13.4	—56.74	—13 2.62	—0.654	16 3.40	1 4.84	13 16 56.
12	13 7 32.98	9.221	7 10 52.7	56.51	13 18.07	0.633	16 3.68	1 4.91	13 20 53.
13	13 11 14.55	9.243	7 33 26.1	56.28	13 33.02	0.611	16 3.95	1 4.99	13 24 49.
14	13 14 56.64	9.266	7 55 53.5	56.00	13 47.44	0.589	16 4.22	1 5.07	13 28 46.
15	13 18 39.29	9.289	8 18 14.4	55.73	14 1.30	0.566	16 4.48	1 5.15	13 32 42.
16	13 22 22.52	9.313	— 8 40 28.3	—55.43	—14 14.60	—0.542	16 4.75	1 5.23	13 36 39.
17	13 26 6.33	9.338	9 2 35.0	55.12	14 27.31	0.517	16 5.02	1 5.31	13 40 36.
18	13 29 50.74	9.364	9 24 33.9	54.79	14 39.42	0.491	16 5.29	1 5.40	13 44 32.
19	13 33 35.77	9.390	9 46 24.8	54.45	14 50.91	0.465	16 5.55	1 5.49	13 48 29.
20	13 37 21.43	9.416	10 8 7.2	54.09	15 1.77	0.439	16 5.82	1 5.58	13 52 25.
21	13 41 7.74	9.443	—10 29 40.8	—53.71	—15 11.98	—0.413	16 6.09	1 5.67	13 56 22.
22	13 44 54.71	9.471	10 51 5.1	53.31	15 21.53	0.384	16 6.35	1 5.77	14 0 18.
23	13 48 42.36	9.500	11 12 19.7	52.90	15 30.41	0.356	16 6.62	1 5.86	14 4 15.
24	13 52 30.70	9.528	11 33 24.2	52.47	15 38.62	0.327	16 6.88	1 5.96	14 8 11.
25	13 56 19.73	9.557	11 54 18.1	52.02	15 46.12	0.298	16 7.15	1 6.07	14 12 8.
26	14 0 9.46	9.587	—12 15 1.1	—51.56	—15 52.92	—0.269	16 7.42	1 6.17	14 16 4.
27	14 3 59.90	9.617	12 35 32.8	51.08	15 59.00	0.239	16 7.68	1 6.27	14 20 1.
28	14 7 51.08	9.648	12 55 52.7	50.58	16 4.37	0.208	16 7.95	1 6.38	14 23 58.
29	14 11 43.00	9.679	13 16 0.5	50.06	16 8.99	0.177	16 8.21	1 6.49	14 27 54.
30	14 15 35.67	9.711	13 35 55.8	49.53	16 12.87	0.146	16 8.47	1 6.60	14 31 51.
31	14 19 29.09	9.742	—13 55 38.0	—48.98	—16 15.99	—0.114	16 8.73	1 6.72	14 35 47.
Nov. 1	14 23 23.28	9.774	14 15 7.0	48.41	16 18.35	0.082	16 8.99	1 6.83	14 39 44.
2	14 27 18.25	9.807	14 34 22.1	47.93	16 19.93	0.050	16 9.25	1 6.94	14 43 40.
3	14 31 14.00	9.839	14 53 23.0	47.24	16 20.73	—0.017	16 9.50	1 7.06	14 47 37.
4	14 35 10.54	9.873	15 12 9.4	46.62	16 20.74	+0.016	16 9.74	1 7.18	14 51 33.
5	14 39 7.89	9.906	—15 30 40.8	—45.98	—16 19.95	+0.050	16 9.99	1 7.30	14 55 30.
6	14 43 6.05	9.940	15 48 56.9	45.34	16 18.35	0.084	16 10.24	1 7.41	14 59 27.
7	14 47 5.04	9.975	16 6 57.2	44.68	16 15.92	0.118	16 10.48	1 7.53	15 3 23.
8	14 51 4.87	10.011	16 24 41.3	43.99	16 12.65	0.153	16 10.71	1 7.65	15 7 20.
9	14 55 5.56	10.046	16 42 8.9	43.30	16 8.54	0.189	16 10.95	1 7.77	15 11 16.
10	14 59 7.09	10.082	—16 59 19.7	—42.59	—16 3.58	+0.225	16 11.18	1 7.89	15 15 13.
11	15 3 9.48	10.118	17 16 13.1	41.85	15 57.75	0.261	16 11.40	1 8.01	15 19 9.
12	15 7 12.75	10.154	17 32 48.8	41.11	15 51.06	0.297	16 11.62	1 8.13	15 23 6.
13	15 11 16.89	10.191	17 49 6.4	40.35	15 43.50	0.333	16 11.83	1 8.25	15 27 2.
14	15 15 21.89	10.227	18 5 5.5	39.57	15 35.07	0.370	16 12.04	1 8.37	15 30 59.
15	15 19 27.77	10.263	—18 20 45.8	—38.78	—15 25.77	+0.406	16 12.25	1 8.48	15 34 56.
16	15 23 34.53	10.299	—18 36 6.7	—37.96	—15 15.60	+0.442	16 12.46	1 8.60	15 38 52.

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.16 from the sidereal interval.

SUN, 1919.

521

FOR WASHINGTON APPARENT NOON.

date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi- diameter.	S. T. of Sem. Pass. Merid.	Sidereal Time of Mean Noon.
	h m s	s	° ' "	"	m s	s	' "	m s	h m s
16	15 23 34.53	10.299	-18 36 6.7	-37.96	-15 15.60	+0.442	16 12.46	1 8.60	15 38 52.63
17	15 27 42.14	10.335	18 51 7.8	37.13	15 4.57	0.477	16 12.66	1 8.72	15 42 49.19
18	15 31 50.60	10.370	19 5 48.9	36.26	14 52.69	0.512	16 12.87	1 8.83	15 46 45.75
19	15 35 59.92	10.405	19 20 9.5	35.42	14 39.96	0.547	16 13.07	1 8.94	15 50 42.30
20	15 40 10.08	10.440	19 34 9.1	34.54	14 26.41	0.582	16 13.26	1 9.06	15 54 38.86
21	15 44 21.06	10.474	-19 47 47.6	-33.65	-14 12.02	+0.616	16 13.46	1 9.17	15 58 35.41
22	15 48 32.86	10.508	20 1 4.4	32.75	13 56.82	0.650	16 13.65	1 9.28	16 2 31.97
23	15 52 45.46	10.541	20 13 59.3	31.82	13 40.82	0.683	16 13.84	1 9.39	16 6 28.53
24	15 56 58.85	10.574	20 26 31.7	30.88	13 24.04	0.715	16 14.03	1 9.50	16 10 25.08
25	16 1 13.00	10.606	20 38 41.5	29.92	13 6.49	0.747	16 14.22	1 9.60	16 14 21.64
26	16 5 27.91	10.636	-20 50 28.2	-28.96	-12 48.18	+0.778	16 14.40	1 9.71	16 18 18.19
27	16 9 43.56	10.666	21 1 51.5	27.98	12 29.14	0.808	16 14.58	1 9.81	16 22 14.75
28	16 13 59.92	10.696	21 12 51.1	26.99	12 9.39	0.837	16 14.75	1 9.91	16 26 11.31
29	16 18 16.98	10.725	21 23 26.7	25.97	11 48.95	0.866	16 14.93	1 10.01	16 30 7.86
30	16 22 34.72	10.753	21 33 37.8	24.95	11 27.82	0.894	16 15.10	1 10.10	16 34 4.42
1	16 26 53.12	10.780	-21 43 24.4	-23.92	-11 6.04	+0.921	16 15.26	1 10.19	16 38 0.98
2	16 31 12.15	10.806	21 52 46.1	22.88	10 43.62	0.947	16 15.42	1 10.28	16 41 57.54
3	16 35 31.80	10.831	22 1 42.5	21.82	10 20.59	0.972	16 15.58	1 10.37	16 45 54.09
4	16 39 52.05	10.855	22 10 13.4	20.75	9 56.96	0.996	16 15.73	1 10.45	16 49 50.65
5	16 44 12.87	10.879	22 18 18.6	19.68	9 32.76	1.020	16 15.87	1 10.53	16 53 47.21
6	16 48 34.25	10.902	-22 25 57.8	-18.59	-9 8.01	+1.043	16 16.01	1 10.60	16 57 43.76
7	16 52 56.16	10.924	22 33 10.8	17.49	8 42.72	1.064	16 16.15	1 10.67	17 1 40.32
8	16 57 18.60	10.945	22 39 57.3	16.38	8 16.92	1.085	16 16.28	1 10.74	17 5 36.88
9	17 1 41.52	10.965	22 46 17.2	15.27	7 50.62	1.105	16 16.39	1 10.80	17 9 33.43
10	17 6 4.92	10.984	22 52 10.0	14.14	7 23.85	1.125	16 16.50	1 10.86	17 13 29.99
11	17 10 28.78	11.003	-22 57 35.9	-13.01	-6 56.64	+1.143	16 16.61	1 10.92	17 17 26.55
12	17 14 53.06	11.020	23 2 34.6	11.87	6 29.00	1.159	16 16.72	1 10.97	17 21 23.11
13	17 19 17.70	11.035	23 7 5.8	10.72	6 0.98	1.175	16 16.82	1 11.02	17 25 19.66
14	17 23 42.72	11.049	23 11 9.4	9.57	5 32.60	1.189	16 16.91	1 11.06	17 29 16.22
15	17 28 8.07	11.062	23 14 45.3	8.41	5 3.89	1.203	16 17.00	1 11.10	17 33 12.78
16	17 32 33.71	11.073	-23 17 53.4	-7.25	-4 34.88	+1.214	16 17.09	1 11.14	17 37 9.34
17	17 36 59.60	11.084	23 20 33.5	6.09	4 5.62	1.224	16 17.17	1 11.17	17 41 5.90
18	17 41 25.73	11.093	23 22 45.6	4.92	3 36.13	1.233	16 17.24	1 11.19	17 45 2.45
19	17 45 52.03	11.099	23 24 29.4	3.74	3 6.47	1.239	16 17.31	1 11.21	17 48 59.01
20	17 50 18.50	11.105	23 25 45.2	2.57	2 36.65	1.245	16 17.38	1 11.23	17 52 55.57
21	17 54 45.07	11.109	-23 26 32.7	-1.39	-2 6.71	+1.249	16 17.44	1 11.24	17 56 52.13
22	17 59 11.72	11.111	23 26 51.8	-0.21	1 36.70	1.251	16 17.50	1 11.25	18 0 48.68
23	18 3 38.40	11.112	23 26 42.6	+0.97	1 6.66	1.252	16 17.56	1 11.25	18 4 45.24
24	18 8 5.08	11.111	23 26 5.2	2.15	0 36.62	1.251	16 17.62	1 11.25	18 8 41.80
25	18 12 31.73	11.108	23 24 59.6	3.32	-0 6.61	1.248	16 17.67	1 11.24	18 12 38.36
26	18 16 58.29	11.104	-23 23 25.6	+4.50	+0 23.31	+1.244	16 17.71	1 11.23	18 16 34.92
27	18 21 24.75	11.100	23 21 23.5	5.67	0 53.13	1.240	16 17.75	1 11.22	18 20 31.47
28	18 25 51.05	11.092	23 18 53.1	6.85	1 22.80	1.232	16 17.79	1 11.20	18 24 28.03
29	18 30 17.16	11.083	23 15 54.8	8.01	1 52.26	1.223	16 17.83	1 11.17	18 28 24.59
30	18 34 43.06	11.074	23 12 28.5	9.18	2 21.51	1.214	16 17.85	1 11.14	18 32 21.15
31	18 39 8.68	11.062	-23 8 34.2	+10.34	+2 50.51	+1.202	16 17.87	1 11.11	18 36 17.70

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.19 from the sidereal interval.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Me- ridian.	Geocen- tric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	" ' "	"	s	" "	" "	
Jan. 0	U	23 29.40	2.201	18 10 30.69	142.25	-21 40 43.0	+207.5	68.58	15 19.6	56 9.0	
1	L	11 55.80	2.197	18 38 57.25	142.07	20 49 59.4	299.4	68.53	15 24.2	56 26.0	
2	U	0 22.11	2.186	19 7 18.26	141.35	19 41 10.2	388.1	68.35	15 28.8	56 42.9	
2	L	12 48.22	2.167	19 35 27.91	140.20	18 15 6.0	471.6	68.07	15 33.3	56 59.3	
3	U	1 14.08	2.143	20 3 21.98	138.78	-16 32 57.9	+548.5	67.72	15 37.6	57 15.2	I. S.
3	L	13 39.64	2.117	20 30 58.04	137.23	14 36 14.1	617.4	67.35	15 41.7	57 30.3	
4	U	2 4.89	2.092	20 58 15.56	135.71	12 26 37.1	677.2	66.99	15 45.6	57 44.6	I. S.
4	L	14 29.86	2.070	21 25 15.83	134.37	10 5 59.6	727.3	66.67	15 49.2	57 57.9	
5	U	2 54.59	2.053	21 52 1.78	133.34	-7 36 21.3	+767.2	66.44	15 52.6	58 10.2	I. S.
5	L	15 19.15	2.042	22 18 37.72	132.72	4 59 47.4	796.6	66.31	15 55.7	58 21.6	
6	U	3 43.63	2.040	22 45 9.02	132.59	-2 18 26.1	815.2	66.31	15 58.6	58 32.1	I. S.
6	L	16 8.14	2.047	23 11 41.93	133.00	+0 25 31.5	822.7	66.45	16 1.2	58 41.6	
7	U	4 32.79	2.063	23 38 23.21	133.98	+3 9 51.6	+818.8	66.73	16 3.5	58 50.1	I. S.
7	L	16 57.09	2.089	0 5 19.86	135.55	5 52 17.1	803.4	67.15	16 5.5	58 57.7	
8	U	5 22.97	2.125	0 32 38.76	137.69	8 30 27.3	776.2	67.70	16 7.4	59 4.4	I. S.
8	L	17 48.72	2.189	1 0 26.35	140.32	11 1 57.6	736.8	68.37	16 8.9	59 10.0	
9	U	6 15.04	2.219	1 28 48.09	143.36	+13 24 18.8	+684.7	69.13	16 10.1	59 14.5	I. S.
9	L	18 41.99	2.274	1 57 48.03	146.66	15 34 59.5	620.0	69.94	16 11.0	59 17.9	
10	U	7 9.62	2.330	2 27 28.18	150.03	17 31 28.2	542.8	70.75	16 11.6	59 19.9	I. S.
10	L	19 37.90	2.383	2 57 47.98	153.22	19 11 18.2	453.7	71.51	16 11.7	59 20.3	
11	U	8 6.78	2.429	3 28 43.84	155.99	+20 32 14.1	+354.0	72.15	16 11.4	59 19.1	I. S.
11	L	20 36.15	2.463	4 0 9.02	158.06	21 32 19.6	245.7	72.61	16 10.5	59 16.0	
12	U	9 5.84	2.482	4 31 53.67	159.20	22 10 7.2	131.5	72.85	16 9.1	59 10.9	I. S.
12	L	21 35.65	2.483	5 3 45.66	159.26	22 24 45.6	+14.7	72.83	16 7.2	59 3.7	
13	U	10 5.36	2.465	5 35 31.52	158.18	+22 16 5.0	-101.1	72.54	16 4.6	58 54.3	I. N.S.
13	L	22 34.75	2.430	6 6 57.80	156.02	21 44 38.7	212.3	71.99	16 1.4	58 42.6	
14	U	11 3.61	2.378	6 37 52.29	152.93	20 51 40.8	315.8	71.23	15 57.7	58 28.9	I. N.S.
14	L	23 31.77	2.315	7 8 5.19	149.13	19 38 58.8	409.2	70.29	15 53.4	58 13.3	
15	U	11 59.13	2.244	7 37 29.60	144.89	+18 8 45.2	-490.9	69.24	15 48.7	57 55.9	I. II. S.
16	L	0 25.62	2.171	8 6 1.68	140.45	16 23 27.2	559.9	68.13	15 43.6	57 37.2	
16	U	12 51.23	2.098	8 33 40.60	136.05	14 25 37.4	616.2	67.02	15 38.2	57 17.4	II. S.
17	L	1 15.98	2.028	9 0 27.90	131.88	12 17 47.0	660.2	65.96	15 32.6	56 56.9	
17	U	13 39.93	1.965	9 26 27.04	128.06	+10 2 19.0	-692.6	64.99	15 26.9	56 36.1	II. S.
18	L	2 3.16	1.909	9 51 42.97	124.68	7 41 26.8	714.4	64.13	15 21.3	56 15.5	
18	U	14 25.77	1.861	10 16 21.49	121.83	5 17 11.1	726.7	63.40	15 15.9	55 55.4	II. S.
19	L	2 47.86	1.823	10 40 29.06	119.53	2 51 19.9	730.5	62.81	15 10.7	55 36.3	
19	U	15 9.55	1.794	11 4 12.36	117.79	+0 25 30.0	-726.6	62.36	15 5.8	55 18.5	II. S.
20	L	3 30.95	1.774	11 27 38.22	116.62	-1 58 52.3	715.9	62.07	15 1.4	55 2.4	
20	U	15 52.18	1.764	11 50 53.45	116.01	4 20 29.2	699.1	61.94	14 57.5	54 48.2	II. S.
21	L	4 13.34	1.763	12 14 4.66	115.95	6 38 9.2	676.6	61.96	14 54.3	54 36.2	
21	U	16 34.53	1.771	12 37 18.29	116.41	-8 50 45.1	-648.6	62.11	14 51.7	54 26.6	II. S.
22	L	4 55.87	1.787	13 0 40.46	117.36	10 57 12.9	615.2	62.39	14 49.8	54 19.6	
22	U	17 17.45	1.811	13 24 16.89	118.78	12 56 28.9	576.6	62.79	14 48.6	54 15.3	II. S.
23	L	5 39.35	1.841	13 48 12.86	120.61	14 47 28.8	532.5	63.29	14 48.2	54 13.7	
23	U	18 1.65	1.877	14 12 32.96	122.80	-16 29 6.8	-482.9	63.88	14 48.5	54 15.0	II. S.

Jan. 13, U Defective Illumination of N. 0''.65. Jan. 15, U Defective Illumination of II. 0''.05.
Jan. 14, U Defective Illumination of N. 0''.23.

MOON-CULMINATIONS, 1919.

523

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Meri- dian.	Geocen- tric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
Jan. 23	U	18 1.65	1.877	14 12 32.96	122.80	-16 29 6.8	-482.9	63.88	14 48.5	54 15.0	II. S.
24	L	6 24.42	1.918	14 37 21.03	125.26	18 0 14.1	427.4	64.53	14 49.6	54 19.1	
24	U	18 47.70	1.962	15 2 39.94	127.91	19 19 39.9	365.9	65.22	14 51.5	54 26.0	II. S.
25	L	7 11.52	2.008	15 28 31.36	130.66	20 26 11.8	298.4	65.92	14 54.1	54 35.6	
25	U	19 35.89	2.053	15 54 55.63	133.37	-21 18 36.8	-224.8	66.60	14 57.4	54 47.8	II. S.
26	L	8 0 7.8	2.095	16 21 51.66	135.93	21 55 43.9	145.5	67.22	15 1.4	55 2.3	
26	U	20 26.16	2.133	16 49 16.77	138.20	22 16 27.7	- 61.1	67.76	15 5.9	55 18.9	II. S.
27	L	8 51.95	2.164	17 17 6.86	140.07	22 19 51.5	+ 27.6	68.20	15 10.9	55 37.3	
27	U	21 18.07	2.187	17 45 16.61	141.46	-22 5 11.7	+119.3	68.52	15 16.3	55 57.2	II. S.
28	L	9 44.42	2.202	18 13 39.90	142.32	21 32 1.8	212.4	68.70	15 22.1	56 18.2	
28	U	22 10.88	2.207	18 42 10.23	142.64	20 40 15.2	305.2	68.74	15 28.0	56 39.9	II. S.
29	L	10 37.36	2.204	19 10 41.36	142.47	19 30 7.8	395.6	68.67	15 34.0	57 1.9	
29	U	23 3 7.5	2.194	19 39 7.72	141.87	-18 2 18.9	+481.7	68.50	15 39.9	57 23.6	II. N.
30	L	11 30.00	2.179	20 7 24.99	140.97	16 17 50.4	561.8	68.26	15 45.7	57 44.7	
30	U	23 56.04	2.161	20 35 30.32	139.90	14 18 6.2	634.1	67.98	15 51.1	58 4.6	
31	L	12 21.87	2.143	21 3 22.47	138.80	12 4 48.6	697.1	67.70	15 56.1	58 23.0	
Feb. 1	U	0 47.49	2.127	21 31 1.88	137.80	- 9 39 56.3	+749.7	67.45	16 0.6	58 39.5	
1	L	13 12.92	2.114	21 58 30.50	137.02	7 5 41.1	790.8	67.26	16 4.5	58 53.9	
2	U	1 38.23	2.106	22 25 51.60	136.56	4 24 24.3	819.8	67.17	16 7.8	59 5.9	I. S.
2	L	14 3 4.9	2.105	22 53 9.48	136.49	- 1 38 34.8	836.3	67.18	16 10.4	59 15.5	
3	U	2 28.78	2.111	23 20 29.24	136.88	+ 1 9 13.9	+839.7	67.30	16 12.3	59 22.5	I. S.
3	L	14 54.19	2.126	23 47 56.43	137.74	3 56 25.4	830.0	67.54	16 13.5	59 27.1	
4	U	3 19.82	2.148	0 15 36.72	139.06	6 40 22.5	807.3	67.91	16 14.1	59 29.3	I. S.
4	L	15 45.76	2.177	0 43 35.55	140.82	9 18 27.7	771.4	68.39	16 14.2	59 29.4	
5	U	4 12.09	2.212	1 11 57.77	142.95	+11 48 6.2	+722.8	68.95	16 13.7	59 27.6	I. S.
5	L	16 38.86	2.252	1 40 47.14	145.32	14 6 46.4	661.9	69.56	16 12.7	59 23.9	
6	U	5 6 1.3	2.293	2 10 5 9.7	147.82	16 12 2.6	589.0	70.19	16 11.3	59 18.7	I. S.
6	L	17 33.90	2.334	2 39 54.64	150.26	18 1 38.5	505.2	70.80	16 9.5	59 12.2	
7	U	6 2 1.3	2.370	3 10 11.27	152.44	+19 33 30.4	+411.9	71.34	16 7.4	59 4.6	I. S.
7	L	18 30.75	2.399	3 40 51.55	154.17	20 45 53.2	310.7	71.76	16 5.1	58 56.0	
8	U	6 59.65	2.417	4 11 48.80	155.24	21 37 24.7	203.8	72.00	16 2.5	58 46.5	I. S.
8	L	19 28.69	2.421	4 42 54.27	155.52	22 7 10.9	+ 93.7	72.04	15 59.7	58 36.2	
9	U	7 57.70	2.411	5 13 57.87	154.93	+22 14 50.4	- 16.9	71.87	15 56.7	58 25.2	I. S.
9	L	20 26.50	2.387	5 44 48.99	153.45	22 0 34.8	125.1	71.48	15 53.5	58 13.4	
10	U	8 54.93	2.349	6 15 17.47	151.17	21 25 8.5	228.2	70.89	15 50.1	58 1.0	I. N.S.
10	L	21 22.83	2.300	6 45 14.51	148.23	20 29 46.0	324.1	70.14	15 46.5	57 48.0	
11	U	9 50.10	2.243	7 14 33.18	144.81	+19 16 5.5	-410.9	69.26	15 42.8	57 34.3	I. N.S.
11	L	22 16.65	2.182	7 43 8.87	141.11	17 46 3.5	487.6	68.30	15 38.9	57 19.9	
12	U	10 42.45	2.118	8 10 59.35	137.31	16 1 47.4	553.3	67.31	15 34.8	57 5.0	I. N.S.
12	L	23 7 4.9	2.056	8 38 4 4.9	133.58	14 5 30.0	607.8	66.34	15 30.6	56 49.6	
13	U	11 31.81	1.998	9 4 26.03	130.05	+11 59 24.1	-651.3	65.42	15 26.3	56 33.9	I. N.S.
13	L	23 55.46	1.945	9 30 7 1.3	126.85	9 45 39.2	684.3	64.57	15 22.0	56 17.9	
14	U	12 18.51	1.898	9 55 12.06	124.03	7 26 18.8	707.4	63.82	15 17.6	56 1.9	I. II. S.
15	L	0 41.04	1.858	10 19 45.83	121.67	5 3 18.7	721.2	63.19	15 13.3	55 46.2	
15	U	13 3 1.4	1.827	10 43 53.93	119.77	+ 2 38 26.3	-726.3	62.69	15 9.1	55 30.8	II. S.

Feb. 10, U Defective Illumination of N. 0°.01.
 Feb. 11, U Defective Illumination of S. 0°.21.
 Feb. 12, U Defective Illumination of S. 0°.04.

Feb. 13, U Defective Illumination of N. 0°.43.
 Feb. 14, U Defective Illumination of I. 0°.01.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Me- ridian.	Geocen- tric Semidi- ameter.	Equa- torial Horizon- tal Parallax	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
Feb. 15	U	13 3.14	1.827	10 43 53.93	119.77	+ 2 38 26.3	-726.3	62.69	15 9.1	55 30.8	II. S.
16	L	1 24.91	1.803	11 7 42.09	118.35	+ 0 13 21.1	723.4	62.32	15 5.1	55 16.0	
16	U	13 46.45	1.788	11 31 16.12	117.41	- 2 10 25.4	713.2	62.09	15 1.3	55 2.1	II. S.
17	L	2 7.85	1.780	11 54 41.79	116.95	4 31 28.5	696.2	62.00	14 57.9	54 49.4	
17	U	14 29.20	1.780	12 18 4.74	116.96	- 6 48 29.8	-672.9	62.03	14 54.8	54 38.1	II. S.
18	L	2 50.60	1.757	12 41 30.46	117.40	9 0 15.2	643.6	62.18	14 52.1	54 28.4	
18	U	15 12.13	1.802	13 5 4.05	118.26	11 5 34.5	608.6	62.45	14 50.0	54 20.6	II. S.
19	L	3 33.87	1.823	13 28 50.31	119.51	13 3 20.3	568.1	62.82	14 48.5	54 14.9	
19	U	15 55.89	1.849	13 52 53.52	121.09	-14 52 26.1	-522.0	63.28	14 47.6	54 11.5	II. S.
20	L	4 18.26	1.880	14 17 17.47	122.95	16 31 47.0	470.5	63.81	14 47.3	54 10.6	
20	U	16 41.02	1.914	14 42 5.22	125.04	18 0 17.9	413.7	64.39	14 47.7	54 12.2	II. S.
21	L	5 4.21	1.952	15 7 18.96	127.28	19 16 54.2	351.5	65.00	14 48.9	54 16.5	
21	U	17 27.86	1.990	15 33 0.02	129.58	-20 20 32.1	-284.0	65.62	14 50.8	54 23.6	II. S.
22	L	5 51.97	2.028	15 59 8.68	131.85	21 10 8.9	211.4	66.22	14 53.5	54 33.5	
22	U	18 16.52	2.064	16 25 44.04	134.02	21 44 45.1	133.9	66.78	14 57.0	54 46.1	II. S.
23	L	6 41.48	2.096	16 52 44.18	135.97	22 3 26.4	- 52.3	67.27	15 1.2	55 1.4	
23	U	19 6.81	2.124	17 20 6.09	137.64	-22 5 25.4	+ 32.9	67.68	15 6.0	55 19.3	II. S.
24	L	7 32.43	2.146	17 47 45.98	138.95	21 50 5.0	120.8	67.99	15 11.5	55 39.5	
24	U	19 58.28	2.162	18 15 39.51	139.90	21 17 0.2	210.2	68.20	15 17.6	56 1.8	II. N.
25	L	8 24.28	2.171	18 43 42.13	140.48	20 26 1.5	209.6	68.31	15 24.2	56 25.9	
25	U	20 50.36	2.175	19 11 49.48	140.70	-19 17 16.3	+387.6	68.33	15 31.1	56 51.4	II. N.
26	L	9 16.46	2.174	19 39 57.71	140.64	17 51 10.4	472.7	68.28	15 38.3	57 17.7	
26	U	21 42.52	2.169	20 8 3.92	140.38	16 8 29.6	553.2	68.18	15 45.5	57 44.3	II. N.
27	L	10 8.52	2.163	20 36 6.30	140.02	14 10 19.3	627.4	68.05	15 52.7	58 10.7	
27	U	22 34.44	2.157	21 4 4.27	139.66	-11 58 5.1	+693.6	67.94	15 59.7	58 36.3	II. N.
28	L	11 0.30	2.153	21 31 58.50	139.41	9 33 31.9	750.3	67.86	16 6.3	59 0.3	
28	U	23 26.13	2.153	21 59 50.96	139.37	6 58 42.4	796.0	67.83	16 12.2	59 22.1	
Mar. 1	L	11 51.98	2.157	22 27 44.56	139.62	4 15 56.2	829.5	67.87	16 17.4	59 41.3	
2	U	0 17.92	2.167	22 55 43.12	140.20	- 1 27 48.0	+849.5	68.02	16 21.8	59 57.3	
2	L	12 44.01	2.183	23 23 51.00	141.17	+ 1 22 55.7	855.2	68.27	16 25.1	60 9.6	
3	U	1 10.33	2.205	23 52 12.84	142.54	4 13 18.6	846.0	68.62	16 27.4	60 18.1	
3	L	13 36.96	2.234	0 20 53.14	144.24	7 0 18.6	821.4	69.07	16 28.7	60 22.6	
4	U	2 3.96	2.267	0 49 55.85	146.25	+ 9 40 51.2	+781.4	69.59	16 28.8	60 23.2	I. S.
4	L	14 31.38	2.304	1 19 24.01	148.46	12 11 54.7	726.6	70.17	16 28.0	60 20.0	
5	U	2 59.25	2.342	1 49 19.19	150.74	14 30 34.2	657.7	70.76	16 26.2	60 13.3	I. S.
5	L	15 27.57	2.378	2 19 41.19	152.90	16 34 7.8	575.9	71.31	16 23.5	60 3.5	
6	U	3 56.29	2.409	2 50 27.59	154.77	+18 20 11.9	+483.0	71.79	16 20.1	59 51.0	I. S.
6	L	16 25.34	2.432	3 21 33.68	156.15	19 46 46.6	381.4	72.15	16 16.1	59 36.4	
7	U	4 54.61	2.444	3 52 52.56	156.87	20 52 21.2	278.6	72.35	16 11.7	59 20.1	I. S.
7	L	17 23.94	2.442	4 24 15.45	156.81	21 35 58.1	162.3	72.35	16 6.9	59 2.6	
8	U	5 53.17	2.427	4 55 32.50	155.90	+21 57 14.7	+ 50.6	72.14	16 1.9	58 44.3	I. S.
8	L	18 22.14	2.396	5 26 33.56	154.14	21 56 23.4	- 58.6	71.71	15 56.8	58 25.5	
9	U	6 50.68	2.357	5 57 9.01	151.65	21 34 9.2	162.8	71.09	15 51.6	58 6.7	I. N.S.
9	L	19 18.66	2.305	6 27 10.71	148.55	20 51 44.3	260.0	70.31	15 46.5	57 48.0	
10	U	7 45.97	2.246	6 56 32.43	145.02	+19 50 42.7	-348.7	69.42	15 41.5	57 29.7	I. N.

Mar. 9, U Defective Illumination of N. 0° 06.

MOON-CULMINATIONS, 1919.

525

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Me- ridian.	Geocen- tric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	" "	" "	s	" "	" "	
Jan. 10	U	7 45.97	2.246	6 56 32.43	145.02	+19 50 42.7	-348.7	69.42	15 41.5	57 29.7	I. N.
10	L	20 12.56	2.184	7 25 10.14	141.26	18 32 53.9	427.8	68.45	15 36.7	57 11.8	
11	U	8 38.38	2.120	7 53 2.13	137.42	17 0 15.8	496.8	67.45	15 32.0	56 54.5	I. N.
11	L	21 3.45	2.058	8 20 8.63	133.69	15 14 50.1	555.7	66.46	15 27.4	56 37.8	
12	U	9 27.80	2.000	8 46 31.61	130.19	+13 18 38.6	-604.5	65.52	15 23.0	56 21.7	I. N.
12	L	21 51.47	1.947	9 12 14.37	127.00	11 13 40.0	643.6	64.65	15 18.8	56 6.3	
13	U	10 14.55	1.900	9 37 21.17	124.20	9 1 48.3	673.4	63.88	15 14.8	55 51.5	I. N.
13	L	22 37.11	1.861	10 1 56.97	121.84	6 44 52.2	694.4	63.23	15 11.0	55 37.4	
14	U	10 59.25	1.829	10 26 7.09	119.92	+ 4 24 34.2	-707.1	62.69	15 7.3	55 24.0	I. N.S.
14	L	23 21.05	1.805	10 49 57.06	118.48	+ 2 2 31.9	711.9	62.28	15 3.8	55 11.3	
15	U	11 42.61	1.789	11 13 32.42	117.49	- 0 19 42.6	709.2	62.00	15 0.6	54 59.3	I. S.
16	L	0 4.02	1.780	11 36 58.67	116.95	2 40 41.6	699.4	61.85	14 57.6	54 48.2	
16	U	12 25.37	1.778	12 0 21.11	116.85	- 4 59 1.5	-682.8	61.82	14 54.8	54 38.0	II. S.
17	L	0 46.73	1.783	12 23 44.76	117.16	7 13 22.3	659.6	61.91	14 52.3	54 28.9	
17	U	13 8.19	1.795	12 47 14.37	117.84	9 22 27.0	630.1	62.11	14 50.1	54 21.0	II. S.
18	L	1 29.83	1.812	13 10 54.22	118.86	11 25 0.8	594.5	62.41	14 48.3	54 14.4	
18	U	13 51.69	1.834	13 34 48.17	120.18	-13 19 51.1	-553.0	62.79	14 46.9	54 9.2	II. S.
19	L	2 13.85	1.860	13 58 59.46	121.74	15 5 48.0	505.6	63.24	14 46.0	54 5.7	
19	U	14 36.34	1.889	14 23 30.70	123.49	16 41 43.2	452.7	63.74	14 45.5	54 4.0	II. S.
20	L	2 59.19	1.920	14 48 23.74	125.36	18 6 30.7	394.3	64.28	14 45.6	54 4.3	
20	U	15 22.42	1.952	15 13 39.65	127.29	-19 19 7.3	-330.9	64.82	14 46.2	54 6.7	II. S.
21	L	3 46.03	1.983	15 39 18.53	129.19	20 18 33.4	262.7	65.35	14 47.5	54 11.3	
21	U	16 10.01	2.013	16 5 19.66	130.98	21 3 54.5	190.1	65.85	14 49.4	54 18.4	II. S.
22	L	4 34.34	2.040	16 31 41.45	132.61	21 34 21.2	113.7	66.30	14 52.0	54 27.9	
22	U	16 58.97	2.064	16 58 21.50	134.02	-21 49 10.9	- 34.1	66.69	14 55.3	54 40.0	II. S.
23	L	5 23.85	2.083	17 25 16.85	135.16	21 47 50.1	+ 47.9	67.00	14 59.3	54 54.8	
23	U	17 48.93	2.097	17 52 24.15	136.01	21 29 54.6	131.5	67.23	15 4.1	55 12.1	II. N.S.
24	L	6 14.16	2.107	18 19 40.00	136.58	20 55 11.3	215.7	67.38	15 9.5	55 31.9	
24	U	18 39.47	2.112	18 47 1.12	136.90	-20 3 38.7	+299.5	67.45	15 15.5	55 54.1	II. N.
25	L	7 4.82	2.114	19 14 24.79	137.02	18 55 28.0	381.9	67.46	15 22.1	56 18.5	
25	U	19 30.18	2.113	19 41 48.99	137.00	17 31 3.6	461.6	67.44	15 29.3	56 44.8	II. N.
26	L	7 55.54	2.112	20 9 12.66	136.94	15 51 3.6	537.6	67.40	15 36.9	57 12.6	
26	U	20 20.88	2.112	20 36 35.75	136.92	-13 56 20.7	+608.6	67.36	15 44.8	57 41.6	II. N.
27	L	8 46.23	2.114	21 3 59.37	137.04	11 48 2.3	673.3	67.36	15 52.8	58 11.0	
27	U	21 11.63	2.119	21 31 25.65	137.38	9 27 32.6	730.3	67.41	16 0.8	58 40.4	II. N.
28	L	9 37.12	2.130	21 58 57.73	138.02	6 56 31.9	778.2	67.54	16 8.6	59 9.0	
28	U	22 2.78	2.147	22 26 39.60	139.03	- 4 16 59.1	+815.4	67.76	16 16.0	59 36.0	II. N.
29	L	10 28.68	2.170	22 54 35.88	140.43	- 1 31 11.2	840.4	68.09	16 22.7	60 0.7	
29	U	22 54.90	2.201	23 22 51.56	142.25	+ 1 18 16.0	851.7	68.53	16 28.6	60 22.4	II. N.
30	L	11 21.52	2.238	23 51 31.71	144.50	4 8 29.2	847.9	69.07	16 33.5	60 40.3	
30	U	23 48.63	2.281	0 20 40.99	147.10	+ 6 56 20.2	+827.8	69.71	16 37.2	60 53.9	
31	L	12 16.29	2.329	0 50 23.26	149.98	9 38 29.0	790.7	70.41	16 39.6	61 2.7	
Apr. 1	U	0 44.53	2.379	1 20 40.96	152.98	12 11 30.2	736.5	71.14	16 40.6	61 6.5	
1	L	13 13.38	2.428	1 51 34.61	155.92	14 31 59.9	665.7	71.87	16 40.3	61 5.2	
2	U	1 42.79	2.472	2 23 2.17	158.60	+16 36 45.6	+579.5	72.54	16 38.6	60 59.0	I. S.

Mar. 14, U Defective Illumination of S. 0°.11.

Mar. 23, U Defective Illumination of N. 0°.36.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
Apr. 2	U	1 42.79	2.472	2 23 2.17	158.60	+16 36 45.6	+579.5	72.54	16 38.6	60 59.0	I. S
2	L	14 12.68	2.508	2 54 58.80	160.74	18 22 55.3	480.1	73.07	16 35.6	60 48.2	
3	U	2 42.92	2.531	3 27 16.68	162.10	19 48 8.2	370.5	73.43	16 31.6	60 33.3	I. S
3	L	15 13.35	2.538	3 59 45.43	162.52	20 50 42.8	284.4	73.56	16 26.6	60 14.9	
4	U	3 43.75	2.527	4 32 12.80	161.87	+21 29 42.7	+135.5	73.43	16 20.8	59 53.7	I. S
4	L	16 13.91	2.498	5 4 25.83	160.14	21 44 59.1	+ 17.7	73.05	16 14.4	59 30.4	
5	U	4 43.63	2.453	5 36 12.05	157.41	21 37 7.8	- 95.3	72.43	16 7.7	59 5.7	I. S
5	L	17 12.72	2.394	6 7 20.60	153.89	21 7 22.4	200.8	71.60	16 0.8	58 40.2	
6	U	5 41.05	2.326	6 37 43.14	149.79	+20 17 25.8	-206.8	70.61	15 53.8	58 14.6	I. N.
6	L	18 8.52	2.252	7 7 14.23	145.35	19 9 20.2	382.2	69.52	15 46.9	57 49.3	
7	U	6 35.09	2.177	7 35 51.31	140.82	17 45 17.8	456.3	68.39	15 40.2	57 24.8	I. N.
7	L	19 0.77	2.103	8 3 34.50	136.40	16 7 32.7	519.3	67.26	15 33.8	57 1.2	
8	U	7 25.59	2.034	8 30 26.08	132.25	+14 18 16.0	-571.7	66.17	15 27.7	56 38.9	I. N.
8	L	19 49.62	1.971	8 56 29.91	128.47	12 19 32.3	613.9	65.16	15 22.0	56 18.0	
9	U	8 12.93	1.916	9 21 51.08	125.15	10 13 18.0	646.9	64.26	15 16.7	55 58.6	I. N.
9	L	20 35.64	1.869	9 46 35.40	122.33	8 1 20.1	671.3	63.48	15 11.9	55 40.8	
10	U	8 57.84	1.831	10 10 49.06	120.04	+ 5 45 18.4	-687.7	62.83	15 7.4	55 24.5	I. N.
10	L	21 19.63	1.802	10 34 38.43	118.28	3 26 45.2	696.6	62.32	15 3.4	55 9.8	
11	U	9 41.12	1.781	10 58 9.84	117.04	+ 1 7 7.0	698.6	61.95	14 59.8	54 56.5	I. N.
11	L	22 2.42	1.769	11 21 29.42	116.30	- 1 12 13.6	693.8	61.72	14 56.6	54 44.7	
12	U	10 23.62	1.765	11 44 43.08	116.04	- 3 29 57.8	-682.6	61.62	14 53.8	54 34.3	I. N.
12	L	22 44.81	1.768	12 7 56.38	116.23	5 44 48.7	694.9	61.64	14 51.3	54 25.3	
13	U	11 6.08	1.778	12 31 14.49	116.84	7 55 30.9	641.0	61.79	14 49.2	54 17.5	I. N.S.
13	L	23 27.51	1.794	12 54 42.04	117.81	10 0 49.5	610.9	62.04	14 47.4	54 11.1	
14	U	11 49.16	1.816	13 18 23.15	119.10	-11 59 30.5	-574.8	62.38	14 46.0	54 6.0	I. II. S
15	L	0 11.10	1.841	13 42 21.29	120.64	13 50 20.3	532.5	62.80	14 45.0	54 2.2	
15	U	12 33.37	1.870	14 6 39.14	122.37	15 32 6.3	484.2	63.27	14 44.4	53 59.8	II. S
16	L	0 55.99	1.901	14 31 18.59	124.22	17 3 37.6	430.1	63.78	14 44.1	53 58.8	
16	U	13 18.99	1.932	14 56 20.55	126.11	-18 23 45.7	-370.4	64.30	14 44.2	53 59.3	II. S
17	L	1 42.36	1.963	15 21 44.97	127.95	19 31 26.2	305.5	64.81	14 44.8	54 1.3	
17	U	14 6.09	1.991	15 47 30.79	129.66	20 25 39.9	236.1	65.28	14 45.8	54 4.9	II. S
18	L	2 30.14	2.016	16 13 36.00	131.17	21 5 35.0	162.6	65.71	14 47.3	54 10.4	
18	U	14 54.46	2.037	16 39 57.78	132.41	-21 30 27.6	- 85.8	66.07	14 49.3	54 17.8	II. S
19	L	3 19.01	2.053	17 6 32.66	133.35	21 39 44.4	- 6.8	66.34	14 51.8	54 27.1	
19	U	15 43.70	2.063	17 33 16.80	133.96	21 33 2.7	+ 73.8	66.53	14 54.9	54 38.5	II. N.S.
20	L	4 8.49	2.068	18 0 6.34	134.24	21 10 11.6	154.7	66.64	14 58.6	54 52.1	
20	U	16 33.31	2.068	18 26 57.65	134.26	-20 31 11.8	+235.1	66.67	15 2.9	55 7.9	II. N.
21	L	4 58.10	2.064	18 53 47.71	134.05	19 36 16.0	313.9	66.64	15 7.8	55 26.0	
21	U	17 22.84	2.058	19 20 34.33	133.70	18 25 47.4	390.4	66.56	15 13.3	55 46.2	II. N.
22	L	5 47.50	2.052	19 47 16.39	133.31	17 0 19.6	463.6	66.47	15 19.4	56 8.6	
22	U	18 12.09	2.046	20 13 53.85	132.96	-15 20 35.9	+532.8	66.38	15 26.1	56 33.0	II. N.
23	L	6 36.62	2.043	20 40 27.92	132.76	13 27 29.9	597.3	66.33	15 33.2	56 59.1	
23	U	19 1.13	2.044	21 7 0.98	132.80	11 22 4.3	656.0	66.33	15 40.7	57 26.7	II. N.
24	L	7 25.68	2.050	21 33 36.53	133.19	9 5 32.0	708.2	66.41	15 48.6	57 55.4	
24	U	19 50.35	2.063	22 0 19.04	133.98	- 6 39 18.3	+762.7	66.59	15 56.6	58 24.7	II. N.

Apr. 13, U Defective Illumination of S. 0".02.
Apr. 14, U Defective Illumination of II. 0".06.

Apr. 19, U Defective Illumination of N. 0".28.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Me- ridian.	Geocen- tric Semidi- ameter.	Equa- torial Horiz- ontal Parallax.	Bright Limbs.
		h m	m	h m s	s	" ' "	"	s	" "	" "	
May 24	U	19 50.35	2.063	22 0 19.04	133.98	- 6 39 18.3	+752.7	66.59	15 56.6	58 24.7	II. N.
25	L	8 15.23	2.084	22 27 13.79	135.23	4 5 1.5	788.4	66.89	16 4.6	58 54.1	
25	U	20 40.40	2.113	22 54 26.76	137.01	- 1 24 35.3	814.0	67.31	16 12.4	59 22.8	II. N.
26	L	9 5.99	2.152	23 22 4.29	139.33	+ 1 19 48.9	827.8	67.87	16 19.8	59 50.1	
26	U	21 32.09	2.199	23 50 12.82	142.18	+ 4 5 41.3	+828.4	68.56	16 26.7	60 15.3	II. N.
27	L	9 58.80	2.255	0 18 58.45	145.51	6 50 12.3	814.0	69.36	16 32.8	60 37.6	
27	U	22 26.22	2.317	0 48 26.49	149.22	9 30 13.9	783.3	70.24	16 37.8	60 56.1	II. N.
28	L	10 54.41	2.382	1 18 40.72	153.17	12 2 23.1	735.2	71.18	16 41.6	61 10.2	
28	U	23 23.39	2.448	1 49 42.74	157.14	+14 23 8.5	+669.3	72.12	16 44.1	61 19.3	
29	L	11 53.15	2.510	2 21 31.21	160.86	16 28 57.9	586.1	73.01	16 45.2	61 23.1	
30	U	0 23.60	2.562	2 54 1.24	164.01	18 16 32.3	487.2	73.75	16 44.7	61 21.4	
30	L	12 54.59	2.600	3 27 4.07	166.28	19 42 58.7	375.4	74.29	16 42.7	61 14.2	
June 1	U	1 25.92	2.618	4 0 27.35	167.38	+20 46 4.5	+254.5	74.57	16 39.4	61 1.9	I. S.
1	L	13 57.34	2.614	4 33 55.92	167.15	21 24 28.3	129.2	74.54	16 34.8	60 44.9	
2	U	2 28.57	2.587	5 7 13.33	165.53	21 37 46.3	+ 4.4	74.19	16 29.0	60 23.9	I. S.
2	L	14 59.35	2.539	5 40 3.49	162.64	21 26 31.6	-115.5	73.54	16 22.4	59 59.7	
3	U	3 29.44	2.474	6 12 12.35	158.69	+20 52 7.4	-226.7	72.64	16 15.1	59 33.0	I. N.
3	L	15 58.67	2.396	6 43 29.05	154.00	19 56 35.1	326.6	71.54	16 7.4	59 4.7	
4	U	4 26.91	2.311	7 13 46.58	148.88	18 42 20.6	413.6	70.33	15 59.5	58 35.6	I. N.
4	L	16 54.12	2.224	7 43 1.71	143.64	17 12 1.0	487.4	69.06	15 51.6	58 6.4	
5	U	5 20.29	2.139	8 11 14.63	138.54	+15 28 13.8	-548.3	67.79	15 43.7	57 37.6	I. N.
5	L	17 45.48	2.060	8 38 28.19	133.78	13 33 29.5	597.1	66.58	15 36.1	57 9.8	
6	U	6 9.76	1.988	9 44 7.19	129.47	11 30 7.3	634.9	65.47	15 28.9	56 43.4	I. N.
6	L	18 33.23	1.926	9 30 17.80	125.72	9 20 12.2	662.7	64.48	15 22.2	56 18.6	
7	U	6 56.02	1.874	9 55 6.93	122.57	+ 7 5 36.8	-681.7	63.62	15 15.9	55 55.7	I. N.
7	L	19 18.23	1.831	10 19 21.85	120.03	4 48 1.4	692.9	62.92	15 10.2	55 34.8	
8	U	7 40.00	1.799	10 43 9.92	118.09	2 28 55.5	696.9	62.38	15 5.1	55 16.1	I. N.
8	L	20 1.45	1.777	11 6 38.39	116.75	+ 0 9 41.1	694.4	61.99	15 0.6	54 59.6	
9	U	8 22.68	1.764	11 29 54.23	115.98	- 2 8 25.9	-685.7	61.75	14 56.7	54 45.1	I. N.
9	L	20 43.82	1.760	11 53 4.06	115.75	4 24 13.8	671.2	61.66	14 53.4	54 32.8	
10	U	9 4.96	1.764	12 16 14.09	116.01	6 36 32.7	651.0	61.70	14 50.6	54 22.5	I. N.
10	L	21 26.19	1.776	12 39 30.01	116.72	8 44 13.9	624.9	61.86	14 48.3	54 14.1	
11	U	9 47.61	1.795	13 2 56.95	117.84	-10 46 8.3	-593.1	62.13	14 46.5	54 7.6	I. N.
11	L	22 9.29	1.819	13 26 39.36	119.29	12 41 6.1	555.5	62.50	14 45.2	54 2.9	
12	U	10 31.28	1.847	13 50 40.91	121.01	14 27 56.8	512.0	62.94	14 44.4	53 59.8	I. N.
12	L	22 53.64	1.879	14 15 4.40	122.93	16 5 28.8	462.4	63.42	14 43.9	53 58.2	
13	U	11 16.39	1.913	14 39 51.59	124.95	-17 32 31.4	-407.0	63.94	14 43.9	53 58.2	I. N.S.
13	L	23 39.55	1.947	15 5 3.12	126.97	18 47 55.1	346.0	64.47	14 44.3	53 59.7	
14	U	12 8.11	1.979	15 30 38.50	128.90	19 50 34.3	279.7	64.97	14 45.0	54 2.5	I. II. N.S.
15	L	0 27.03	2.008	15 56 35.97	130.64	20 39 28.8	208.7	65.43	14 46.2	54 6.7	
15	U	12 51.27	2.032	16 22 52.68	132.10	-21 13 46.3	-133.7	65.82	14 47.7	54 12.3	II. N.S.
16	L	1 15.76	2.050	16 49 24.82	133.20	21 32 45.1	- 55.7	66.12	14 49.6	54 19.2	
16	U	13 40.44	2.062	17 16 7.89	133.91	21 35 55.4	+ 24.2	66.33	14 51.9	54 27.6	II. N.S.
17	L	2 5.22	2.067	17 42 57.02	134.21	21 23 0.8	104.9	66.44	14 54.6	54 37.4	
17	U	14 30.02	2.066	18 9 47.43	134.12	-20 53 59.1	+185.2	66.45	14 57.7	54 48.7	II. N.S.

May 13, U Defective Illumination of S. 0°.00.
 May 14, U Defective Illumination of I. 0°.02.
 May 14, U Defective Illumination of N. 0°.41.

May 15, U Defective Illumination of N. 0°.73.
 May 16, U Defective Illumination of N. 0°.13.
 May 17, U Defective Illumination of S. 0°.43.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Me- ridian.	Geocen- tric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
May 17	U	14 30.02	2.066	18 9 47.43	134.12	-20 53 59.1	+185.2	66.45	14 57.7	54 48.7	II.N.S.
18	L	2 54.77	2.069	18 36 34.75	133.71	20 9 2.5	263.9	66.37	15 1.2	55 1.5	
18	U	15 19.41	2.048	19 3 15.43	133.04	19 8 35.7	340.1	66.23	15 5.1	55 15.9	II.N.
19	L	3 43.90	2.034	19 29 46.99	132.21	17 53 15.9	412.7	66.05	15 9.5	55 32.0	
19	U	16 8.22	2.019	19 56 8.26	131.33	-16 23 49.7	+481.0	65.85	15 14.3	55 49.7	II.N.
20	L	4 32.36	2.006	20 22 19.34	130.53	14 41 12.7	544.3	65.67	15 19.6	56 9.0	
20	U	16 56.37	1.995	20 48 21.78	129.91	12 46 27.9	602.2	65.53	15 25.3	56 29.9	II.N.
21	L	5 20.27	1.990	21 14 18.37	129.58	10 40 44.5	654.0	65.46	15 31.4	56 52.3	
21	U	17 44.15	1.991	21 40 13.09	129.62	-8 25 18.8	+699.1	65.48	15 37.8	57 16.1	II.N.
22	L	6 8.08	1.999	22 6 11.00	130.11	6 1 33.5	737.1	65.61	15 44.6	57 40.9	
22	U	18 32.16	2.016	22 32 17.99	131.14	3 31 0.4	767.0	65.87	15 51.6	58 6.5	II.N.
23	L	6 56.50	2.043	22 58 40.69	132.74	-0 55 20.7	788.1	66.28	15 58.7	58 32.6	
23	U	19 21.22	2.079	23 25 26.24	134.95	+1 43 32.0	+799.0	66.83	16 5.8	58 58.6	II.N.
24	L	7 46.44	2.126	23 52 42.03	137.78	4 23 29.0	798.6	67.52	16 12.7	59 24.0	
24	U	20 12.28	2.183	0 20 35.26	141.19	7 2 5.8	785.3	68.36	16 19.3	59 48.2	II.N.
25	L	8 38.86	2.248	0 49 12.63	145.12	9 36 40.3	757.9	69.32	16 25.4	60 10.6	
25	U	21 6.27	2.320	1 18 39.65	149.44	+12 4 13.5	+714.9	70.35	16 30.8	60 30.3	II.N.
26	L	9 34.56	2.395	1 48 59.94	153.96	14 21 32.0	655.3	71.42	16 35.2	60 46.6	
26	U	22 3.75	2.469	2 20 14.38	158.42	16 25 14.2	578.9	72.46	16 38.6	60 59.0	II.N.
27	L	10 33.79	2.537	2 52 20.30	162.48	18 12 0.5	486.2	73.40	16 40.7	61 6.9	
27	U	23 4.58	2.592	3 25 10.94	165.80	+19 38 45.2	+379.1	74.16	16 41.5	61 9.8	
28	L	11 35.93	2.629	3 58 35.19	168.03	20 42 52.6	260.6	74.67	16 40.9	61 7.6	
29	U	0 7.59	2.643	4 32 18.20	168.89	21 22 31.1	135.1	74.87	16 38.9	61 0.3	
29	L	12 39.27	2.632	5 6 2.59	168.24	21 36 45.5	+7.5	74.73	16 35.6	60 48.0	
30	U	1 10.67	2.597	5 39 30.23	166.11	+21 25 41.7	-117.2	74.25	16 31.0	60 31.1	I. N.
30	L	13 41.52	2.540	6 12 24.19	162.67	20 50 24.8	234.1	73.46	16 25.3	60 10.3	
31	U	2 11.57	2.466	6 44 30.48	158.23	19 52 48.9	339.8	72.43	16 18.7	59 46.2	I. N.
31	L	14 40.66	2.381	7 15 39.09	153.12	18 35 23.4	432.0	71.24	16 11.5	59 19.6	
June 1	U	3 8.70	2.291	7 45 44.31	147.72	+17 0 58.2	-509.7	69.95	16 3.8	58 51.3	I. N.
1	L	15 35.66	2.202	8 14 44.44	142.32	15 12 28.3	572.9	68.64	15 55.8	58 22.1	
2	U	4 1.56	2.116	8 42 41.10	137.18	13 12 44.0	622.3	67.38	15 47.8	57 52.6	I. N.
2	L	16 26.48	2.038	9 9 38.56	132.48	11 4 22.9	659.2	66.20	15 39.9	57 23.5	
3	U	4 50.51	1.909	9 35 42.70	128.31	+8 49 48.1	-684.9	65.13	15 32.2	56 55.4	I. N.
3	L	17 13.77	1.910	10 1 0.56	124.77	6 31 5.6	700.8	64.21	15 24.9	56 28.7	
4	U	5 36.39	1.862	10 25 39.74	121.87	4 10 5.3	708.1	63.45	15 18.1	56 3.8	I. N.
4	L	17 58.49	1.824	10 49 47.99	119.62	+1 48 23.4	707.8	62.84	15 11.9	55 40.9	
5	U	6 20.21	1.797	11 13 33.04	118.00	-0 32 34.9	-700.8	62.40	15 6.3	55 20.3	I. N.
5	L	18 41.67	1.781	11 37 2.36	116.99	2 51 33.1	687.8	62.12	15 1.3	55 2.1	
6	U	7 2.99	1.774	12 0 23.12	116.57	5 7 21.6	669.2	61.99	14 57.1	54 46.4	I. N.
6	L	19 24.28	1.775	12 23 42.03	116.67	7 18 54.4	645.2	62.00	14 53.5	54 33.2	
7	U	7 45.64	1.785	12 47 5.30	117.28	-9 25 7.4	-615.9	62.14	14 50.6	54 22.5	I. N.
7	L	20 7.16	1.803	13 10 38.56	118.33	11 24 56.6	581.3	62.40	14 48.3	54 14.1	
8	U	8 28.93	1.827	13 34 26.78	119.76	13 17 18.1	541.3	62.75	14 46.6	54 8.1	I. N.
8	L	20 51.02	1.856	13 58 34.08	121.50	15 1 6.3	495.7	63.19	14 45.6	54 4.4	
9	U	9 13.48	1.889	14 23 3.71	123.47	-16 35 14.1	-444.5	63.69	14 45.2	54 2.8	I. N.

May 17, U Defective Illumination of S. & A.

MOON-CULMINATIONS, 1919.

529

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocen- tric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
June 9	U	9 13.48	1.889	14 23 3.71	123.47	-16 35 14.1	-444.5	63.69	14 45.2	54 2.8	I. N.
9	L	21 36.35	1.923	14 47 57.82	125.57	17 58 33.9	387.7	64.21	14 45.3	54 3.1	
10	U	9 59.64	1.958	15 13 17.36	127.69	19 9 58.6	325.4	64.74	14 45.8	54 5.2	I. N.
10	L	22 23.35	1.992	15 39 1.98	129.72	20 8 23.3	257.9	65.25	14 46.9	54 9.0	
11	U	10 47.44	2.023	16 5 10.03	131.57	-20 52 48.0	-185.5	65.70	14 48.3	54 14.4	I. N.S.
11	L	23 11.88	2.049	16 31 38.54	133.13	21 22 19.7	109.1	66.08	14 50.2	54 21.2	
12	U	11 36.59	2.068	16 58 23.46	134.29	21 36 16.0	-29.8	66.37	14 52.4	54 29.3	I. N.S.
13	L	0 1.49	2.081	17 25 19.84	135.03	21 34 7.3	+51.5	66.56	14 54.9	54 38.6	
13	U	12 26.49	2.085	17 52 22.30	135.31	-21 15 38.1	+133.4	66.64	14 57.8	54 49.0	II. N.S.
14	L	0 51.50	2.082	18 19 25.41	135.14	20 40 49.6	214.5	66.61	15 0.9	55 0.4	
14	U	13 16.44	2.073	18 46 24.12	134.59	19 49 58.8	293.5	66.48	15 4.2	55 12.7	II. N.
15	L	1 41.24	2.059	19 13 14.25	133.73	18 43 38.0	369.3	66.28	15 7.8	55 25.9	
15	U	14 5.84	2.041	19 39 52.71	132.66	-17 22 33.4	+440.7	66.03	15 11.7	55 40.0	II. N.
16	L	2 30.22	2.022	20 6 17.75	131.50	15 47 43.3	506.7	65.76	15 15.7	55 54.9	
16	U	14 54.37	2.004	20 32 29.10	130.40	14 0 15.2	566.9	65.50	15 20.0	56 10.7	II. N.
17	L	3 18.32	1.988	20 58 27.94	129.45	12 1 24.7	620.4	65.28	15 24.5	56 27.3	
17	U	15 42.10	1.976	21 24 16.79	128.75	-9 52 33.4	+666.9	65.13	15 29.3	56 44.7	II. N.
18	L	4 5.77	1.971	21 49 59.43	128.42	7 35 8.1	706.0	65.08	15 34.3	57 2.9	
18	U	16 29.42	1.973	22 15 40.67	128.54	5 10 40.5	737.2	65.13	15 39.4	57 21.8	II. N.
19	L	4 53.14	1.983	22 41 26.30	129.16	2 40 47.1	760.2	65.31	15 44.7	57 41.3	
19	U	17 17.05	2.003	23 7 22.82	130.36	-0 7 11.2	+774.3	65.63	15 50.1	58 1.2	II. N.
20	L	5 41.25	2.033	23 33 37.22	132.15	+2 28 17.2	778.8	66.10	15 55.6	58 21.3	
20	U	18 5.87	2.073	0 0 16.80	134.55	5 3 38.1	772.9	66.73	16 1.1	58 41.4	II. N.
21	L	6 31.03	2.123	0 27 28.84	137.56	7 36 41.1	755.6	67.49	16 6.5	59 1.2	
21	U	18 56.85	2.182	0 55 20.28	141.10	+10 5 3.3	+725.9	68.37	16 11.7	59 20.2	II. N.
22	L	7 23.42	2.248	1 23 57.14	145.10	12 26 9.4	682.8	69.35	16 16.5	59 38.0	
22	U	19 50.82	2.319	1 53 23.97	149.40	14 37 12.6	625.3	70.39	16 20.9	59 54.1	II. N.
23	L	8 19.09	2.392	2 23 43.10	153.78	16 35 17.8	553.1	71.42	16 24.7	60 8.0	
23	U	20 48.22	2.462	2 54 53.87	157.96	+18 17 28.1	+466.3	72.39	16 27.7	60 19.2	II. N.
24	L	9 18.14	2.523	3 26 52.07	161.63	19 40 54.2	365.9	73.24	16 29.9	60 27.2	
24	U	21 48.70	2.569	3 59 29.41	164.43	20 43 6.1	254.3	73.87	16 31.1	60 31.6	II. N.
25	L	10 19.72	2.597	4 32 33.87	166.10	21 22 6.1	134.7	74.23	16 31.2	60 32.0	
25	U	22 50.94	2.602	5 5 50.33	166.41	+21 36 42.3	+11.1	74.29	16 30.2	60 28.2	II. N.
26	L	11 22.08	2.584	5 39 2.04	165.30	21 26 35.2	-111.8	74.02	16 28.0	60 20.2	
26	U	23 52.86	2.543	6 11 52.37	162.87	20 52 21.9	229.3	73.44	16 24.7	60 8.1	
27	L	12 23.04	2.484	6 44 6.49	159.32	19 55 30.4	337.5	72.60	16 20.4	59 52.3	
28	U	0 52.43	2.411	7 15 32.68	154.94	+18 38 10.7	-433.5	71.56	16 15.2	59 33.1	
28	L	13 20.88	2.331	7 46 3.08	150.08	17 3 1.2	515.6	70.40	16 9.2	59 11.1	
29	U	1 48.35	2.247	8 15 33.77	145.04	15 12 54.8	583.0	69.18	16 2.6	58 46.9	I. N.
29	L	14 14.81	2.165	8 44 4.24	140.09	13 10 47.1	635.9	67.97	15 55.6	58 21.1	
30	U	2 40.32	2.087	9 11 36.94	135.43	+10 59 26.9	-675.3	66.82	15 48.3	57 54.4	I. N.
30	L	15 4.94	2.017	9 38 16.41	131.23	8 41 30.5	702.2	65.77	15 40.9	57 27.4	
1	U	3 28.77	1.956	10 4 8.60	127.56	6 19 18.6	718.1	64.85	15 33.7	57 0.8	I. N.
1	L	15 51.93	1.905	10 29 20.32	124.49	3 54 55.2	724.2	64.07	15 26.7	56 35.0	
2	U	4 14.54	1.864	10 53 58.86	122.03	+1 30 9.4	-722.0	63.43	15 20.0	56 10.5	I. N.

June 11, U Defective Illumination of S. 0'.62.

June 12, U Defective Illumination of S. 0'.05.

June 13, U Defective Illumination of S. 0'.15.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocen- tric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	"	"	"	
July 2	U	4 14.54	1.864	10 53 58.86	122.03	+ 1 30 9.4	-722.0	63.43	15 20.0	56 10.5	I. N.
2	L	16 36.72	1.834	11 18 11.60	120.19	- 0 53 24.2	712.4	62.95	15 13.7	55 47.6	
3	U	4 58.59	1.813	11 42 5.86	118.95	3 14 21.7	696.2	62.64	15 8.1	55 26.8	I. N.
3	L	17 20.27	1.802	12 5 48.69	118.28	5 31 29.0	674.1	62.47	15 3.0	55 8.2	
4	U	5 41.88	1.800	12 29 26.84	118.16	- 7 43 37.7	-646.4	62.44	14 58.6	54 52.1	I. N.
4	L	18 3.51	1.806	12 53 6.55	118.54	9 49 44.0	613.7	62.54	14 54.9	54 38.6	
5	U	6 25.27	1.820	13 16 53.62	119.37	11 48 46.4	575.9	62.77	14 52.0	54 27.7	I. N.
5	L	18 47.23	1.841	13 40 53.18	120.61	13 39 44.4	532.9	63.09	14 49.7	54 19.4	
6	U	7 9.47	1.867	14 5 9.63	122.18	-15 21 37.3	-485.0	63.49	14 48.2	54 13.8	I. N.
6	L	19 32.05	1.897	14 29 46.54	124.02	16 53 23.4	431.9	63.95	14 47.4	54 10.8	
7	U	7 55.02	1.930	14 54 46.46	126.00	18 14 0.5	373.5	64.45	14 47.2	54 10.3	I. N.
7	L	20 18.39	1.965	15 20 10.83	128.06	19 22 26.9	310.0	64.97	14 47.7	54 12.2	
8	U	8 42.17	1.998	15 45 59.83	130.09	-20 17 41.9	-241.7	65.47	14 48.9	54 16.4	I. N.
8	L	21 6.34	2.030	16 12 12.38	131.97	20 58 48.3	168.7	65.92	14 50.6	54 22.6	
9	U	9 30.86	2.057	16 38 46.09	133.80	21 24 54.9	91.7	66.30	14 52.8	54 30.7	I. N.
9	L	21 55.68	2.078	17 5 37.41	134.89	21 35 19.4	- 11.8	66.60	14 55.4	54 40.4	
10	U	10 20.71	2.093	17 32 41.86	135.78	-21 29 30.8	+ 70.2	66.80	14 58.5	54 51.6	I. N.S.
10	L	22 45.88	2.101	17 59 54.35	136.23	21 7 12.1	153.0	66.89	15 1.9	55 4.1	
11	U	11 11.09	2.101	18 27 9.59	136.24	20 28 22.1	235.2	66.87	15 5.5	55 17.6	I. N.S.
11	L	23 36.27	2.094	18 54 22.51	135.85	19 33 16.6	315.4	66.76	15 9.4	55 31.9	
12	U	12 1.33	2.082	19 21 28.70	135.13	-18 22 27.5	+392.2	66.58	15 13.5	55 46.7	I. N.S.
13	L	0 26.23	2.066	19 48 24.76	134.18	16 56 42.7	464.4	66.34	15 17.7	56 2.0	
13	U	12 50.92	2.049	20 15 8.51	133.10	15 17 5.0	530.8	66.07	15 21.9	56 17.6	II. N.
14	L	1 15.39	2.031	20 41 39.10	132.01	13 24 49.4	590.6	65.80	15 26.1	56 33.2	
14	U	13 39.65	2.014	21 7 57.12	131.02	-11 21 20.2	+642.9	65.57	15 30.4	56 48.8	II. N.
15	L	2 3.74	2.001	21 34 4.52	130.25	9 8 10.6	687.2	65.39	15 34.6	57 4.2	
15	U	14 27.70	1.993	22 0 4.43	129.79	6 47 0.6	722.9	65.29	15 38.7	57 19.4	II. N.
16	L	2 51.60	1.992	22 26 1.03	129.72	4 19 35.4	749.7	65.30	15 42.8	57 34.4	
16	U	15 15.54	1.999	22 51 59.42	130.10	- 1 47 44.7	+767.2	65.43	15 46.8	57 49.0	II. N.
17	L	3 39.60	2.013	23 18 5.41	130.99	+ 0 46 36.9	774.8	65.69	15 50.7	58 3.3	
17	U	16 3.90	2.037	23 44 25.21	132.41	3 21 29.8	772.3	66.08	15 54.5	58 17.1	II. N.
18	L	4 28.53	2.070	0 11 5.35	134.37	5 54 49.4	759.1	66.61	15 58.1	58 30.4	
18	U	16 53.60	2.111	0 38 12.28	136.86	+ 8 24 24.6	+734.8	67.26	16 1.6	58 43.2	II. N.
19	L	5 19.22	2.160	1 5 52.04	139.84	10 47 58.1	698.8	68.03	16 4.9	58 55.3	
19	U	17 45.48	2.216	1 34 9.90	143.20	13 3 6.2	650.5	68.88	16 8.0	59 6.6	II. N.
20	L	6 12.43	2.276	2 3 9.79	146.81	15 7 20.2	589.7	69.77	16 10.8	59 16.8	
20	U	18 40.12	2.338	2 32 53.76	150.51	+16 58 8.7	+516.3	70.67	16 13.2	59 25.7	II. N.
21	L	7 8.53	2.397	3 3 21.43	154.06	18 33 2.7	430.7	71.52	16 15.2	59 33.2	
21	U	19 37.61	2.449	3 34 29.51	157.20	19 49 41.6	334.0	72.25	16 16.8	59 38.9	II. N.
22	L	8 7.26	2.490	4 6 11.51	159.66	20 46 2.1	228.0	72.81	16 17.8	59 42.6	
22	U	20 37.31	2.516	4 38 17.87	161.22	+21 20 27.6	+115.3	73.14	16 18.1	59 43.9	II. N.
23	L	9 7.57	2.524	5 10 36.56	161.70	21 31 56.6	- 0.7	73.22	16 17.8	59 42.7	
23	U	21 37.81	2.512	5 42 54.02	161.01	21 20 9.8	116.6	73.03	16 16.7	59 38.8	II. N.
24	L	10 7.79	2.482	6 14 56.51	159.21	20 45 32.9	228.5	72.58	16 14.9	59 32.0	
24	U	22 37.32	2.436	6 46 31.38	156.45	+19 49 14.9	-332.9	71.90	16 12.3	59 22.4	II. N.

July 10, U Defective Illumination of S. 6° 44.
 July 11, U Defective Illumination of S. 6° 19.

July 12, U Defective Illumination of N. 6° 22.
 July 13, U Defective Illumination of S. 6° 38.

OR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

te.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Me- ridian.	Geocen- tric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
24	U	22 37.32	2.436	6 46 31.38	156.45	+19 49 14.9	-332.9	71.90	16 12.3	59 22.4	II. N.
25	L	11 6.22	2.378	7 17 28.18	152.92	18 33 2.1	427.2	71.03	16 8.9	59 10.0	
25	U	23 34.36	2.311	7 47 39.36	148.88	16 59 9.1	509.4	70.03	16 4.8	58 55.0	
26	L	12 1.66	2.240	8 17 0.49	144.61	15 10 9.1	578.3	68.97	16 0.1	58 37.7	
27	U	0 28.11	2.169	8 45 30.11	140.33	+13 8 43.4	-633.7	67.91	15 54.8	58 18.4	
27	L	12 53.73	2.101	9 13 9.30	136.24	10 57 33.3	675.8	66.89	15 49.1	57 57.5	
28	U	1 18.55	2.038	9 40 1.14	132.47	8 39 13.8	705.4	65.94	15 43.1	57 35.5	I. N.
28	L	13 42.66	1.982	10 6 10.20	129.12	6 16 9.5	723.5	65.09	15 36.9	57 12.8	
29	U	2 6.16	1.935	10 31 42.01	126.26	+ 3 50 32.0	-731.1	64.37	15 30.7	56 50.0	I. N.
29	L	14 29.14	1.896	10 56 42.66	123.93	+ 1 24 19.5	729.4	63.78	15 24.6	56 27.4	
30	U	2 51.70	1.866	11 21 18.54	122.14	- 1 0 42.2	719.5	63.33	15 18.6	56 5.6	I. N.
30	L	15 13.96	1.845	11 45 36.07	120.88	3 22 59.9	702.3	63.02	15 13.0	55 45.0	
31	U	3 36.02	1.833	12 9 41.58	120.13	- 5 41 10.0	-678.4	62.85	15 7.8	55 25.9	I. N.
31	L	15 57.98	1.829	12 33 41.11	119.87	7 53 57.5	648.6	62.81	15 3.1	55 8.7	
1	U	4 19.94	1.832	12 57 40.37	120.08	10 0 13.5	613.2	62.89	14 59.0	54 53.5	I. N.
1	L	16 41.98	1.842	13 21 44.66	120.70	11 58 54.3	572.7	63.08	14 55.5	54 40.7	
2	U	5 4.18	1.859	13 45 58.70	121.09	-13 48 58.5	-527.2	63.36	14 52.7	54 30.4	I. N.
2	L	17 26.61	1.881	14 10 26.61	123.00	15 29 27.8	476.9	63.72	14 50.6	54 22.7	
3	U	5 49.33	1.907	14 35 11.76	124.56	16 59 24.1	421.7	64.13	14 49.2	54 17.7	I. N.
3	L	18 12.38	1.935	15 0 16.67	126.29	18 17 50.9	361.9	64.58	14 48.6	54 15.5	
4	U	6 35.78	1.965	15 25 42.90	128.10	-19 23 52.7	-297.5	65.05	14 48.8	54 16.0	I. N.
4	L	18 59.54	1.995	15 51 30.97	129.91	20 16 35.4	228.8	65.50	14 49.6	54 19.2	
5	U	7 23.66	2.024	16 17 40.31	131.63	20 55 8.6	156.1	65.92	14 51.2	54 25.0	I. N.
5	L	19 48.11	2.050	16 44 9.26	133.16	21 18 46.8	79.7	66.30	14 53.5	54 33.3	
6	U	8 12.83	2.071	17 10 55.19	134.44	-21 26 51.3	- 0.6	66.60	14 56.4	54 43.9	I. N.
6	L	20 37.78	2.087	17 37 54.63	135.41	21 18 52.9	+ 80.6	66.82	14 59.8	54 56.5	
7	U	9 2.89	2.097	18 5 3.55	136.02	20 54 33.7	162.7	66.94	15 3.8	55 11.0	I. N.S.
7	L	21 28.09	2.101	18 32 17.67	136.28	20 13 49.4	244.6	66.97	15 8.2	55 27.1	
8	U	9 53.30	2.100	18 59 32.79	136.20	-19 16 50.7	+324.9	66.92	15 12.9	55 44.4	I. N.S.
8	L	22 18.47	2.094	19 26 45.22	135.84	18 4 3.6	402.4	66.79	15 17.9	56 2.7	
9	U	10 43.54	2.084	19 53 51.99	135.26	16 36 10.3	475.6	66.62	15 23.0	56 21.6	I. N.S.
9	L	23 8.48	2.073	20 20 51.08	134.57	14 54 8.0	543.6	66.43	15 28.2	56 40.7	
10	U	11 33.29	2.061	20 47 41.69	133.86	-12 59 9.0	+605.1	66.23	15 33.4	56 59.7	I. N.S.
10	L	23 57.96	2.051	21 14 24.16	133.23	10 52 38.1	658.8	66.06	15 38.4	57 18.3	
11	U	12 22.52	2.043	21 40 59.97	132.77	8 36 12.3	704.0	65.94	15 43.3	57 36.1	II. N.
12	L	0 47.01	2.040	22 7 31.71	132.57	6 11 39.1	739.9	65.90	15 47.9	57 52.9	
12	U	13 11.49	2.042	22 34 2.94	132.70	- 3 40 55.2	+765.7	65.95	15 52.1	58 8.4	II. N.
13	L	1 36.03	2.050	23 0 37.93	133.21	- 1 6 4.2	780.9	66.10	15 56.0	58 22.5	
13	U	14 0.72	2.066	23 27 21.58	134.14	+ 1 30 42.7	785.0	66.36	15 59.4	58 35.0	II. N.
14	L	2 25.64	2.089	23 54 19.10	135.52	4 7 9.5	777.5	66.74	16 2.3	58 45.9	
14	U	14 50.88	2.119	0 21 35.80	137.34	+ 6 40 55.3	+758.0	67.23	16 4.8	58 55.1	II. N.
15	L	3 16.52	2.156	0 49 16.78	139.55	9 9 35.7	726.5	67.82	16 6.9	59 2.6	
15	U	15 42.64	2.198	1 17 26.53	142.12	11 30 44.2	682.8	68.49	16 8.5	59 8.5	II. N.
16	L	4 9.30	2.245	1 46 8.65	144.98	13 41 53.5	626.7	69.22	16 9.7	59 12.9	
16	U	16 36.53	2.294	2 15 25.30	147.85	+15 40 38.8	+558.8	69.96	16 10.5	59 15.8	II. N.

Aug. 7, U Defective Illumination of S. 0°.07.
Aug. 8, U Defective Illumination of N. 0°.06.

Aug. 9, U Defective Illumination of N. 0°.01.
Aug. 10, U Defective Illumination of S. 0°.02.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semi- Pass- ing Me- ridian.	Geocen- tric Semi-di- ameter.	Equa- torial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	"	"	"	
Aug. 16	U	16 36.53	2.294	2 15 25.30	147.85	+15 40 38.8	+553.8	69.96	16 10.5	59 15.8	II. N.
17	L	5 4.34	2.341	2 45 16.81	150.71	17 24 40.4	479.7	70.67	16 10.9	59 17.2	
17	U	17 32.70	2.394	3 15 41.33	153.32	18 51 49.0	390.2	71.31	16 10.9	59 17.3	II. N.
18	L	6 1.54	2.420	3 46 34.59	155.47	20 0 10.3	292.1	71.83	16 10.5	59 16.0	
18	U	18 30.74	2.445	4 17 49.89	156.96	+20 48 12.2	+187.4	72.18	16 9.8	59 13.5	II. N.
19	L	7 0.17	2.456	4 49 18.44	157.65	21 14 50.2	+ 78.5	72.33	16 8.8	59 9.6	
19	U	19 29.64	2.483	5 20 49.95	157.44	21 19 31.8	- 31.5	72.26	16 7.4	59 4.4	II. N.
20	L	7 58.98	2.495	5 52 13.48	156.33	21 2 20.2	139.8	71.96	16 5.6	58 57.9	
20	U	20 28.01	2.402	6 23 18.44	154.37	+20 23 53.3	-243.6	71.46	16 3.4	58 49.9	II. N.
21	L	8 56.58	2.357	6 53 55.47	151.70	19 25 22.1	340.3	70.78	16 0.9	58 40.6	
21	U	21 24.56	2.304	7 23 57.11	148.50	18 8 24.6	427.7	69.97	15 57.9	58 29.8	II. S.
22	L	9 51.87	2.246	7 53 18.25	144.98	16 35 0.4	504.5	69.07	15 54.6	58 17.6	
22	U	22 18.45	2.185	8 21 56.16	141.33	+14 47 22.4	-599.8	68.14	15 50.9	58 4.1	II. S.
23	L	10 44.31	2.125	8 49 50.31	137.72	12 47 51.5	623.3	67.21	15 46.9	57 49.3	
23	U	23 9.47	2.068	9 17 2.10	134.29	10 38 50.1	665.0	66.32	15 42.5	57 33.3	
24	L	11 33.97	2.016	9 43 34.43	131.16	8 22 37.6	695.2	65.50	15 37.9	57 16.3	
24	U	23 57.88	1.970	10 9 31.36	128.40	+ 6 1 28.1	-714.6	64.78	15 33.1	56 58.6	
25	L	12 21.28	1.931	10 34 57.63	126.06	3 37 27.5	729.9	64.17	15 28.2	56 40.5	
26	U	0 44.26	1.900	10 59 58.46	124.17	+ 1 12 32.9	723.8	63.68	15 23.2	56 22.2	
26	L	13 6.91	1.876	11 24 39.29	122.72	- 1 11 28.1	715.1	63.31	15 18.2	56 4.0	
27	U	1 29.32	1.859	11 49 5.58	121.73	- 3 32 57.1	-698.5	63.07	15 13.3	55 46.2	I. N.
27	L	13 51.57	1.850	12 13 22.63	121.18	5 50 23.5	674.8	62.95	15 8.7	55 29.2	
28	U	2 13.75	1.848	12 37 35.54	121.04	8 2 25.5	644.5	62.94	15 4.4	55 13.3	I. N.
28	L	14 35.95	1.852	13 1 49.04	121.27	10 7 47.3	608.1	63.03	15 0.4	54 58.7	
29	U	2 58.22	1.862	13 26 7.47	121.85	-12 5 19.0	-566.2	63.22	14 56.9	54 45.8	I. N.
29	L	15 20.64	1.876	13 50 34.63	122.72	13 53 55.4	519.0	63.48	14 53.9	54 34.8	
30	U	3 43.26	1.894	14 15 13.77	123.84	15 32 35.8	466.9	63.81	14 51.5	54 25.9	I. N.
30	L	16 6.12	1.916	14 40 7.42	125.13	17 0 22.9	410.2	64.18	14 49.7	54 19.4	
31	U	4 29.25	1.940	15 5 17.41	126.55	-18 16 22.4	-349.0	64.58	14 48.6	54 15.4	I. N.
31	L	16 52.67	1.964	15 30 44.81	128.02	19 19 44.1	283.9	64.98	14 48.2	54 14.0	
Sept. 1	U	5 16.39	1.988	15 56 29.77	129.47	20 9 40.8	215.0	65.37	14 48.6	54 15.2	I. N.
1	L	17 40.38	2.011	16 22 31.68	130.83	20 45 30.1	142.7	65.73	14 49.7	54 19.3	
2	U	6 4.63	2.031	16 48 49.15	132.05	-21 6 34.9	- 67.7	66.05	14 51.6	54 26.2	I. N.
2	L	18 29.11	2.048	17 15 20.06	133.07	21 12 25.1	+ 9.6	66.31	14 54.2	54 35.7	
3	U	6 53.77	2.061	17 42 1.84	133.85	21 2 37.9	88.5	66.49	14 57.5	54 47.9	I. N.S.
3	L	19 18.56	2.070	18 8 51.60	134.39	20 36 59.9	168.0	66.61	15 1.5	55 2.7	
4	U	7 43.43	2.075	18 35 46.39	134.70	-19 55 28.4	+247.2	66.66	15 6.1	55 19.7	I. N.S.
4	L	20 8.34	2.076	19 2 43.42	134.78	18 58 11.7	325.3	66.65	15 11.3	55 38.8	
5	U	8 33.25	2.075	19 29 40.40	134.70	17 45 30.7	401.1	66.59	15 17.0	55 59.6	I. S.
5	L	20 58.14	2.072	19 56 35.67	134.50	16 17 58.9	473.5	66.51	15 23.1	56 21.9	
6	U	9 22.98	2.068	20 23 28.33	134.27	-14 36 23.8	+541.5	66.42	15 29.4	56 45.1	I. S.
6	L	21 47.77	2.065	20 50 18.45	134.09	12 41 45.6	603.8	66.34	15 35.9	57 8.9	
7	U	10 12.54	2.064	21 17 7.03	134.03	10 35 19.3	659.3	66.29	15 42.4	57 32.8	I. S.
7	L	22 37.32	2.066	21 43 55.96	134.16	8 18 33.4	706.9	66.30	15 48.8	57 56.2	
8	U	11 2.15	2.073	22 10 48.04	134.57	- 5 53 10.0	+745.3	66.39	15 54.9	58 18.5	I. N.S.

Sept. 3, U Defective Illumination of S. 0".58.
 Sept. 4, U Defective Illumination of N. 0".51.

Sept. 8, U Defective Illumination of N. 0".62.

R TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Me- ridian.	Geocen- tric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
8	U	11 2.15	2.073	22 10 48.04	134.57	- 5 53 10.0	+745.3	66.39	15 54.9	58 18.5	I. N.S.
8	L	23 27.09	2.085	22 37 46.76	135.28	3 21 5.3	773.6	66.56	16 0.6	58 39.4	
9	U	11 52.20	2.103	23 4 56.19	136.35	- 0 44 28.1	790.6	66.82	16 5.7	58 58.4	I. II. N.
0	L	0 17.57	2.127	23 32 20.77	137.81	+ 1 54 20.8	795.4	67.19	16 10.2	59 14.9	
0	U	12 43.27	2.157	0 0 5.05	139.64	+ 4 32 50.1	+787.2	67.67	16 14.0	59 28.7	II. N.
1	L	1 9.37	2.193	0 28 13.41	141.81	7 8 19.8	765.4	68.23	16 17.0	59 39.6	
1	U	13 35.93	2.234	0 56 49.68	144.28	9 38 4.6	729.6	68.86	16 19.1	59 47.4	II. N.
2	L	2 3.00	2.278	1 25 56.77	146.93	11 59 16.8	680.0	69.54	16 20.3	59 52.0	
2	U	14 30.61	2.323	1 55 36.26	149.65	+14 9 10.6	+616.8	70.24	16 20.8	59 53.6	II. N.
3	L	2 58.76	2.367	2 25 47.94	152.27	16 5 7.8	540.8	70.90	16 20.4	59 52.3	
3	U	15 27.40	2.406	2 56 29.48	154.59	17 44 43.6	453.4	71.49	16 19.3	59 48.3	II. N.
4	L	3 56.46	2.436	3 27 36.29	156.45	19 5 52.3	356.6	71.97	16 17.6	59 42.0	
4	U	16 25.83	2.456	3 59 1.55	157.64	+20 6 54.0	+252.7	72.28	16 15.3	59 33.6	II. N.
5	L	4 55.36	2.463	4 30 36.54	158.05	20 46 39.9	144.5	72.39	16 12.5	59 23.4	
5	U	17 24.89	2.455	5 2 11.23	157.59	21 4 35.1	+ 34.8	72.29	16 9.4	59 11.9	II. N.
6	L	5 54.24	2.433	5 33 35.19	156.26	21 0 40.6	- 73.4	71.98	16 6.0	58 59.3	
6	U	18 23.24	2.398	6 4 38.41	154.15	+20 35 31.8	-177.2	71.47	16 2.3	58 45.8	II. S.
7	L	6 51.75	2.352	6 35 12.18	151.38	19 50 14.2	274.5	70.79	15 58.5	58 31.7	
7	U	19 19.66	2.298	7 5 9.70	148.14	18 46 18.0	363.4	69.97	15 54.5	58 17.1	II. S.
8	L	7 46.89	2.240	7 34 26.40	144.61	17 25 32.0	442.6	69.07	15 50.4	58 2.3	
8	U	20 13.41	2.180	8 3 0.02	140.98	+15 49 56.1	-511.8	68.14	15 46.3	57 47.2	II. S.
9	L	8 39.21	2.120	8 30 50.31	137.42	14 1 36.9	569.8	67.21	15 42.2	57 32.0	
9	U	21 4.31	2.064	8 57 58.89	134.05	12 2 42.9	617.4	66.32	15 38.0	57 16.6	II. S.
10	L	9 28.77	2.013	9 24 28.76	130.98	9 55 20.5	654.6	65.50	15 33.8	57 1.2	
10	U	21 52.65	1.968	9 50 23.93	128.27	+ 7 41 32.3	-681.8	64.76	15 29.6	56 45.9	II. S.
11	L	10 16.04	1.930	10 15 49.09	125.98	5 23 16.0	699.4	64.13	15 25.4	56 30.5	
11	U	22 39.01	1.899	10 40 49.37	124.13	3 2 23.7	707.9	63.62	15 21.2	56 15.2	II. S.
12	L	11 1.65	1.876	11 5 30.04	122.72	+ 0 40 40.9	707.8	63.23	15 17.1	56 0.1	
12	U	23 24.06	1.860	11 29 56.34	121.74	- 1 40 12.2	-699.6	62.96	15 13.1	55 45.3	
13	L	11 46.31	1.850	11 54 13.38	121.17	3 58 41.0	683.9	62.80	15 9.2	55 30.8	
14	U	0 8.49	1.847	12 18 25.98	120.99	6 13 16.4	660.8	62.76	15 5.4	55 16.9	
14	L	12 30.67	1.850	12 42 38.58	121.17	8 22 34.7	631.0	62.82	15 1.8	55 3.7	
15	U	0 52.91	1.858	13 6 55.20	121.65	-10 25 16.4	-594.9	62.96	14 58.4	54 51.4	I. N.
15	L	13 15.28	1.871	13 31 19.30	122.40	12 20 7.4	552.7	63.18	14 55.4	54 40.1	
16	U	1 37.82	1.887	13 55 53.74	123.37	14 5 58.1	504.8	63.46	14 52.7	54 30.2	I. N.
16	L	14 0.57	1.905	14 20 40.72	124.48	15 41 43.3	451.8	63.79	14 50.4	54 21.8	
17	U	2 23.55	1.925	14 45 41.70	125.68	-17 6 23.2	-394.1	64.14	14 48.5	54 15.0	I. N.
17	L	14 46.78	1.946	15 10 57.39	126.93	18 19 2.8	331.9	64.50	14 47.2	54 10.1	
18	U	3 10.25	1.966	15 36 27.77	128.13	19 18 53.0	265.8	64.85	14 46.4	54 7.4	I. N.
18	L	15 33.95	1.984	16 2 12.03	129.23	20 5 11.1	196.7	65.17	14 46.3	54 6.9	
19	U	3 57.86	2.000	16 28 8.76	130.20	-20 37 21.2	-124.7	65.45	14 46.8	54 8.8	I. N.
19	L	16 21.94	2.013	16 54 16.04	130.99	20 54 54.8	- 50.6	65.68	14 48.0	54 13.2	
20	U	4 46.16	2.023	17 20 31.51	131.56	20 57 30.9	+ 24.8	65.85	14 49.9	54 20.3	I. N.
20	L	17 10.48	2.029	17 46 52.70	131.94	20 44 57.1	100.9	65.96	14 52.6	54 30.1	
1	U	5 34.85	2.032	18 13 17.19	132.12	-20 17 10.0	+176.9	66.02	14 56.0	54 42.0	I. S.

Sept. 8, U Defective Illumination of N. 0°.02.

Sept. 9, U Defective Illumination of II. 6°.01.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semi- Passing Meridian.	Geocen- tric Semi-di- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	"	"	"	
Oct. 1	U	5 34.85	2.032	18 13 17.19	132.12	-20 17 10.0	+176.9	66.02	14 56.0	54 42.6	I S
1	L	17 59.24	2.033	18 39 42.81	132.13	19 34 14.0	252.2	66.03	15 0.2	54 57.8	I S
2	U	6 23.62	2.031	19 6 7.88	132.03	18 36 22.9	326.0	65.99	15 5.0	55 15.6	I S
2	L	18 47.97	2.028	19 32 31.35	131.88	17 23 59.0	397.5	65.94	15 10.5	55 35.9	I S
3	U	7 12.29	2.026	19 58 52.94	131.74	-15 57 33.9	+466.1	65.89	15 16.7	55 58.4	I S
3	L	19 36.59	2.025	20 25 13.25	131.67	14 17 48.3	530.9	65.85	15 23.4	56 22.9	I S
4	U	8 0.90	2.026	20 51 33.73	131.77	12 25 32.4	590.9	65.84	15 30.5	56 49.0	I S
4	L	20 25.24	2.032	21 17 56.70	132.10	10 21 47.9	645.4	65.89	15 37.9	57 16.4	I S
5	U	8 49.68	2.042	21 44 25.30	132.73	-8 7 47.6	+693.4	66.02	15 45.6	57 44.4	I S
5	L	21 14.28	2.038	22 11 3.44	133.70	5 44 58.1	733.5	66.24	15 53.2	58 12.5	I S
6	U	9 39.11	2.081	22 37 55.56	135.00	3 15 0.3	764.5	66.55	16 0.7	58 40.1	I S
6	L	22 4.25	2.111	23 5 6.60	136.85	-0 39 51.2	785.1	66.98	16 7.9	59 6.4	I S
7	U	10 29.79	2.148	23 32 41.70	139.07	+1 58 15.6	+793.9	67.52	16 14.6	59 30.9	I S
7	L	22 55.82	2.191	0 0 45.91	141.70	4 36 50.2	789.5	68.16	16 20.5	59 52.8	I S
8	U	11 22.41	2.241	0 29 23.91	144.69	7 13 5.9	770.6	68.89	16 25.6	60 11.4	I N.S.
8	L	23 49.63	2.295	0 58 39.52	147.95	9 44 3.6	736.3	69.69	16 29.7	60 26.3	I N.S.
9	U	12 17.51	2.351	1 28 35.18	151.33	+12 6 35.5	+686.2	70.52	16 32.6	60 37.0	II N.
10	L	0 46.06	2.407	1 59 11.49	154.68	14 17 31.1	620.4	71.34	16 34.3	60 43.2	II N.
10	U	13 15.26	2.458	2 30 26.53	157.76	16 13 45.5	539.6	72.10	16 34.8	60 44.9	II N.
11	L	1 45.03	2.501	3 2 15.64	160.32	17 52 29.3	445.7	72.73	16 34.0	60 42.2	II N.
11	U	14 15.23	2.531	3 34 31.23	162.14	+19 11 19.2	+341.1	73.18	16 32.1	60 35.3	II N.
12	L	2 45.71	2.546	4 7 3.05	163.00	20 8 26.5	229.2	73.42	16 29.2	60 24.6	II N.
12	U	15 16.25	2.542	4 39 38.90	163.79	20 42 45.4	+113.6	73.41	16 25.4	60 10.6	II N.
13	L	3 46.64	2.520	5 12 5.70	161.49	20 53 56.4	-1.6	73.13	16 20.8	59 53.8	II N.S.
13	U	16 16.67	2.482	5 44 10.65	159.17	+20 42 24.2	-112.9	72.61	16 15.7	59 34.9	II N.S.
14	L	4 46.15	2.429	6 15 42.49	156.01	20 9 14.2	217.4	71.88	16 10.1	59 14.5	II S
14	U	17 14.93	2.366	6 46 32.33	152.22	19 16 3.3	312.8	70.98	16 4.3	58 53.1	II S
15	L	5 42.91	2.297	7 16 34.15	148.06	18 4 50.9	397.5	69.97	15 58.3	58 31.2	II S
15	U	18 10.05	2.225	7 45 44.86	143.74	+16 37 48.4	-471.0	68.90	15 52.3	58 9.2	II S
16	L	6 36.33	2.155	8 14 4.10	139.50	14 57 12.9	533.0	67.83	15 46.4	57 47.5	II S
16	U	19 1.78	2.088	8 41 33.75	135.49	13 5 19.6	584.1	66.81	15 40.7	57 26.4	II S
17	L	7 26.47	2.028	9 8 17.39	131.85	11 4 18.0	624.6	65.85	15 35.1	57 6.0	II S
17	U	19 50.47	1.974	9 34 19.83	128.65	+8 56 10.9	-655.1	64.99	15 29.8	56 46.5	II S
18	L	8 13.88	1.928	9 59 46.74	125.93	6 42 52.5	676.5	64.24	15 24.7	56 28.0	II S
18	U	20 36.81	1.892	10 24 44.09	123.72	4 26 9.2	689.4	63.63	15 20.0	56 10.5	II S
19	L	8 59.34	1.865	10 49 18.05	122.03	+2 7 40.4	694.2	63.15	15 15.5	55 54.1	II S
19	U	21 21.58	1.845	11 13 34.74	120.84	-0 11 0.7	-691.5	62.79	15 11.3	55 38.7	II S
20	L	9 43.64	1.833	11 37 40.02	120.13	2 28 26.0	681.5	62.57	15 7.4	55 24.4	II S
20	U	22 5.60	1.828	12 1 39.44	119.85	4 43 10.4	664.7	62.47	15 3.8	55 11.1	II S
21	L	10 27.55	1.830	12 25 38.08	119.99	6 53 53.1	641.2	62.48	15 0.4	54 58.7	II S
21	U	22 49.56	1.839	12 49 40.51	120.48	-8 59 15.2	-611.4	62.59	14 57.3	54 47.4	II S
22	L	11 11.69	1.852	13 13 50.66	121.27	10 58 0.8	575.2	62.79	14 54.5	54 37.1	II S
22	U	23 34.01	1.869	13 38 11.77	122.29	12 48 55.7	533.0	63.06	14 52.0	54 27.9	II S
23	L	11 56.55	1.889	14 2 46.29	123.49	14 30 49.5	485.0	63.37	14 49.8	54 19.8	II S
24	U	0 19.35	1.910	14 27 35.84	124.78	-16 2 34.8	-431.6	63.72	14 47.9	54 12.9	II S

Oct. 8, U Defective Illumination of S. 0°.04.

Oct. 13, U Defective Illumination of S. 0°.02.

MOON-CULMINATIONS, 1919.

535

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Me- ridian.	Geo- centric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
Oct. 24	U	0 19.35	1.910	14 27 35.84	124.78	-16 2 34.8	-431.6	63.72	14 47.9	54 12.9	
24	L	12 42.40	1.932	14 52 41.14	126.10	17 23 9.0	373.3	64.09	14 46.4	54 7.2	
25	U	1 5.71	1.953	15 18 1.99	127.36	18 31 35.0	310.4	64.44	14 45.2	54 2.9	I. N.
25	L	13 29.27	1.972	15 43 37.30	128.50	19 27 2.6	243.6	64.76	14 44.4	54 0.1	
26	U	1 53.03	1.988	16 9 25.20	129.45	-20 8 49.7	-173.7	65.04	14 44.1	53 59.0	I. N.
26	L	14 16.96	2.000	16 35 23.13	130.16	20 36 23.2	101.5	65.26	14 44.3	53 59.7	
27	U	2 41.00	2.007	17 1 28.08	130.61	20 49 19.3	-27.7	65.41	14 45.0	54 2.3	I. N.
27	L	15 5.11	2.010	17 27 36.81	130.80	20 47 25.2	+46.8	65.50	14 46.3	54 7.0	
28	U	3 29.23	2.009	17 53 46.18	130.73	-20 30 37.6	+121.1	65.52	14 48.2	54 13.9	I. S.
28	L	15 53.31	2.004	18 19 53.34	130.44	19 59 3.5	194.4	65.48	14 50.7	54 23.1	
29	U	4 17.32	1.997	18 45 56.02	129.98	19 12 58.4	266.1	65.39	14 53.9	54 34.8	I. S.
29	L	16 41.23	1.988	19 11 52.70	129.45	18 12 46.5	335.5	65.27	14 57.8	54 49.0	
30	U	5 5.03	1.979	19 37 42.79	128.90	-16 58 58.6	+402.0	65.14	15 2.3	55 5.7	I. S.
30	L	17 28.72	1.971	20 3 26.68	128.43	15 32 12.7	465.1	65.03	15 7.5	55 24.8	
31	U	5 52.34	1.966	20 29 5.79	128.12	13 53 11.9	524.3	64.96	15 13.4	55 46.4	I. S.
31	L	18 15.91	1.965	20 54 42.55	128.05	12 2 46.0	579.2	64.94	15 19.9	56 10.3	
Nov. 1	U	6 39.51	1.969	21 20 20.31	128.30	-10 1 50.9	+629.1	64.99	15 27.0	56 36.2	I. S.
1	L	19 3.19	1.979	21 46 3.35	128.94	7 51 30.2	673.3	65.14	15 34.5	57 3.9	
2	U	7 27.04	1.997	22 11 56.69	130.03	5 32 56.0	711.1	65.40	15 42.4	57 33.0	I. S.
2	L	19 51.16	2.024	22 38 6.03	131.62	3 7 32.1	741.5	65.79	15 50.6	58 3.0	
3	U	8 15.65	2.059	23 4 37.57	133.74	-0 36 55.1	+763.1	66.31	15 58.9	58 33.4	I. S.
3	L	20 40.61	2.103	23 31 37.79	136.40	+1 57 2.1	774.6	66.95	16 7.1	59 3.4	
4	U	9 6.16	2.156	23 59 13.24	139.60	4 32 9.2	774.5	67.73	16 15.0	59 32.3	I. S.
4	L	21 32.40	2.218	0 27 30.11	143.29	7 5 56.3	761.0	68.62	16 22.4	59 59.4	
5	U	9 59.41	2.286	0 56 33.81	147.39	+9 35 34.0	+732.6	69.60	16 29.0	60 23.8	I. S.
5	L	22 27.27	2.358	1 26 28.32	151.74	11 57 55.8	688.2	70.64	16 34.7	60 44.7	
6	U	10 56.01	2.431	1 57 15.52	156.13	14 9 42.7	626.8	71.68	16 39.2	61 1.3	I. N.S.
6	L	23 25.61	2.501	2 28 54.40	160.29	16 7 31.2	548.5	72.66	16 42.4	61 13.2	
7	U	11 55.99	2.561	3 1 20.42	163.93	+17 48 4.8	+454.5	73.51	16 44.2	61 19.7	II. N.S.
8	L	0 27.01	2.607	3 34 25.17	166.70	19 8 27.3	347.2	74.17	16 44.5	61 20.8	
8	U	12 58.47	2.634	4 7 56.43	168.30	20 6 18.5	230.0	74.56	16 43.3	61 16.5	II. N.S.
9	L	1 30.13	2.638	4 41 39.07	168.56	20 40 6.2	+107.4	74.64	16 40.7	61 6.9	
9	U	14 1.69	2.619	5 15 16.26	167.40	+20 49 14.5	-15.7	74.40	16 36.8	60 52.5	II. N.S.
10	L	2 32.88	2.577	5 48 31.36	164.90	20 34 6.3	134.7	73.85	16 31.8	60 34.0	
10	U	15 3.46	2.517	6 21 9.48	161.28	19 55 56.8	245.4	73.04	16 25.8	60 12.0	II. S.
11	L	3 33.23	2.443	6 52 58.89	156.84	18 56 44.0	344.8	72.02	16 19.1	59 47.4	
11	U	16 2.06	2.361	7 23 51.74	151.91	+17 38 53.6	-431.4	70.86	16 11.9	59 20.9	II. S.
12	L	4 29.89	2.276	7 53 44.08	146.81	16 5 5.8	504.4	69.64	16 4.4	58 53.4	
12	U	16 56.70	2.193	8 22 35.51	141.80	14 18 3.6	563.8	68.42	15 56.8	58 25.5	II. S.
13	L	5 22.54	2.115	8 50 28.47	137.09	12 20 24.4	610.6	67.24	15 49.2	57 57.7	
13	U	17 47.49	2.044	9 17 27.51	132.84	+10 14 34.6	-645.9	66.16	15 41.8	57 30.7	II. S.
14	L	6 11.63	1.982	9 43 38.59	129.12	8 2 46.6	670.3	65.20	15 34.8	57 4.8	
14	U	18 35.10	1.930	10 9 8.51	125.98	5 47 0.0	685.8	64.37	15 28.1	56 40.2	II. S.
15	L	6 58.00	1.888	10 34 4.46	123.45	3 29 1.1	692.7	63.68	15 21.8	56 17.2	
15	U	19 20.45	1.856	10 58 33.71	121.53	+1 10 25.1	-692.1	63.14	15 16.0	55 56.0	II. S.

Nov. 6, U Defective Illumination of N. 0°.76.
Nov. 7, U Defective Illumination of S. 0°.12.

Nov. 8, U Defective Illumination of S. 0°.59.
Nov. 9, U Defective Illumination of S. 0°.50.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Meridian.	Geocen- tric Semid- iameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	" "	" "	" "	" "	" "	
Nov. 15	U	19 20.45	1.856	10 58 33.71	121.53	+ 1 10 25.1	-692.1	63.14	15 16.0	55 56.0	II. S.
16	L	7 42.58	1.834	11 22 43.35	120.18	- 1 7 20.9	684.5	62.75	15 10.8	55 36.7	
16	U	20 4.49	1.821	11 46 40.17	119.38	3 22 57.2	670.5	62.51	15 6.0	55 19.2	II. S.
17	L	8 26.30	1.816	12 10 30.49	119.09	5 35 8.7	650.4	62.40	15 1.7	55 3.6	
17	U	20 48.10	1.819	12 34 20.15	119.27	- 7 42 43.3	-624.4	62.41	14 58.0	54 49.7	II. S.
18	L	9 9.97	1.828	12 58 14.35	119.84	9 44 31.1	592.6	62.53	14 54.7	54 37.6	
18	U	21 31.99	1.843	13 22 17.51	120.75	11 39 23.6	555.1	62.74	14 51.8	54 27.2	II. S.
19	L	9 54.22	1.863	13 46 33.34	121.93	13 26 12.9	512.1	63.03	14 49.4	54 18.4	
19	U	22 16.71	1.886	14 11 4.58	123.30	-15 3 52.2	-463.6	63.37	14 47.5	54 11.2	II. S.
20	L	10 39.49	1.910	14 35 52.98	124.78	16 31 16.8	409.7	63.74	14 45.9	54 5.4	
20	U	23 2.56	1.935	15 0 59.28	126.27	17 47 24.7	330.9	64.11	14 44.7	54 1.0	
21	L	11 25.92	1.958	15 26 23.06	127.68	18 51 18.5	287.4	64.47	14 43.8	53 57.9	
21	U	23 49.54	1.979	15 52 2.85	128.92	-19 42 7.1	-220.0	64.79	14 43.4	53 56.2	
22	L	12 13.39	1.996	16 17 56.17	129.92	20 19 7.4	149.5	65.06	14 43.3	53 55.9	
23	U	0 37.42	2.007	16 43 59.78	130.62	20 41 45.8	76.6	65.25	14 43.6	53 56.9	
23	L	13 1.55	2.013	17 10 9.79	130.98	20 49 40.2	- 2.3	65.36	14 44.2	53 59.3	
24	U	1 25.72	2.014	17 36 22.09	131.00	-20 42 40.7	+ 72.2	65.39	14 45.3	54 3.2	I. S.
24	L	13 49.85	2.009	18 2 32.57	130.70	20 20 49.1	146.1	65.34	14 46.8	54 8.7	
25	U	2 13.90	1.999	18 28 37.55	130.10	19 44 19.3	218.4	65.22	14 48.7	54 15.8	I. S.
25	L	14 37.80	1.985	18 54 34.06	129.29	18 53 36.1	288.3	65.05	14 51.2	54 24.7	
26	U	3 1.53	1.969	19 20 19.99	128.36	-17 49 13.9	+354.9	64.84	14 54.1	54 35.4	I. S.
26	L	15 25.07	1.953	19 45 54.40	127.38	16 31 54.4	417.7	64.62	14 57.5	54 48.0	
27	U	3 48.42	1.938	20 11 17.45	126.47	15 2 25.8	476.3	64.42	15 1.5	55 2.6	I. S.
27	L	16 11.60	1.926	20 36 30.44	125.73	13 21 41.4	530.3	64.25	15 6.0	55 19.3	
28	U	4 34.66	1.918	21 1 35.94	125.24	-11 30 38.2	+579.4	64.14	15 11.1	55 38.1	I. S.
28	L	16 57.65	1.915	21 26 37.47	125.08	9 30 17.0	623.2	64.12	15 16.8	55 58.9	
29	U	5 20.65	1.919	21 51 39.54	125.34	7 21 43.3	661.4	64.20	15 23.0	56 21.7	I. S.
29	L	17 43.75	1.932	22 16 47.58	126.08	5 6 6.6	693.6	64.40	15 29.7	56 46.3	
30	U	6 7.05	1.953	22 42 7.66	127.36	- 2 44 43.4	+719.1	64.74	15 36.9	57 12.6	I. S.
30	L	18 30.66	1.984	23 7 46.56	129.22	- 0 18 58.6	737.0	65.22	15 44.4	57 40.3	
Dec. 1	U	6 54.71	2.025	23 33 51.47	131.70	+ 2 9 32.0	746.5	65.85	15 52.2	58 8.9	I. S.
1	L	19 19.31	2.077	0 0 29.80	134.80	4 38 59.4	746.3	66.63	16 0.2	58 38.0	
2	U	7 44.59	2.138	0 27 48.97	138.50	+ 7 7 18.1	+734.8	67.54	16 8.1	59 7.1	I. S.
2	L	20 10.66	2.209	0 55 55.92	142.74	9 32 4.8	710.7	68.58	16 15.8	59 35.4	
3	U	8 37.63	2.287	1 24 56.62	147.43	11 50 37.9	672.3	69.71	16 23.1	60 2.1	I. S.
3	L	21 5.56	2.369	1 54 55.34	152.38	13 59 58.1	618.4	70.88	16 29.8	60 26.5	
4	U	9 34.48	2.452	2 25 53.85	157.35	+15 56 53.7	+548.1	72.04	16 35.6	60 47.8	I. S.
4	L	22 4.37	2.529	2 57 50.54	162.02	17 38 7.6	461.5	73.12	16 40.3	61 5.1	
5	U	10 35.13	2.596	3 30 39.68	166.03	19 0 29.7	359.8	74.04	16 43.7	61 17.7	I. S.
5	L	23 6.60	2.645	4 4 11.09	169.01	20 1 13.4	245.6	74.71	16 45.7	61 25.2	
6	U	11 38.53	2.672	4 38 10.43	170.64	+20 38 10.3	+122.7	75.08	16 46.2	61 27.1	I. N.S.
7	L	0 10.64	2.674	5 12 20.27	170.73	20 50 5.1	- 3.9	75.10	16 45.2	61 23.3	
7	U	12 42.60	2.649	5 46 21.78	169.26	20 36 44.9	128.8	74.77	16 42.7	61 13.9	II. N.S.
8	L	1 14.13	2.601	6 19 56.80	166.26	19 58 59.8	247.1	74.12	16 38.7	60 59.3	
8	U	13 44.96	2.534	6 52 49.75	162.30	+18 58 35.6	-354.7	73.19	16 33.4	60 40.1	II. S.

Dec. 6, U Defective Illumination of N. 0° 57.

Dec. 7, U Defective Illumination of N. 0° 56.

MOON-CULMINATIONS, 1919.

537

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Pass- ing Me- ridian.	Geocen- tric Semidi- ameter.	Equa- torial Hori- zontal Parallax.	Bright Limbs.
		h m	m	h m s	s	" ' "	"	s	' "	' "	
ec. 9	L	2 14.89	2.453	7 24 48.87	157.46	+17 38 0.7	-448.6	72.07	16 27.1	60 17.0	
9	U	14 43.81	2.366	7 55 46.91	152.19	16 0 9.6	527.3	70.84	16 20.0	59 50.8	II. S.
10	L	3 11.66	2.277	8 25 40.87	146.82	14 8 7.5	590.5	69.57	16 12.3	59 22.4	
10	U	15 38.46	2.191	8 54 31.42	141.65	12 4 57.0	638.9	68.32	16 4.2	58 52.6	II. S.
11	L	4 4.26	2.111	9 22 22.15	136.88	+ 9 53 29.7	-673.5	67.15	15 55.9	58 22.1	
11	U	16 29.16	2.040	9 49 18.54	132.62	7 36 21.1	606.0	66.08	15 47.6	57 51.7	II. S.
12	L	4 53.27	1.979	10 15 27.38	128.96	5 15 49.1	707.7	65.15	15 39.5	57 22.1	
12	U	17 16.71	1.929	10 40 56.08	125.93	2 53 53.5	710.1	64.37	15 31.7	56 53.6	II. S.
13	L	5 39.62	1.890	11 5 52.35	123.55	+ 0 32 18.6	-704.4	63.75	15 24.4	56 26.8	
13	U	18 2.11	1.860	11 30 23.78	121.79	- 1 47 24.4	691.6	63.28	15 17.7	56 2.0	II. S.
14	L	6 24.31	1.841	11 54 37.68	120.63	4 3 55.4	672.4	62.96	15 11.5	55 39.3	
14	U	18 46.33	1.831	12 18 41.00	120.01	6 16 1.8	647.6	62.78	15 5.9	55 18.8	II. S.
15	L	7 8.28	1.829	12 42 40.09	119.91	- 8 22 36.9	-617.4	62.73	15 1.0	55 0.8	
15	U	19 30.26	1.835	13 6 40.74	120.26	10 22 37.2	581.9	62.80	14 56.7	54 45.2	II. S.
16	L	7 52.35	1.847	13 30 48.02	121.01	12 15 2.2	541.3	62.97	14 53.1	54 31.9	
16	U	20 14.62	1.865	13 55 6.19	122.07	13 58 51.6	496.0	63.22	14 50.1	54 21.0	II. S.
17	L	8 37.13	1.887	14 19 38.59	123.37	-15 33 6.4	-445.7	63.54	14 47.8	54 12.3	
17	U	20 59.91	1.911	14 44 27.61	124.82	16 56 48.7	390.6	63.89	14 46.0	54 5.8	II. S.
18	L	9 22.99	1.936	15 9 34.49	126.33	18 9 2.0	330.9	64.25	14 44.7	54 1.2	
18	U	21 46.37	1.960	15 34 59.32	127.80	19 8 52.9	266.9	64.60	14 44.0	53 58.6	II. S.
19	L	10 10.03	1.982	16 0 41.07	129.13	-19 55 32.4	-199.1	64.92	14 43.8	53 57.7	
19	U	22 33.93	2.001	16 26 37.55	130.24	20 28 18.7	128.1	65.18	14 44.0	53 58.4	II. S.
20	L	10 58.03	2.014	16 52 45.66	131.05	20 46 38.3	- 54.8	65.37	14 44.6	54 0.6	
20	U	23 22.26	2.022	17 19 1.47	131.52	20 50 8.3	+ 20.0	65.48	14 45.6	54 4.2	
21	L	11 46.54	2.024	17 45 20.71	131.63	-20 38 37.7	+ 95.1	65.50	14 46.9	54 9.2	
22	U	0 10.81	2.019	18 11 38.93	131.36	20 12 9.2	169.5	65.43	14 48.6	54 15.4	
22	L	12 34.99	2.009	18 37 51.97	130.77	19 30 58.2	242.0	65.28	14 50.6	54 22.7	
23	U	0 59.02	1.995	19 3 56.25	129.91	18 35 32.3	311.8	65.07	14 52.9	54 31.2	I. S.
23	L	13 22.86	1.978	19 29 49.02	128.87	-17 26 31.2	+377.8	64.82	14 55.6	54 40.9	
24	U	1 46.49	1.959	19 55 28.64	127.74	16 4 43.6	439.3	64.55	14 58.5	54 51.7	I. S.
24	L	14 9.89	1.941	20 20 54.66	126.61	14 31 6.8	495.9	64.29	15 1.8	55 3.8	
25	U	2 33.07	1.924	20 46 7.74	125.60	12 46 43.8	547.0	64.05	15 5.4	55 17.1	I. S.
25	L	14 56.07	1.910	21 11 9.85	124.79	-10 52 42.4	+592.2	63.87	15 9.4	55 31.6	
26	U	3 18.94	1.902	21 36 3.98	124.28	8 50 14.3	631.4	63.77	15 13.7	55 47.5	I. S.
26	L	15 41.74	1.900	22 0 54.14	124.15	6 40 34.3	604.2	63.77	15 18.4	56 4.7	
27	U	4 4.56	1.905	22 25 45.27	124.46	4 24 59.9	690.3	63.88	15 23.4	56 23.2	I. S.
27	L	16 27.49	1.918	22 50 43.02	125.27	- 2 4 52.8	+709.6	64.12	15 28.8	56 43.0	
28	U	4 50.63	1.941	23 15 53.73	126.63	+ 0 18 20.7	721.4	64.49	15 34.5	57 4.0	I. S.
28	L	17 14.10	1.973	23 41 24.20	128.56	2 43 7.8	725.0	65.02	15 40.6	57 26.2	
29	U	5 38.02	2.015	0 7 21.58	131.11	5 7 47.2	719.9	65.69	15 46.9	57 49.4	I. S.
29	L	18 2.51	2.067	0 33 53.12	134.25	+ 7 30 27.7	+705.0	66.50	15 53.4	58 13.2	
30	U	6 27.68	2.129	1 1 5.83	137.96	9 49 5.4	679.3	67.44	16 0.0	58 37.3	I. S.
30	L	18 53.65	2.199	1 29 6.13	142.16	12 1 23.5	641.6	68.48	16 6.5	59 1.3	
31	U	7 20.49	2.275	1 57 59.25	146.73	14 4 51.6	590.8	69.59	16 12.9	59 24.8	I. S.
31	L	19 48.26	2.354	2 27 48.60	151.49	+15 56 47.2	+526.1	70.73	16 19.0	59 47.0	

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.
	h m	h m s	" ' "	"	"	"		h m	h m s	" ' "	"
Jan. 1	22 29	17 13 25.57	-20 30 46.5	9.8	3.7	0.26	Feb. 15	23 55	21 37 36.43	-16 23 23.3	6.3
2	22 27	17 16 9.68	20 41 45.4	9.5	3.6	0.26	16	23 58	21 44 29.67	15 48 39.3	6.3
3	22 27	17 19 16.76	20 53 18.2	9.3	3.5	0.25	18	0 1	21 51 23.62	15 12 29.7	6.3
4	22 26	17 22 44.56	21 5 12.5	9.1	3.5	0.25	19	0 4	21 58 18.29	14 34 54.6	6.3
5	22 26	17 26 31.02	21 17 16.7	8.9	3.4	0.24	20	0 7	22 5 13.62	13 55 54.8	6.3
6	22 26	17 30 34.30	-21 29 20.8	8.8	3.3	0.24	21	0 10	22 12 9.59	-13 15 30.8	6.4
7	22 26	17 34 52.73	21 41 15.7	8.6	3.3	0.23	22	0 13	22 19 6.16	12 33 4 5	6.4
8	22 27	17 39 24.84	21 52 52.9	8.4	3.2	0.23	23	0 16	22 26 3.30	11 50 34.2	6.4
9	22 28	17 44 9.33	22 4 5.6	8.3	3.2	0.23	24	0 19	22 33 0.91	11 6 4.3	6.4
10	22 29	17 49 5.00	22 14 47.1	8.1	3.1	0.22	25	0 22	22 39 58.90	10 20 15.6	6.5
11	22 30	17 54 10.81	-22 24 51.8	8.0	3.0	0.22	26	0 25	22 46 57.14	-9 33 10.6	6.5
12	22 31	17 59 25.85	22 34 14.5	7.9	3.0	0.22	27	0 28	22 53 55.46	8 44 51.9	6.5
13	22 33	18 4 49.27	22 42 50.7	7.8	3.0	0.21	28	0 31	23 0 53.65	7 55 22.9	6.6
14	22 34	18 10 20.35	22 50 36.5	7.7	2.9	0.21	Mar. 1	0 34	23 7 51.42	7 4 47.9	6.6
15	22 36	18 15 58.40	22 57 28.2	7.6	2.9	0.21	2	0 37	23 14 48.44	6 13 11.7	6.7
16	22 38	18 21 42.84	-23 3 22.6	7.5	2.8	0.21	3	0 40	23 21 44.31	-5 20 40.1	6.7
17	22 40	18 27 33.13	23 8 16.9	7.4	2.8	0.20	4	0 43	23 28 38.48	4 27 19.8	6.8
18	22 42	18 33 28.79	23 12 8.3	7.3	2.8	0.20	5	0 46	23 35 30.36	3 33 19.1	6.9
19	22 44	18 39 29.36	23 14 54.7	7.2	2.7	0.20	6	0 49	23 42 19.23	2 38 46.6	7.0
20	22 46	18 45 34.46	23 16 34.1	7.1	2.7	0.20	7	0 51	23 49 4.27	1 43 52.8	7.1
21	22 48	18 51 43.72	-23 17 4.4	7.1	2.7	0.19	8	0 54	23 55 44.49	-0 48 49.3	7.2
22	22 50	18 57 56.79	23 16 23.8	7.0	2.7	0.19	9	0 57	0 2 18.81	+0 6 11.0	7.3
23	22 53	19 4 13.40	23 14 31.0	6.9	2.6	0.19	10	0 59	0 8 45.96	1 0 53.8	7.5
24	22 55	19 10 33.24	23 11 24.4	6.9	2.6	0.19	11	1 2	0 15 4.65	1 55 4.4	7.6
25	22 57	19 16 56.06	23 7 2.9	6.8	2.6	0.19	12	1 4	0 21 13.44	2 48 26.4	7.8
26	23 0	19 23 21.64	-23 1 25.4	6.8	2.6	0.19	13	1 6	0 27 10.74	+3 40 43.2	7.9
27	23 2	19 29 49.75	22 54 30.5	6.7	2.6	0.19	14	1 8	0 32 54.97	4 31 37.7	8.1
28	23 5	19 36 20.18	22 46 17.5	6.7	2.5	0.18	15	1 9	0 38 24.50	5 20 52.5	8.3
29	23 7	19 42 52.76	22 36 45.4	6.7	2.5	0.18	16	1 10	0 43 37.66	6 8 10.8	8.5
30	23 10	19 49 27.31	22 25 53.3	6.6	2.5	0.18	17	1 11	0 48 32.84	6 53 15.7	8.7
31	23 13	19 56 3.68	-22 13 40.8	6.6	2.5	0.18	18	1 12	0 53 8.45	+7 35 51.7	9.0
Feb. 1	23 15	20 2 41.73	22 0 6.8	6.5	2.5	0.18	19	1 12	0 57 23.04	8 15 43.7	9.2
2	23 18	0 9 21.31	21 45 10.9	6.5	2.5	0.18	20	1 12	1 1 15.21	8 52 37.9	9.5
3	23 21	20 16 2.33	21 28 52.6	6.5	2.5	0.18	21	1 12	1 4 43.75	9 26 21.4	9.8
4	23 24	20 22 44.64	21 11 11.1	6.4	2.4	0.17	22	1 11	1 7 47.59	9 56 42.8	10.1
5	23 26	20 29 28.19	-20 52 6.2	6.4	2.4	0.17	23	1 10	1 10 25.82	+10 23 31.7	10.4
6	23 29	20 36 12.86	20 31 37.2	6.4	2.4	0.17	24	1 8	1 12 37.78	10 46 39.0	10.8
7	23 32	20 42 58.60	20 9 43.8	6.4	2.4	0.17	25	1 6	1 14 22.96	11 5 56.9	11.1
8	23 35	20 49 45.33	19 46 25.7	6.4	2.4	0.17	26	1 3	1 15 41.19	11 21 18.8	11.4
9	23 38	20 56 32.98	19 21 42.4	6.3	2.4	0.17	27	1 0	1 16 32.48	11 32 39.6	11.8
10	23 41	21 3 21.53	-18 55 33.8	6.3	2.4	0.17	28	0 57	1 16 57.20	+11 39 55.8	12.1
11	23 43	21 10 10.94	18 27 59.6	6.3	2.4	0.17	29	0 53	1 16 55.99	11 43 6.0	12.5
12	23 46	21 17 1.15	17 58 59.6	6.3	2.4	0.17	30	0 48	1 16 29.86	11 42 10.6	12.8
13	23 49	21 23 52.14	17 28 33.4	6.3	2.4	0.17	31	0 43	1 15 40.12	11 37 12.9	13.1
14	23 52	21 30 43.91	16 56 41.3	6.3	2.4	0.17	Apr. 1	0 38	1 14 28.44	11 28 18.5	13.4
15	23 55	21 37 36.43	-16 23 23.3	6.3	2.4	0.17	2	0 33	1 12 56.89	+11 15 36.7	13.7
16	23 58	21 44 29.67	-15 48 39.3	6.3	2.4	0.17	3	0 27	1 11 7.81	+10 59 19.7	14.0

MERCURY, 1919.

539

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m	h m s	" ' "	" "	" "	s		h m	h m s	" ' "	" "	" "	s
pr. 1	0 38	1 14 28.44	+11 28 18.5	13.4	5.1	0.35	May 16	22 27	2 4 6.42	+9 34 23.2	8.6	3.3	0.22
2	0 33	1 12 56.89	11 15 36.7	13.7	5.2	0.36	17	22 29	2 9 39.29	10 8 54.0	8.5	3.2	0.22
3	0 27	1 11 7.81	10 59 19.7	14.0	5.3	0.36	18	22 30	2 15 21.64	10 44 14.5	8.4	3.2	0.21
4	0 21	1 9 3.85	10 39 43.6	14.3	5.4	0.37	19	22 32	2 21 13.62	11 20 20.4	8.2	3.1	0.21
5	0 15	1 6 47.89	10 17 7.6	14.5	5.5	0.37	20	22 34	2 27 15.41	11 57 7.0	8.1	3.1	0.21
6	0 9	1 4 23.01	+9 51 54.2	14.7	5.6	0.38	21	22 37	2 33 27.23	+12 34 29.6	8.0	3.0	0.21
7	0 2	1 1 52.38	9 24 29.1	14.9	5.6	0.38	22	22 39	2 39 49.29	13 12 23.0	7.9	3.0	0.20
7	23 56	0 59 19.19	8 55 19.9	15.0	5.7	0.38	23	22 42	2 46 21.85	13 50 41.8	7.8	2.9	0.20
8	23 49	0 56 46.59	8 24 55.6	15.1	5.7	0.39	24	22 44	2 53 5.15	14 29 20.2	7.6	2.9	0.20
9	23 43	0 54 17.57	7 53 46.3	15.2	5.8	0.39	25	22 47	2 59 59.44	15 8 11.9	7.5	2.9	0.20
10	23 37	0 51 54.95	+7 22 21.3	15.2	5.8	0.39	26	22 50	3 7 4.97	+15 47 10.0	7.4	2.8	0.20
11	23 30	0 49 41.25	6 51 9.7	15.2	5.8	0.39	27	22 54	3 14 21.95	16 26 7.3	7.3	2.8	0.19
12	23 24	0 47 38.68	6 20 38.0	15.1	5.7	0.38	28	22 57	3 21 50.60	17 4 55.6	7.3	2.8	0.19
13	23 19	0 45 49.17	5 51 10.8	15.0	5.7	0.38	29	23 1	3 29 31.04	17 43 26.2	7.2	2.7	0.19
14	23 13	0 44 14.25	5 23 9.6	14.9	5.7	0.38	30	23 5	3 37 23.39	18 21 29.9	7.1	2.7	0.19
15	23 8	0 42 55.18	+4 56 53.2	14.8	5.6	0.38	31	23 9	3 45 27.63	+18 58 56.5	7.0	2.7	0.19
16	23 3	0 41 52.85	4 32 37.1	14.6	5.6	0.37	June 1	23 13	3 53 43.67	19 35 35.2	6.9	2.6	0.19
17	22 58	0 41 7.87	4 10 33.8	14.4	5.5	0.37	2	23 18	4 2 11.32	20 11 14.7	6.9	2.6	0.19
18	22 54	0 40 40.60	3 50 52.7	14.3	5.4	0.36	3	23 23	4 10 50.20	20 45 43.1	6.8	2.6	0.19
19	22 50	0 40 31.19	3 33 40.8	14.1	5.3	0.36	4	23 27	4 19 39.82	21 18 47.8	6.8	2.6	0.18
20	22 46	0 40 39.56	+3 19 2.1	13.8	5.3	0.35	5	23 32	4 28 39.50	+21 50 16.8	6.8	2.6	0.18
21	22 42	0 41 5.48	3 6 59.6	13.6	5.2	0.35	6	23 38	4 37 48.38	22 19 57.3	6.7	2.5	0.18
22	22 39	0 41 48.65	2 57 33.5	13.4	5.1	0.34	7	23 43	4 47 5.42	22 47 37.6	6.7	2.5	0.18
23	22 36	0 42 48.61	2 50 43.0	13.2	5.0	0.33	8	23 48	4 56 29.45	23 13 6.1	6.7	2.5	0.18
24	22 34	0 44 4.83	2 46 26.0	12.9	4.9	0.33	9	23 54	5 5 59.11	23 36 12.5	6.7	2.5	0.18
25	22 31	0 45 36.81	+2 44 39.8	12.7	4.8	0.32	10	23 59	5 15 32.94	+23 56 47.7	6.6	2.5	0.18
26	22 29	0 47 23.93	2 45 20.4	12.5	4.7	0.32	12	0 5	5 25 9.38	24 14 44.2	6.6	2.5	0.19
27	22 27	0 49 25.62	2 48 23.9	12.2	4.6	0.31	13	0 11	5 34 46.84	24 29 56.3	6.7	2.5	0.19
28	22 26	0 51 41.28	2 53 45.7	12.0	4.6	0.30	14	0 17	5 44 23.71	24 42 19.9	6.7	2.5	0.19
29	22 24	0 54 10.36	3 1 20.9	11.8	4.5	0.30	15	0 22	5 53 58.43	24 51 53.0	6.7	2.5	0.19
30	22 23	0 56 52.30	+3 11 4.7	11.6	4.4	0.29	16	0 28	6 3 29.48	+24 58 35.5	6.7	2.6	0.19
May 1	22 22	0 59 46.58	3 22 52.1	11.3	4.3	0.29	17	0 33	6 12 55.47	25 2 28.6	6.8	2.6	0.19
2	22 21	1 2 52.71	3 36 38.3	11.1	4.2	0.28	18	0 39	6 22 15.13	25 3 35.6	6.8	2.6	0.19
3	22 20	1 6 10.23	3 52 18.1	10.9	4.1	0.28	19	0 44	6 31 27.28	25 2 0.8	6.9	2.6	0.19
4	22 20	1 9 38.77	4 9 47.1	10.7	4.1	0.27	20	0 49	6 40 30.95	24 57 49.6	6.9	2.6	0.19
5	22 20	1 13 17.94	+4 29 0.4	10.5	4.0	0.27	21	0 54	6 49 25.27	+24 51 8.4	7.0	2.7	0.20
6	22 19	1 17 7.40	4 49 53.3	10.3	3.9	0.26	22	0 59	6 58 9.51	24 42 4.5	7.1	2.7	0.20
7	22 19	1 21 6.89	5 12 21.4	10.1	3.8	0.26	23	1 3	7 6 43.08	24 30 45.1	7.1	2.7	0.20
8	22 20	1 25 16.15	5 36 20.4	9.9	3.8	0.25	24	1 8	7 15 5.52	24 17 18.2	7.2	2.7	0.20
9	22 20	1 29 35.00	6 1 45.9	9.8	3.7	0.25	25	1 12	7 23 16.44	24 1 51.7	7.3	2.8	0.20
10	22 21	1 34 3.26	+6 28 33.9	9.6	3.6	0.24	26	1 16	7 31 15.58	+23 44 33.7	7.4	2.8	0.20
11	22 21	1 38 40.82	6 56 40.0	9.4	3.6	0.24	27	1 20	7 39 2.74	23 25 32.1	7.5	2.8	0.21
12	22 22	1 43 27.58	7 26 0.4	9.3	3.5	0.24	28	1 23	7 46 37.77	23 4 54.9	7.6	2.9	0.21
13	22 23	1 48 23.52	7 56 30.8	9.1	3.4	0.23	29	1 27	7 54 0.62	22 42 49.7	7.7	2.9	0.21
14	22 24	1 53 28.61	8 28 7.5	8.9	3.4	0.23	30	1 30	8 1 11.25	22 19 24.1	7.8	3.0	0.21
15	22 26	1 58 42.89	+9 0 46.2	8.8	3.3	0.23	July 1	1 33	8 8 9.64	+21 54 45.3	7.9	3.0	0.21
16	22 27	2 4 6.42	+9 34 23.2	8.6	3.3	0.22	2	1 36	8 14 55.82	+21 29 0.4	8.0	3.0	0.22

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
July 1	1 33	8 8 9.64	+21 54 45.3	7.9	3.0	0.21	Aug. 15	23 51	9 26 38.70	+10 21 50.4	14.2	5.4	0.37
2	1 36	8 14 55.82	21 29 0.4	8.0	3.0	0.22	16	23 44	9 23 50.69	10 45 57.8	14.0	5.3	0.36
3	1 39	8 21 29.84	21 2 16.1	8.1	3.1	0.22	17	23 37	9 21 15.40	11 10 36.5	13.8	5.3	0.36
4	1 41	8 27 51.72	20 34 39.2	8.2	3.1	0.22	18	23 31	9 18 56.30	11 35 23.0	13.6	5.2	0.35
5	1 43	8 34 1.52	20 6 15.9	8.4	3.2	0.22	19	23 25	9 16 56.59	11 59 53.9	13.3	5.1	0.35
6	1 45	8 39 59.32	+19 37 12.3	8.5	3.2	0.23	20	23 20	9 15 19.22	+12 23 47.0	13.1	5.0	0.34
7	1 47	8 45 45.13	19 7 34.4	8.6	3.3	0.23	21	23 14	9 14 6.75	12 46 40.3	12.8	4.8	0.33
8	1 49	8 51 18.99	18 37 28.3	8.7	3.3	0.23	22	23 10	9 13 21.40	13 8 13.1	12.4	4.7	0.32
9	1 50	8 56 40.92	18 6 59.4	8.9	3.4	0.24	23	23 6	9 13 4.95	13 28 6.6	12.1	4.6	0.32
10	1 51	9 1 50.92	17 36 13.3	9.0	3.4	0.24	24	23 2	9 13 18.73	13 46 3.3	11.8	4.5	0.31
11	1 52	9 6 48.94	+17 5 15.7	9.2	3.5	0.24	25	22 59	9 14 3.69	+14 1 47.3	11.5	4.3	0.30
12	1 53	9 11 34.97	16 34 11.9	9.3	3.5	0.25	26	22 56	9 15 20.33	14 15 4.5	11.1	4.2	0.29
13	1 54	9 16 8.91	16 3 7.2	9.5	3.6	0.25	27	22 54	9 17 8.79	14 25 41.9	10.8	4.1	0.28
14	1 54	9 20 30.69	15 32 7.1	9.6	3.7	0.25	28	22 52	9 19 28.80	14 33 28.5	10.5	4.0	0.27
15	1 54	9 24 40.15	15 1 17.1	9.8	3.7	0.26	29	22 51	9 22 19.74	14 38 14.8	10.2	3.9	0.27
16	1 54	9 28 37.16	+14 30 42.4	10.0	3.8	0.26	30	22 51	9 25 40.68	+14 39 52.6	9.9	3.7	0.26
17	1 54	9 32 21.51	14 0 28.9	10.2	3.9	0.26	31	22 50	9 29 30.36	14 38 15.9	9.6	3.6	0.25
18	1 54	9 35 52.96	13 30 41.9	10.3	3.9	0.27	Sept. 1	22 51	9 33 47.23	14 33 20.3	9.3	3.5	0.24
19	1 53	9 39 11.27	13 1 27.6	10.5	4.0	0.27	2	22 52	9 38 29.54	14 25 3.3	9.0	3.4	0.24
20	1 52	9 42 16.15	12 32 51.6	10.7	4.1	0.28	3	22 53	9 43 35.27	14 13 24.5	8.8	3.3	0.23
21	1 51	9 45 7.25	+12 5 0.2	10.9	4.1	0.28	4	22 54	9 49 2.30	+13 58 25.4	8.5	3.2	0.22
22	1 50	9 47 44.21	11 37 59.7	11.1	4.2	0.29	5	22 56	9 54 48.34	13 40 9.9	8.3	3.2	0.22
23	1 48	9 50 6.64	11 11 56.9	11.3	4.3	0.29	6	22 58	10 0 51.10	13 18 43.8	8.1	3.1	0.21
24	1 46	9 52 14.10	10 46 58.5	11.5	4.4	0.30	7	23 0	10 7 8.19	12 54 14.8	7.9	3.0	0.21
25	1 44	9 54 6.14	10 23 11.7	11.7	4.5	0.30	8	23 3	10 13 37.32	12 26 52.2	7.7	2.9	0.20
26	1 42	9 55 42.30	+10 0 43.8	11.9	4.5	0.31	9	23 6	10 20 16.27	+11 56 46.8	7.6	2.9	0.20
27	1 39	9 57 2.08	9 39 42.6	12.1	4.6	0.31	10	23 9	10 27 2.96	11 24 10.8	7.4	2.8	0.19
28	1 37	9 58 5.01	9 20 15.8	12.4	4.7	0.32	11	23 11	10 33 55.45	10 49 16.7	7.3	2.8	0.19
29	1 33	9 58 50.60	9 2 31.7	12.6	4.8	0.32	12	23 14	10 40 52.00	10 12 17.7	7.2	2.7	0.18
30	1 30	9 59 18.42	8 46 38.5	12.8	4.9	0.33	13	23 17	10 47 51.07	9 33 27.0	7.1	2.7	0.18
31	1 26	9 59 28.09	+8 32 44.6	13.0	4.9	0.33	14	23 21	10 54 51.31	+8 52 57.6	7.0	2.6	0.18
Aug. 1	1 22	9 59 19.28	8 20 57.7	13.2	5.0	0.34	15	23 24	11 1 51.59	8 11 2.1	6.9	2.6	0.17
2	1 18	9 58 51.80	8 11 26.2	13.4	5.1	0.34	16	23 27	11 8 50.94	7 27 52.6	6.8	2.6	0.17
3	1 13	9 58 5.57	8 4 17.2	13.6	5.2	0.35	17	23 30	11 15 48.61	6 43 40.5	6.7	2.5	0.17
4	1 8	9 57 0.67	7 59 37.7	13.8	5.2	0.35	18	23 33	11 22 43.97	5 58 36.3	6.6	2.5	0.17
5	1 3	9 55 37.42	+7 57 33.4	14.0	5.3	0.36	19	23 36	11 29 36.56	+5 12 49.8	6.6	2.5	0.17
6	0 57	9 53 56.37	7 58 9.0	14.1	5.4	0.36	20	23 38	11 36 26.01	4 26 29.7	6.5	2.5	0.17
7	0 51	9 51 58.34	8 1 27.6	14.3	5.4	0.36	21	23 41	11 43 12.09	3 39 44.4	6.5	2.5	0.16
8	0 45	9 49 44.48	8 7 29.9	14.4	5.4	0.37	22	23 44	11 49 54.63	2 52 41.0	6.4	2.4	0.16
9	0 39	9 47 16.32	8 16 14.7	14.5	5.5	0.37	23	23 47	11 56 33.57	2 5 26.0	6.4	2.4	0.16
10	0 32	9 44 35.69	+8 27 38.2	14.5	5.5	0.37	24	23 49	12 3 8.89	+1 18 5.5	6.4	2.4	0.16
11	0 25	9 41 44.83	8 41 33.6	14.6	5.5	0.37	25	23 52	12 9 40.61	+0 30 44.6	6.3	2.4	0.16
12	0 18	9 38 46.37	8 57 51.2	14.6	5.5	0.37	26	23 54	12 16 8.81	-0 16 31.9	6.3	2.4	0.16
13	0 11	9 35 43.20	9 16 18.4	14.5	5.5	0.37	27	23 57	12 22 33.59	1 3 39.7	6.3	2.4	0.16
14	0 4	9 32 38.55	9 36 39.7	14.5	5.5	0.37	28	23 59	12 28 55.07	1 50 35.1	6.3	2.4	0.16
14 23 57	9 29 35.87	+9 58 37.0	14.4	5.4	0.37		30	0 2	12 35 13.41	-2 37 14.7	6.2	2.4	0.16
15 23 51	9 26 38.70	+10 21 50.4	14.2	5.4	0.37	Oct. 1	0 4	12 41 28.76	-3 23 35.5	6.2	2.4	0.16	

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
ct. 1	0 4	12 41 28.75	- 3 23 35.5	6.2	2.4	0.16	Nov. 16	1 17	16 55 56.91	-25 11 34.2	9.4	3.6	0.26
2	0 6	12 47 41.29	4 9 34.7	6.2	2.4	0.16	17	1 16	16 59 2.73	25 11 31.5	9.6	3.7	0.27
3	0 8	12 53 51.16	4 55 9.9	6.2	2.4	0.16	18	1 15	17 143.65	25 9 36.4	9.9	3.7	0.28
4	0 11	12 59 58.57	5 40 18.9	6.2	2.4	0.16	19	1 13	17 3 56.61	25 5 44.6	10.1	3.8	0.28
5	0 13	13 6 3.67	6 24 59.5	6.2	2.4	0.16	20	1 11	17 5 38.41	24 59 50.8	10.4	3.9	0.29
6	0 15	13 12 6.66	7 9 9.9	6.2	2.4	0.16	21	1 8	17 6 45.77	-24 51 49.8	10.6	4.0	0.30
7	0 17	13 18 7.70	7 52 48.3	6.2	2.4	0.16	22	1 5	17 7 15.46	24 41 35.5	10.9	4.1	0.30
8	0 19	13 24 6.96	8 35 53.4	6.2	2.4	0.16	23	1 0	17 7 4.46	24 29 1.9	11.2	4.3	0.31
9	0 21	13 30 4.60	9 18 23.3	6.3	2.4	0.16	24	0 56	17 6 10.21	24 14 3.3	11.5	4.4	0.32
10	0 23	13 36 0.78	10 0 16.8	6.3	2.4	0.16	25	0 50	17 4 30.93	23 56 34.8	11.8	4.5	0.33
11	0 25	13 41 55.65	-10 41 32.5	6.3	2.4	0.16	26	0 44	17 2 5.94	-23 36 33.6	12.0	4.6	0.33
12	0 27	13 47 49.35	11 22 9.0	6.3	2.4	0.16	27	0 37	16 58 56.04	23 14 0.2	12.3	4.7	0.34
13	0 29	13 53 42.03	12 2 5.3	6.3	2.4	0.16	28	0 29	16 55 3.85	22 49 0.7	12.5	4.7	0.34
14	0 31	13 59 33.80	12 41 20.0	6.3	2.4	0.17	29	0 20	16 50 34.03	22 21 48.1	12.7	4.8	0.35
15	0 33	14 5 24.75	13 19 51.7	6.4	2.4	0.17	30	0 11	16 45 33.40	21 52 44.5	12.8	4.9	0.35
16	0 34	14 11 15.01	-13 57 39.4	6.4	2.4	0.17	Dec. 1	0 2	16 40 10.72	-21 22 21.7	12.9	4.9	0.35
17	0 36	14 17 4.65	14 34 42.0	6.4	2.4	0.17	1	23 53	16 34 36.27	20 51 20.9	13.0	4.9	0.35
18	0 38	14 22 53.74	15 10 57.9	6.5	2.5	0.17	2	23 43	16 29 1.17	20 20 30.8	12.9	4.9	0.35
19	0 40	14 28 42.34	15 46 26.2	6.5	2.5	0.17	3	23 34	16 23 36.57	19 50 43.9	12.9	4.9	0.35
20	0 42	14 34 30.50	16 21 5.5	6.5	2.5	0.17	4	23 25	16 18 32.78	19 22 52.2	12.7	4.8	0.34
21	0 44	14 40 18.23	-16 54 54.5	6.6	2.5	0.17	5	23 16	16 13 58.66	-18 57 42.7	12.5	4.8	0.34
22	0 46	14 46 5.54	17 27 52.1	6.6	2.5	0.18	6	23 8	16 10 1.09	18 35 53.7	12.3	4.7	0.33
23	0 47	14 51 52.40	17 59 56.5	6.7	2.5	0.18	7	23 1	16 6 44.85	18 17 52.1	12.0	4.6	0.32
24	0 49	14 57 38.80	18 31 6.8	6.7	2.5	0.18	8	22 55	16 4 12.66	18 3 53.4	11.7	4.5	0.31
25	0 51	15 3 24.66	19 1 21.3	6.8	2.6	0.18	9	22 49	16 2 25.42	17 54 1.6	11.4	4.4	0.30
26	0 53	15 9 9.88	-19 30 38.6	6.8	2.6	0.18	10	22 44	16 1 22.55	-17 48 11.4	11.2	4.2	0.30
27	0 55	15 14 54.35	19 58 57.2	6.9	2.6	0.19	11	22 40	16 1 2.40	17 46 10.2	10.9	4.1	0.29
28	0 57	15 20 37.93	20 26 15.5	6.9	2.6	0.19	12	22 36	16 1 22.54	17 47 39.9	10.6	4.0	0.28
29	0 58	15 26 20.41	20 52 31.8	7.0	2.7	0.19	13	22 33	16 2 20.15	17 52 19.7	10.3	3.9	0.27
30	1 0	15 32 1.58	21 17 44.6	7.1	2.7	0.19	14	22 31	16 3 52.14	17 59 47.0	10.0	3.8	0.27
31	1 2	15 37 41.13	-21 41 52.0	7.2	2.7	0.20	15	22 29	16 5 55.45	-18 9 38.8	9.8	3.7	0.26
Nov. 1	1 3	15 43 18.75	22 4 52.3	7.3	2.8	0.20	16	22 28	16 8 27.06	18 21 32.9	9.5	3.6	0.25
2	1 5	15 48 54.08	22 26 43.5	7.3	2.8	0.20	17	22 27	16 11 24.15	18 35 8.3	9.3	3.5	0.25
3	1 7	15 54 26.63	22 47 23.9	7.4	2.8	0.20	18	22 26	16 14 44.12	18 50 5.4	9.1	3.4	0.24
4	1 8	15 59 55.91	23 6 51.2	7.5	2.9	0.21	19	22 26	16 18 24.57	19 6 6.3	8.9	3.4	0.24
5	1 10	16 5 21.30	-23 25 3.6	7.6	2.9	0.21	20	22 26	16 22 23.36	-19 22 55.0	8.7	3.3	0.23
6	1 11	16 10 42.12	23 41 58.8	7.8	3.0	0.22	21	22 26	16 26 38.57	19 40 16.9	8.5	3.2	0.23
7	1 12	16 15 57.58	23 57 34.6	7.9	3.0	0.22	22	22 27	16 31 8.49	19 57 59.1	8.3	3.2	0.22
8	1 14	16 21 6.78	24 11 48.8	8.0	3.0	0.22	23	22 27	16 35 51.63	20 15 50.3	8.2	3.1	0.22
9	1 15	16 26 8.69	24 24 39.0	8.1	3.1	0.23	24	22 28	16 40 46.63	20 33 40.1	8.0	3.1	0.22
10	1 16	16 31 2.11	-24 36 2.8	8.3	3.2	0.23	25	22 30	16 45 52.34	-20 51 19.7	7.9	3.0	0.21
11	1 16	16 35 45.74	24 45 57.4	8.5	3.2	0.24	26	22 31	16 51 7.74	21 8 41.2	7.8	2.9	0.21
12	1 17	16 40 18.06	24 54 20.2	8.6	3.3	0.24	27	22 32	16 56 31.91	21 25 37.4	7.7	2.9	0.21
13	1 17	16 44 37.35	25 1 8.5	8.8	3.3	0.25	28	22 34	17 2 4.03	21 42 2.3	7.5	2.9	0.21
14	1 17	16 48 41.73	25 6 19.0	9.0	3.4	0.25	29	22 36	17 7 43.43	21 57 50.3	7.4	2.8	0.20
15	1 17	16 52 29.05	-25 9 48.8	9.2	3.5	0.26	30	22 37	17 13 29.47	-22 12 56.5	7.3	2.8	0.20
16	1 17	16 55 56.91	-25 11 34.2	9.4	3.6	0.26	31	22 39	17 19 21.61	-22 27 16.6	7.2	2.7	0.20

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension. °	Apparent Declination. °	Hor. Par. "	Semidiam. "	S. T. of Sem. Pass. Mer. s	Date.	Wash. Mean Time.	Apparent Right Ascension. °	Apparent Declination. °	Hor. Par. "	Semidiam. "	S. T. of Sem. Pass. Mer. s
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 1	0 44	19 25 32.46	-23 4 5.1	5.2	5.1	0.37	Feb. 16	1 32	23 15 8.56	-6 18 33.7	5.6	5.5	0.36
2	0 46	19 30 57.78	22 54 30.2	5.2	5.1	0.37	17	1 33	23 19 42.97	5 48 18.8	5.6	5.5	0.36
3	0 47	19 36 22.27	22 44 13.3	5.2	5.1	0.37	18	1 34	23 24 16.75	5 17 54.7	5.6	5.5	0.37
4	0 49	19 41 45.88	22 33 14.8	5.3	5.1	0.37	19	1 34	23 28 49.92	4 47 22.2	5.6	5.5	0.37
5	0 50	19 47 8.54	22 21 35.2	5.3	5.1	0.37	20	1 35	23 33 22.53	4 16 42.2	5.7	5.5	0.37
6	0 51	19 52 30.22	-22 9 14.9	5.3	5.1	0.37	21	1 35	23 37 54.63	-3 45 55.2	5.7	5.5	0.37
7	0 53	19 57 50.86	21 56 14.6	5.3	5.1	0.37	22	1 36	23 42 26.24	3 15 2.1	5.7	5.5	0.37
8	0 54	20 3 10.44	21 42 34.8	5.3	5.1	0.37	23	1 37	23 46 57.43	2 44 3.6	5.7	5.5	0.37
9	0 56	20 8 28.91	21 28 16.1	5.3	5.1	0.37	24	1 37	23 51 28.24	2 13 0.5	5.7	5.6	0.37
10	0 57	20 13 46.24	21 13 19.0	5.3	5.1	0.37	25	1 38	23 55 58.69	1 41 53.5	5.7	5.6	0.37
11	0 58	20 19 2.40	-20 57 44.1	5.3	5.1	0.37	26	1 38	0 0 28.84	-1 10 43.3	5.7	5.6	0.37
12	1 0	20 24 17.36	20 41 32.1	5.3	5.1	0.37	27	1 39	0 4 58.74	0 39 30.6	5.8	5.6	0.37
13	1 1	20 29 31.11	20 24 43.8	5.3	5.1	0.37	28	1 39	0 9 28.41	-0 8 16.3	5.8	5.6	0.37
14	1 2	20 34 43.62	20 7 19.6	5.3	5.2	0.37	Mar. 1	1 40	0 13 57.91	+0 22 58.9	5.8	5.6	0.38
15	1 3	20 39 54.86	19 49 20.1	5.3	5.2	0.37	2	1 40	0 18 27.27	0 54 14.2	5.8	5.6	0.38
16	1 5	20 45 4.84	-19 30 46.1	5.3	5.2	0.37	3	1 41	0 22 56.54	+1 25 29.0	5.8	5.7	0.38
17	1 6	20 50 13.52	19 11 38.3	5.3	5.2	0.37	4	1 42	0 27 25.75	1 56 42.4	5.8	5.7	0.38
18	1 7	20 55 20.92	18 51 57.4	5.3	5.2	0.37	5	1 42	0 31 54.93	2 27 53.7	5.8	5.7	0.38
19	1 8	21 0 27.02	18 31 44.2	5.3	5.2	0.37	6	1 43	0 36 24.13	2 59 2.1	5.9	5.7	0.38
20	1 9	21 5 31.80	18 10 59.3	5.4	5.2	0.37	7	1 43	0 40 53.40	3 30 7.0	5.9	5.7	0.38
21	1 10	21 10 35.30	-17 49 43.4	5.4	5.2	0.37	8	1 44	0 45 22.76	+4 1 7.5	5.9	5.7	0.38
22	1 11	21 15 37.48	17 27 57.4	5.4	5.2	0.37	9	1 44	0 49 52.26	4 32 2.9	5.9	5.7	0.38
23	1 13	21 20 38.36	17 5 42.0	5.4	5.2	0.37	10	1 45	0 54 21.95	5 252.5	6.0	5.8	0.38
24	1 14	21 25 37.96	16 42 58.0	5.4	5.2	0.36	11	1 45	0 58 51.84	5 33 35.7	6.0	5.8	0.39
25	1 15	21 30 36.26	16 19 46.1	5.4	5.2	0.36	12	1 46	1 3 21.97	6 4 11.6	6.0	5.8	0.39
26	1 16	21 35 33.28	-15 56 7.1	5.4	5.2	0.36	13	1 47	1 7 52.42	+6 34 39.4	6.0	5.8	0.39
27	1 17	21 40 29.04	15 32 1.8	5.4	5.2	0.36	14	1 47	1 12 23.21	7 4 58.5	6.0	5.8	0.39
28	1 18	21 45 23.54	15 7 30.9	5.4	5.3	0.36	15	1 48	1 16 54.37	7 35 8.3	6.0	5.9	0.39
29	1 18	21 50 16.80	14 42 35.3	5.4	5.3	0.36	16	1 48	1 21 25.94	8 5 7.8	6.0	5.9	0.39
30	1 19	21 55 8.83	14 17 15.7	5.4	5.3	0.36	17	1 49	1 25 57.96	8 34 56.4	6.1	5.9	0.40
31	1 20	21 59 59.66	-13 51 33.0	5.4	5.3	0.36	18	1 49	1 30 30.48	+9 4 33.5	6.1	5.9	0.40
Feb. 1	1 21	22 4 49.31	13 25 28.0	5.4	5.3	0.36	19	1 50	1 35 3.53	9 33 58.3	6.1	5.9	0.40
2	1 22	22 9 37.77	12 59 1.4	5.5	5.3	0.36	20	1 51	1 39 37.14	10 3 10.1	6.1	5.9	0.40
3	1 23	22 14 25.09	12 32 14.1	5.5	5.3	0.36	21	1 51	1 44 11.36	10 32 7.9	6.1	6.0	0.40
4	1 24	22 19 11.29	12 5 7.0	5.5	5.3	0.36	22	1 52	1 48 46.22	11 0 51.2	6.2	6.0	0.41
5	1 24	22 23 56.38	-11 37 40.6	5.5	5.3	0.36	23	1 53	1 53 21.74	+11 29 19.3	6.2	6.0	0.41
6	1 25	22 28 40.40	11 9 56.0	5.5	5.3	0.36	24	1 53	1 57 57.97	11 57 31.5	6.2	6.0	0.41
7	1 26	22 33 23.38	10 41 53.7	5.5	5.4	0.36	25	1 54	2 2 34.93	12 25 26.9	6.2	6.1	0.41
8	1 27	22 38 5.35	10 13 34.8	5.5	5.4	0.36	26	1 55	2 7 12.65	12 53 4.9	6.3	6.1	0.42
9	1 28	22 42 46.32	9 45 0.0	5.5	5.4	0.36	27	1 55	2 11 51.16	13 20 24.7	6.3	6.1	0.42
10	1 28	22 47 26.35	-9 16 9.9	5.5	5.4	0.36	28	1 56	2 16 30.50	+13 47 25.5	6.3	6.1	0.42
11	1 29	22 52 5.45	8 47 5.4	5.6	5.4	0.36	29	1 57	2 21 10.66	14 14 6.6	6.3	6.1	0.42
12	1 30	22 56 43.68	8 17 47.3	5.6	5.4	0.36	30	1 57	2 25 51.69	14 40 27.3	6.3	6.2	0.42
13	1 30	23 1 21.07	7 48 16.4	5.6	5.4	0.36	31	1 58	2 30 33.60	15 6 26.8	6.4	6.2	0.43
14	1 31	23 5 57.65	7 18 33.3	5.6	5.4	0.36	Apr. 1	1 59	2 35 16.42	15 32 4.5	6.4	6.2	0.43
15	1 32	23 10 33.47	-6 48 38.8	5.6	5.4	0.36	2	2 0	2 40 0.15	+15 57 19.4	6.4	6.2	0.43
16	1 32	23 15 8.56	-6 18 33.7	5.6	5.5	0.36	3	2 0	2 44 44.78	+16 22 10.9	6.4	6.3	0.44

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
pr. 1	1 59	2 35 16.42	+15 32 4.5	6.4	6.2	0.43	May 17	2 48	6 25 42.38	+25 33 54.8	8.1	7.9	0.58
2	2 0	2 40 0.15	15 57 19.4	6.4	6.2	0.43	18	2 49	6 30 46.76	25 31 47.4	8.2	8.0	0.59
3	2 0	2 44 44.78	16 22 10.9	6.4	6.3	0.44	19	2 50	6 35 50.35	25 28 59.0	8.3	8.0	0.59
4	2 1	2 49 30.36	16 46 38.3	6.5	6.3	0.44	20	2 51	6 40 53.09	25 25 30.0	8.3	8.1	0.60
5	2 2	2 54 16.89	17 10 40.8	6.5	6.3	0.44	21	2 52	6 45 54.92	25 21 20.6	8.4	8.1	0.60
6	2 3	2 59 4.36	+17 34 17.7	6.5	6.3	0.44	22	2 53	6 50 55.77	+25 16 31.2	8.4	8.2	0.60
7	2 4	3 3 52.79	17 57 28.3	6.6	6.4	0.45	23	2 54	6 55 55.57	25 11 2.2	8.5	8.3	0.61
8	2 5	3 8 42.17	18 20 11.9	6.6	6.4	0.45	24	2 55	7 0 54.27	25 4 53.7	8.5	8.3	0.61
9	2 6	3 13 32.51	18 42 27.8	6.6	6.4	0.45	25	2 56	7 5 51.80	24 58 6.3	8.6	8.4	0.61
10	2 7	3 18 23.81	19 4 15.3	6.6	6.5	0.46	26	2 57	7 10 48.11	24 50 40.2	8.7	8.4	0.62
11	2 7	3 23 16.06	+19 25 33.8	6.7	6.5	0.46	27	2 58	7 15 43.13	+24 42 35.9	8.7	8.5	0.62
12	2 8	3 28 9.28	19 46 22.5	6.7	6.5	0.46	28	2 59	7 20 36.81	24 33 53.9	8.8	8.6	0.63
13	2 9	3 33 3.44	20 6 40.8	6.7	6.5	0.47	29	3 0	7 25 29.08	24 24 34.9	8.9	8.6	0.63
14	2 10	3 37 58.54	20 26 28.0	6.8	6.6	0.47	30	3 1	7 30 19.89	24 14 39.0	8.9	8.7	0.63
15	2 11	3 42 54.58	20 45 43.5	6.8	6.6	0.47	31	3 2	7 35 9.19	24 4 7.0	9.0	8.8	0.64
16	2 12	3 47 51.53	+21 4 26.7	6.8	6.6	0.47	June 1	3 3	7 39 56.90	+23 52 59.4	9.1	8.8	0.64
17	2 13	3 52 49.39	21 22 36.9	6.9	6.7	0.48	2	3 4	7 44 42.96	23 41 16.9	9.2	8.9	0.65
18	2 14	3 57 48.13	21 40 13.5	6.9	6.7	0.48	3	3 5	7 49 27.34	23 29 0.0	9.2	9.0	0.65
19	2 15	4 2 47.75	21 57 16.0	6.9	6.7	0.48	4	3 5	7 54 10.00	23 16 9.3	9.3	9.0	0.66
20	2 17	4 7 48.21	22 13 43.7	6.9	6.8	0.49	5	3 6	7 58 50.88	23 2 45.5	9.4	9.1	0.66
21	2 18	4 12 49.50	+22 29 36.2	7.0	6.8	0.49	6	3 7	8 3 29.92	+22 48 49.3	9.5	9.2	0.67
22	2 19	4 17 51.58	22 44 52.8	7.0	6.8	0.49	7	3 7	8 8 7.09	22 34 21.1	9.5	9.3	0.67
23	2 20	4 22 54.42	22 59 33.1	7.1	6.9	0.50	8	3 8	8 12 42.35	22 19 21.9	9.6	9.4	0.67
24	2 21	4 27 57.99	23 13 36.4	7.1	6.9	0.50	9	3 9	8 17 15.66	22 3 52.3	9.7	9.4	0.68
25	2 22	4 33 2.26	23 27 2.4	7.1	6.9	0.50	10	3 9	8 21 46.98	21 47 52.8	9.8	9.5	0.68
26	2 23	4 38 7.18	+23 39 50.6	7.2	7.0	0.51	11	3 10	8 26 16.29	+21 31 24.3	9.9	9.6	0.69
27	2 24	4 43 12.70	23 52 0.5	7.2	7.0	0.51	12	3 10	8 30 43.54	21 14 27.4	10.0	9.7	0.69
28	2 25	4 48 18.80	24 3 31.7	7.2	7.0	0.52	13	3 11	8 35 8.71	20 57 2.8	10.1	9.8	0.70
29	2 27	4 53 25.42	24 14 23.8	7.3	7.1	0.52	14	3 11	8 39 31.79	20 39 11.3	10.2	9.9	0.70
30	2 28	4 58 32.49	24 24 36.5	7.3	7.1	0.52	15	3 12	8 43 52.72	20 20 53.6	10.3	10.0	0.71
ay 1	2 29	5 3 39.98	+24 34 9.2	7.4	7.2	0.53	16	3 12	8 48 11.50	+20 2 10.4	10.4	10.1	0.71
2	2 30	5 8 47.81	24 43 1.9	7.4	7.2	0.53	17	3 13	8 52 28.10	19 43 2.5	10.5	10.2	0.72
3	2 31	5 13 55.93	24 51 14.3	7.4	7.2	0.53	18	3 13	8 56 42.50	19 23 30.6	10.6	10.3	0.72
4	2 33	5 19 4.26	24 58 46.0	7.5	7.3	0.54	19	3 13	9 0 54.69	19 3 35.5	10.7	10.4	0.73
5	2 34	5 24 12.75	25 5 36.7	7.5	7.3	0.54	20	3 13	9 5 4.65	18 43 17.8	10.8	10.5	0.73
6	2 35	5 29 21.33	+25 11 46.3	7.6	7.4	0.54	21	3 13	9 9 12.35	+18 22 38.3	10.9	10.6	0.74
7	2 36	5 34 29.94	25 17 14.7	7.6	7.4	0.55	22	3 13	9 13 17.78	18 1 37.7	11.0	10.7	0.75
8	2 37	5 39 38.51	25 22 1.6	7.7	7.5	0.55	23	3 14	9 17 20.93	17 40 16.9	11.1	10.8	0.75
9	2 39	5 44 46.96	25 26 7.2	7.7	7.5	0.55	24	3 14	9 21 21.76	17 18 36.7	11.2	10.9	0.76
10	2 40	5 49 55.24	25 29 31.1	7.8	7.6	0.56	25	3 14	9 25 20.28	16 56 37.8	11.3	11.0	0.77
11	2 41	5 55 3.28	+25 32 13.3	7.8	7.6	0.56	26	3 14	9 29 16.45	+16 34 20.9	11.4	11.1	0.77
12	2 42	6 0 10.99	25 34 14.0	7.9	7.7	0.57	27	3 14	9 33 10.25	16 11 46.9	11.6	11.2	0.78
13	2 43	6 5 18.32	25 35 33.1	7.9	7.7	0.57	28	3 13	9 37 1.66	15 48 56.7	11.7	11.4	0.79
14	2 44	6 10 25.18	25 36 10.6	8.0	7.8	0.57	29	3 13	9 40 50.64	15 25 51.1	11.8	11.5	0.80
15	2 45	6 15 31.53	25 36 6.7	8.0	7.8	0.58	30	3 13	9 44 37.17	15 2 30.8	11.9	11.6	0.80
16	2 47	6 20 37.29	+25 35 21.3	8.1	7.9	0.58	July 1	3 13	9 48 21.23	+14 38 56.8	12.1	11.7	0.81
17	2 48	6 25 42.38	+25 33 54.8	8.1	7.9	0.58	2	3 13	9 52 2.79	+14 15 9.8	12.2	11.9	0.81

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam. S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam. S. T. of Sem. Pass. Mer.
	h m	h m s	" "	" "	" s		h m	h m s	" "	" "	" s
July 1	3 13	9 48 21.23	+14 38 56.8	12.1	11.7 0.81	Aug. 16	2 3	11 39 26.46	- 3 11 29.6	23.1	22.4 1.49
2	3 13	9 52 2.79	14 15 9.8	12.2	11.9 0.81	17	1 59	11 39 52.31	3 27 3.3	23.4	22.8 1.52
3	3 12	9 55 41.79	13 51 10.6	12.3	12.0 0.82	18	1 56	11 40 10.59	3 41 50.2	23.8	23.1 1.54
4	3 12	9 59 18.22	13 27 0.2	12.5	12.1 0.83	19	1 52	11 40 21.15	3 55 47.6	24.2	23.5 1.57
5	3 12	10 2 52.06	13 2 39.3	12.6	12.3 0.84	20	1 48	11 40 23.84	4 8 53.2	24.6	23.9 1.59
6	3 11	10 6 23.26	+12 38 8.8	12.8	12.4 0.85	21	1 44	11 40 18.53	- 4 21 4.4	25.0	24.3 1.62
7	3 11	10 9 51.78	12 13 29.5	12.9	12.6 0.86	22	1 40	11 40 5.12	4 32 18.6	25.4	24.6 1.65
8	3 10	10 13 17.60	11 48 42.3	13.1	12.7 0.87	23	1 36	11 39 43.53	4 42 32.9	25.7	25.0 1.67
9	3 10	10 16 40.67	11 23 47.8	13.2	12.9 0.88	24	1 31	11 39 13.69	4 51 45.0	26.1	25.4 1.70
10	3 9	10 20 0.95	10 58 47.0	13.4	13.0 0.89	25	1 27	11 38 35.57	4 59 52.2	26.5	25.7 1.72
11	3 8	10 23 18.41	+10 33 40.8	13.6	13.2 0.90	26	1 22	11 37 49.18	- 5 6 52.0	26.9	26.1 1.75
12	3 8	10 26 33.00	10 8 30.0	13.7	13.4 0.91	27	1 17	11 36 54.55	5 12 41.8	27.2	26.5 1.77
13	3 7	10 29 44.68	9 43 15.4	13.9	13.5 0.91	28	1 12	11 35 51.78	5 17 19.2	27.6	26.8 1.79
14	3 6	10 32 53.40	9 17 57.9	14.1	13.7 0.92	29	1 7	11 34 41.00	5 20 42.3	28.0	27.2 1.82
15	3 6	10 35 59.11	8 52 38.2	14.3	13.9 0.93	30	1 2	11 33 22.40	5 22 49.0	28.3	27.5 1.84
16	3 5	10 39 1.76	+ 8 27 17.3	14.5	14.1 0.95	31	0 56	11 31 56.23	- 5 23 37.9	28.6	27.8 1.86
17	3 4	10 42 1.30	8 1 56.0	14.7	14.2 0.96	Sept. 1	0 51	11 30 22.80	5 23 7.5	29.0	28.2 1.88
18	3 3	10 44 57.66	7 36 35.1	14.9	14.4 0.97	2	0 45	11 28 42.51	5 21 17.3	29.3	28.4 1.90
19	3 2	10 47 50.80	7 11 15.6	15.1	14.6 0.98	3	0 40	11 26 55.78	5 18 6.6	29.5	28.7 1.92
20	3 1	10 50 40.64	6 45 58.3	15.3	14.8 0.99	4	0 34	11 25 3.13	5 13 35.4	29.8	29.0 1.94
21	2 59	10 53 27.11	+ 6 20 44.3	15.5	15.1 1.01	5	0 28	11 23 5.13	- 5 7 44.4	30.1	29.2 1.96
22	2 58	10 56 10.14	5 55 34.4	15.7	15.3 1.03	6	0 22	11 21 2.40	5 0 34.7	30.3	29.5 1.97
23	2 57	10 58 49.64	5 30 29.7	15.9	15.5 1.04	7	0 16	11 18 55.64	4 52 8.1	30.5	29.6 1.98
24	2 56	11 1 25.54	5 5 31.0	16.2	15.7 1.05	8	0 10	11 16 45.60	4 42 27.3	30.6	29.8 1.99
25	2 54	11 3 57.73	4 40 39.6	16.4	15.9 1.06	9	0 4	11 14 33.08	4 31 35.5	30.8	29.9 2.00
26	2 53	11 6 26.10	+ 4 15 56.3	16.6	16.2 1.08	9	23 58	11 12 18.89	- 4 19 36.1	30.9	30.0 2.01
27	2 51	11 8 50.55	3 51 22.6	16.9	16.4 1.09	10	23 51	11 10 3.91	4 6 33.3	31.0	30.1 2.01
28	2 50	11 11 10.95	3 26 59.4	17.1	16.6 1.11	11	23 45	11 7 49.02	3 52 32.1	31.0	30.2 2.01
29	2 48	11 13 27.16	3 2 48.0	17.4	16.9 1.12	12	23 39	11 5 35.10	3 37 37.8	31.0	30.2 2.01
30	2 46	11 15 39.09	2 38 49.7	17.6	17.1 1.14	13	23 33	11 3 23.02	3 21 56.2	31.0	30.2 2.01
31	2 44	11 17 46.57	+ 2 15 5.7	17.9	17.4 1.16	14	23 27	11 1 13.63	- 3 5 33.3	31.0	30.1 2.01
Aug. 1	2 42	11 19 49.45	1 51 37.3	18.2	17.7 1.18	15	23 21	10 59 7.75	2 48 35.6	30.9	30.0 2.00
2	2 40	11 21 47.59	1 28 26.1	18.5	17.9 1.20	16	23 15	10 57 6.17	2 31 9.6	30.8	30.0 2.00
3	2 38	11 23 40.83	1 5 33.2	18.7	18.2 1.21	17	23 9	10 55 9.62	2 13 21.9	30.7	29.9 1.99
4	2 36	11 25 28.99	0 43 0.1	19.0	18.5 1.23	18	23 3	10 53 18.79	1 55 18.5	30.5	29.7 1.98
5	2 34	11 27 11.90	+ 0 20 48.5	19.3	18.8 1.25	19	22 58	10 51 34.28	- 1 37 6.1	30.3	29.5 1.97
6	2 32	11 28 49.43	- 0 1 0.0	19.7	19.1 1.27	20	22 52	10 49 56.66	1 18 51.1	30.1	29.3 1.95
7	2 29	11 30 21.36	0 22 24.0	20.0	19.4 1.29	21	22 47	10 48 26.43	1 0 39.3	29.9	29.0 1.94
8	2 27	11 31 47.51	0 43 21.5	20.3	19.7 1.31	22	22 41	10 47 4.01	0 42 36.6	29.6	28.8 1.92
9	2 24	11 33 7.70	1 3 51.0	20.6	20.0 1.33	23	22 36	10 45 49.77	0 24 48.1	29.3	28.5 1.90
10	2 21	11 34 21.75	- 1 23 50.5	20.9	20.3 1.36	24	22 31	10 44 44.02	- 0 7 19.1	29.0	28.2 1.88
11	2 19	11 35 29.46	1 43 18.4	21.3	20.7 1.38	25	22 26	10 43 46.99	+ 0 9 45.9	28.7	27.9 1.86
12	2 16	11 36 30.64	2 2 12.5	21.6	21.0 1.40	26	22 22	10 42 58.88	0 26 22.3	28.4	27.6 1.84
13	2 13	11 37 25.12	2 20 30.6	22.0	21.3 1.42	27	22 17	10 42 19.83	0 42 26.2	28.1	27.3 1.82
14	2 10	11 38 12.70	2 38 11.0	22.3	21.7 1.45	28	22 13	10 41 49.91	0 57 54.3	27.7	26.9 1.79
15	2 6	11 38 53.21	- 2 55 11.5	22.7	22.0 1.47	29	22 8	10 41 29.16	+ 1 12 43.2	27.4	26.6 1.77
16	2 3	11 39 26.46	- 3 11 29.6	23.1	22.4 1.49	30	22 4	10 41 17.58	+ 1 28 50.5	27.0	26.2 1.75

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m	h m s	" "	" "	" "	s		h m	h m s	" "	" "	" "	s
Sept. 30	22 4	10 41 17.58	+1 26 50.5	27.0	26.2	1.75	Nov. 15	20 48	12 26 8.77	-1 37 12.5	14.0	13.6	0.91
Oct. 1	22 0	10 41 15.12	1 40 13.5	26.6	25.9	1.73	16	20 48	12 29 48.65	1 54 56.4	13.8	13.4	0.90
2	21 56	10 41 21.70	1 52 50.3	26.3	25.5	1.70	17	20 47	12 33 30.30	2 13 0.1	13.7	13.3	0.89
3	21 53	10 41 37.22	2 4 38.9	25.9	25.2	1.68	18	20 47	12 37 13.70	2 31 22.7	13.5	13.1	0.88
4	21 49	10 42 1.54	2 15 38.3	25.5	24.8	1.65	19	20 47	12 40 58.77	2 50 3.1	13.4	13.0	0.87
5	21 46	10 42 34.50	+2 25 47.0	25.1	24.4	1.63	20	20 47	12 44 45.47	-3 9 0.4	13.2	12.8	0.86
6	21 42	10 43 15.93	2 35 4.3	24.8	24.1	1.60	21	20 47	12 48 33.78	3 28 13.5	13.1	12.7	0.85
7	21 39	10 44 5.65	2 43 29.3	24.4	23.7	1.58	22	20 46	12 52 23.64	3 47 41.6	12.9	12.6	0.84
8	21 36	10 45 3.45	2 51 1.7	24.0	23.3	1.56	23	20 46	12 56 15.04	4 7 23.7	12.8	12.4	0.83
9	21 34	10 46 9.11	2 57 41.2	23.7	23.0	1.53	24	20 46	13 0 7.93	4 27 18.8	12.6	12.3	0.82
10	21 31	10 47 22.41	+3 3 27.6	23.3	22.6	1.51	25	20 46	13 4 2.31	-4 47 26.0	12.5	12.1	0.81
11	21 28	10 48 43.12	3 8 21.2	22.9	22.3	1.49	26	20 46	13 7 58.13	5 7 44.5	12.4	12.0	0.80
12	21 26	10 50 11.01	3 12 22.1	22.6	21.9	1.46	27	20 46	13 11 55.39	5 28 13.2	12.2	11.9	0.80
13	21 23	10 51 45.81	3 15 30.7	22.2	21.6	1.44	28	20 46	13 15 54.07	5 48 51.3	12.1	11.8	0.79
14	21 21	10 53 27.29	3 17 47.7	21.9	21.3	1.42	29	20 46	13 19 54.15	6 9 37.8	12.0	11.6	0.79
15	21 19	10 55 15.21	+3 19 13.5	21.5	21.0	1.40	30	20 46	13 23 55.63	-6 30 31.9	11.9	11.5	0.78
16	21 17	10 57 9.30	3 19 49.0	21.2	20.6	1.38	Dec. 1	20 47	13 27 58.48	6 51 32.6	11.7	11.4	0.77
17	21 15	10 59 9.32	3 19 34.9	20.9	20.3	1.35	2	20 47	13 32 2.72	7 12 39.2	11.6	11.3	0.76
18	21 13	11 1 15.03	3 18 31.9	20.6	20.0	1.33	3	20 47	13 36 8.35	7 33 50.6	11.5	11.2	0.76
19	21 11	11 3 26.21	3 16 41.0	20.3	19.7	1.31	4	20 47	13 40 15.34	7 55 5.9	11.4	11.1	0.75
20	21 10	11 5 42.61	+3 14 3.1	20.0	19.4	1.29	5	20 47	13 44 23.73	-8 16 24.3	11.3	11.0	0.74
21	21 8	11 8 4.02	3 10 38.9	19.7	19.1	1.27	6	20 47	13 48 33.48	8 37 44.9	11.2	10.9	0.73
22	21 7	11 10 30.24	3 6 29.6	19.4	18.8	1.25	7	20 48	13 52 44.62	8 59 6.8	11.1	10.8	0.73
23	21 5	11 13 1.06	3 1 36.1	19.1	18.5	1.24	8	20 48	13 56 57.17	9 20 29.0	11.0	10.7	0.72
24	21 4	11 15 36.26	2 55 59.4	18.8	18.3	1.22	9	20 48	14 1 11.07	9 41 50.8	10.9	10.6	0.72
25	21 3	11 18 15.67	+2 49 40.4	18.5	18.0	1.20	10	20 49	14 5 26.37	-10 3 11.0	10.8	10.5	0.71
26	21 1	11 20 59.12	2 42 40.1	18.2	17.7	1.18	11	20 49	14 9 43.07	10 24 28.9	10.7	10.4	0.71
27	21 0	11 23 46.46	2 34 59.5	18.0	17.5	1.16	12	20 49	14 14 1.14	10 45 43.4	10.6	10.3	0.70
28	20 59	11 26 37.47	2 26 39.5	17.7	17.3	1.15	13	20 50	14 18 20.59	11 6 53.7	10.5	10.2	0.70
29	20 58	11 29 32.05	2 17 41.0	17.5	17.0	1.13	14	20 50	14 22 41.42	11 27 58.8	10.4	10.1	0.69
30	20 57	11 32 30.03	+2 8 5.1	17.2	16.7	1.12	15	20 50	14 27 3.64	-11 48 57.9	10.3	10.0	0.68
31	20 56	11 35 31.27	1 57 52.9	17.0	16.5	1.10	16	20 51	14 31 27.22	12 9 49.9	10.2	9.9	0.68
Nov. 1	20 55	11 38 35.65	1 47 5.2	16.8	16.3	1.09	17	20 51	14 35 52.18	12 30 34.0	10.1	9.8	0.67
2	20 55	11 41 43.03	1 35 43.0	16.5	16.1	1.07	18	20 52	14 40 18.51	12 51 9.2	10.0	9.8	0.67
3	20 54	11 44 53.32	1 23 47.0	16.3	15.8	1.06	19	20 52	14 44 46.22	13 11 34.8	10.0	9.7	0.66
4	20 53	11 48 6.39	+1 11 18.4	16.1	15.6	1.04	20	20 53	14 49 15.30	-13 31 49.9	9.9	9.6	0.66
5	20 52	11 51 22.17	0 58 18.1	15.9	15.4	1.03	21	20 53	14 53 45.74	13 51 53.3	9.8	9.5	0.66
6	20 52	11 54 40.53	0 44 47.1	15.7	15.2	1.02	22	20 54	14 58 17.56	14 11 44.4	9.7	9.5	0.65
7	20 51	11 58 1.41	0 30 46.3	15.5	15.0	1.00	23	20 55	15 2 50.75	14 31 22.4	9.6	9.4	0.65
8	20 51	12 1 24.09	0 16 16.9	15.3	14.8	0.99	24	20 55	15 7 25.30	14 50 46.1	9.6	9.3	0.64
9	20 50	12 4 50.31	+0 1 19.6	15.1	14.6	0.98	25	20 56	15 12 1.21	-15 9 54.9	9.5	9.2	0.64
10	20 50	12 8 18.19	-0 14 4.7	14.9	14.5	0.96	26	20 57	15 16 38.49	15 28 47.9	9.4	9.2	0.64
11	20 49	12 11 48.24	0 29 54.7	14.7	14.3	0.95	27	20 57	15 21 17.12	15 47 24.1	9.4	9.1	0.63
12	20 49	12 15 20.39	0 46 9.4	14.5	14.1	0.94	28	20 58	15 25 57.12	16 5 42.9	9.3	9.0	0.63
13	20 48	12 18 54.58	1 2 47.9	14.3	13.9	0.93	29	20 59	15 30 38.47	16 23 43.3	9.2	9.0	0.63
14	20 48	12 22 30.72	-1 19 49.3	14.2	13.7	0.92	30	21 0	15 35 21.17	-16 41 24.5	9.1	8.9	0.62
15	20 48	12 26 8.77	-1 37 12.5	14.0	13.6	0.91	31	21 0	15 40 5.25	-16 58 45.8	9.1	8.8	0.62

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam. S. P. of Sem. Trans. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam. S. P. of Sem. Trans. Mer.
	h m s	h m s	° ' "	" "	" "		h m s	h m s	° ' "	" "	" "
Jan. 6	12 5 6.47	27.09	+23 152.6	2.1	22.4 1.73	Feb. 15	8 47 6.26	39.12	+23 26 12.5	1.9	20.9 1.0
1	12 4 6.46	52.61	23 240.6	2.1	22.4 1.73	16	8 43 6.26	27.07	23 26 26.8	1.9	20.8 1.0
2	11 59 6.46	17.53	23 328.1	2.1	22.4 1.73	17	8 38 6.26	15.84	23 26 40.4	1.9	20.8 1.0
3	11 55 6.45	42.49	23 415.0	2.1	22.4 1.73	18	8 34 6.26	5.45	23 26 53.3	1.9	20.7 1.0
4	11 50 6.45	7.50	23 51.3	2.1	22.4 1.73	19	8 30 6.25	55.91	23 27 5.7	1.9	20.6 1.0
5	11 46 6.44	32.60	+23 547.0	2.1	22.4 1.72	20	8 26 6.25	47.21	+23 27 17.4	1.9	20.6 1.0
6	11 41 6.43	57.80	23 632.1	2.1	22.4 1.72	21	8 22 6.25	39.36	23 27 28.5	1.9	20.5 1.0
7	11 37 6.43	23.14	23 716.6	2.1	22.4 1.72	22	8 18 6.25	32.35	23 27 39.1	1.9	20.5 1.0
8	11 32 6.42	48.65	23 80.4	2.1	22.4 1.72	23	8 14 6.25	26.21	23 27 49.1	1.9	20.4 1.0
9	11 28 6.42	14.34	23 843.7	2.1	22.4 1.72	24	8 10 6.25	20.93	23 27 58.5	1.9	20.3 1.0
10	11 23 6.41	40.25	+23 926.1	2.1	22.3 1.72	25	8 6 6.25	16.51	+23 28 7.2	1.9	20.3 1.0
11	11 19 6.41	6.41	23 107.8	2.1	22.3 1.72	26	8 2 6.25	12.94	23 28 15.4	1.9	20.2 1.0
12	11 14 6.40	32.84	23 1048.8	2.1	22.3 1.72	27	7 58 6.25	10.24	23 28 23.0	1.9	20.2 1.0
13	11 10 6.39	59.55	23 1129.0	2.1	22.3 1.72	28	7 54 6.25	8.41	23 28 29.9	1.9	20.1 1.0
14	11 5 6.39	26.58	23 128.6	2.1	22.3 1.72	Mar. 1	7 50 6.25	7.44	23 28 36.3	1.9	20.0 1.0
15	11 1 6.38	53.94	+23 1247.3	2.1	22.3 1.71	2	7 46 6.25	7.33	+23 28 42.3	1.9	20.0 1.0
16	10 56 6.38	21.67	23 1325.1	2.1	22.2 1.71	3	7 42 6.25	8.08	23 28 47.6	1.9	19.9 1.0
17	10 52 6.37	49.78	23 142.2	2.1	22.2 1.71	4	7 38 6.25	9.70	23 28 52.3	1.9	19.8 1.0
18	10 47 6.37	18.28	23 1438.5	2.1	22.2 1.71	5	7 34 6.25	12.18	23 28 56.4	1.9	19.8 1.0
19	10 43 6.36	47.22	23 1514.0	2.1	22.1 1.70	6	7 30 6.25	15.51	23 29 0.0	1.8	19.7 1.0
20	10 38 6.36	16.06	+23 1548.0	2.1	22.1 1.70	7	7 27 6.25	19.70	+23 29 3.0	1.8	19.6 1.0
21	10 34 6.35	46.45	23 1622.0	2.1	22.1 1.70	8	7 23 6.25	24.73	23 29 5.4	1.8	19.6 1.0
22	10 30 6.35	16.81	23 1655.0	2.1	22.0 1.70	9	7 19 6.25	30.62	23 29 7.2	1.8	19.5 1.0
23	10 25 6.34	47.67	23 1727.8	2.1	22.0 1.69	10	7 15 6.25	37.34	23 29 8.5	1.8	19.5 1.0
24	10 21 6.34	19.05	23 1759.3	2.1	22.0 1.69	11	7 11 6.25	44.90	23 29 9.2	1.8	19.4 1.0
25	10 16 6.33	50.99	-23 1829.0	2.0	21.9 1.69	12	7 8 6.25	53.28	+23 29 9.4	1.8	19.3 1.0
26	10 12 6.33	23.51	23 1859.7	2.0	21.9 1.68	13	7 4 6.26	2.49	23 29 9.0	1.8	19.3 1.0
27	10 8 6.32	56.63	23 1928.7	2.0	21.8 1.68	14	7 0 6.26	12.51	23 29 7.9	1.8	19.2 1.0
28	10 3 6.32	30.33	23 1957.0	2.0	21.8 1.68	15	6 56 6.26	23.35	23 29 6.3	1.8	19.2 1.0
29	9 59 6.32	4.67	23 2024.4	2.0	21.8 1.68	16	6 53 6.26	34.98	23 29 4.1	1.8	19.1 1.0
30	9 54 6.31	39.67	-23 2050.8	2.0	21.7 1.67	17	6 49 6.26	47.42	+23 29 1.3	1.8	19.0 1.0
31	9 50 6.31	15.34	23 2116.6	2.0	21.7 1.67	18	6 45 6.27	0.66	23 28 57.9	1.8	19.0 1.0
Feb. 1	9 46 6.30	51.67	23 2141.6	2.0	21.6 1.67	19	6 41 6.27	14.68	23 28 53.9	1.8	18.9 1.0
2	9 42 6.30	28.71	23 225.7	2.0	21.6 1.66	20	6 38 6.27	29.47	23 28 49.2	1.8	18.8 1.0
3	9 37 6.30	6.47	23 2229.0	2.0	21.5 1.66	21	6 34 6.27	45.05	23 28 43.9	1.8	18.8 1.0
4	9 33 6.29	44.94	+23 2251.7	2.0	21.5 1.65	22	6 30 6.28	1.39	+23 28 38.0	1.8	18.7 1.0
5	9 29 6.29	24.16	23 2313.5	2.0	21.4 1.65	23	6 27 6.28	18.51	23 28 31.4	1.8	18.7 1.0
6	9 24 6.29	4.14	23 2334.6	2.0	21.4 1.65	24	6 23 6.28	36.38	23 28 24.1	1.7	18.6 1.0
7	9 20 6.28	44.86	23 2355.0	2.0	21.3 1.64	25	6 19 6.28	55.00	23 28 16.2	1.7	18.6 1.0
8	9 16 6.28	26.35	23 2414.6	2.0	21.3 1.64	26	6 16 6.29	14.37	23 28 7.6	1.7	18.5 1.0
9	9 12 6.28	8.63	+23 2433.6	2.0	21.2 1.63	27	6 12 6.29	34.47	+23 27 58.2	1.7	18.4 1.0
10	9 8 6.27	51.70	23 2451.7	2.0	21.2 1.63	28	6 9 6.29	55.31	23 27 48.2	1.7	18.4 1.0
11	9 3 6.27	35.56	23 259.2	2.0	21.1 1.63	29	6 5 6.30	16.88	23 27 37.4	1.7	18.3 1.0
12	8 59 6.27	20.24	23 2526.0	2.0	21.1 1.62	30	6 2 6.30	39.17	23 27 25.9	1.7	18.3 1.0
13	8 55 6.27	5.71	23 2542.2	2.0	21.0 1.62	31	5 58 6.31	2.17	23 27 13.5	1.7	18.2 1.0
14	8 51 6.26	52.01	+23 2557.7	2.0	20.9 1.61	Apr. 1	5 54 6.31	25.87	+23 27 0.3	1.7	18.1 1.0
15	8 47 6.26	39.12	+23 26 12.5	1.9	20.9 1.61	2	5 51 6.31	50.28	+23 26 46.5	1.7	18.1 1.0

Stellar magnitude at opposition in January, 1919, -2.3.

JUPITER, 1919.

547

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam. S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam. S. T. of Sem. Pass. Mer.
	h m s	° ' "	° ' "	"	" s		h m s	° ' "	° ' "	"	" s
pr. 1	5 54	6 31 25.87	+23 27 0.3	1.7	18.1 1.40	Nov. 15	17 43	9 20 50.08	+16 9 58.3	1.7	18.4 1.36
2	5 51	6 31 50.28	23 26 46.5	1.7	18.1 1.39	16	17 39	9 21 4.28	16 9 6.4	1.7	18.5 1.37
3	5 47	6 32 15.37	23 26 31.9	1.7	18.0 1.39	17	17 36	9 21 17.75	16 8 17.7	1.7	18.6 1.37
4	5 44	6 32 41.14	23 26 16.4	1.7	18.0 1.39	18	17 32	9 21 30.51	16 7 32.4	1.7	18.6 1.38
5	5 40	6 33 7.59	23 26 0.1	1.7	17.9 1.38	19	17 28	9 21 42.53	16 6 50.5	1.7	18.7 1.38
6	5 37	6 33 34.70	+23 25 43.1	1.7	17.9 1.38	20	17 24	9 21 53.84	+16 6 12.0	1.7	18.7 1.39
7	5 33	6 34 2.46	23 25 25.1	1.7	17.8 1.37	21	17 21	9 22 4.40	16 5 36.9	1.8	18.8 1.39
8	5 30	6 34 30.86	23 25 6.3	1.7	17.8 1.37	22	17 17	9 22 14.21	16 5 5.3	1.8	18.8 1.39
9	5 27	6 34 59.90	23 24 46.6	1.7	17.7 1.36	23	17 13	9 22 23.28	16 4 37.3	1.8	18.9 1.40
.....	.....	.....	.....	.....	.....	24	17 9	9 22 31.60	16 4 12.7	1.8	19.0 1.40
ct. 10	19 49	9 5 14.70	+17 12 18.0	1.6	16.7 1.23	25	17 5	9 22 39.17	+16 3 51.7	1.8	19.0 1.41
11	19 46	9 5 50.49	17 9 54.5	1.6	16.7 1.24	26	17 2	9 22 45.97	16 3 34.1	1.8	19.1 1.41
12	19 42	9 6 25.80	17 7 32.6	1.6	16.7 1.24	27	16 58	9 22 52.02	16 3 20.2	1.8	19.1 1.41
13	19 39	9 7 0.61	17 5 12.5	1.6	16.8 1.24	28	16 54	9 22 57.31	16 3 9.9	1.8	19.2 1.42
14	19 36	9 7 34.92	17 2 54.3	1.6	16.8 1.24	29	16 50	9 23 1.82	16 3 2.2	1.8	19.2 1.42
15	19 32	9 8 8.75	+17 0 38.0	1.6	16.9 1.25	30	16 46	9 23 5.57	+16 3 0.1	1.8	19.3 1.43
16	19 29	9 8 42.06	16 58 23.4	1.6	16.9 1.25	Dec. 1	16 42	9 23 8.56	16 3 0.6	1.8	19.4 1.43
17	19 26	9 9 14.84	16 56 10.8	1.6	16.9 1.25	2	16 38	9 23 10.78	16 3 4.7	1.8	19.4 1.44
18	19 22	9 9 47.10	16 54 0.3	1.6	17.0 1.26	3	16 35	9 23 12.23	16 3 12.5	1.8	19.5 1.44
19	19 19	9 10 18.83	16 51 51.9	1.6	17.0 1.26	4	16 31	9 23 12.91	16 3 23.8	1.8	19.5 1.44
20	19 15	9 10 50.02	+16 49 45.5	1.6	17.1 1.26	5	16 27	9 23 12.81	+16 3 38.8	1.8	19.6 1.45
21	19 12	9 11 20.66	16 47 41.4	1.6	17.1 1.27	6	16 23	9 23 11.95	16 3 57.4	1.8	19.6 1.45
22	19 8	9 11 50.75	16 45 39.6	1.6	17.2 1.27	7	16 19	9 23 10.30	16 4 19.6	1.8	19.7 1.46
23	19 5	9 12 20.27	16 43 40.1	1.6	17.2 1.27	8	16 15	9 23 7.89	16 4 45.4	1.8	19.8 1.46
24	19 1	9 12 49.23	16 41 42.9	1.6	17.3 1.28	9	16 11	9 23 4.70	16 5 14.9	1.9	19.8 1.47
25	18 58	9 13 17.62	+16 39 48.0	1.6	17.3 1.28	10	16 7	9 23 0.74	+16 5 48.0	1.9	19.9 1.47
26	18 55	9 13 45.42	16 37 55.5	1.6	17.4 1.29	11	16 3	9 22 56.00	16 6 24.7	1.9	19.9 1.47
27	18 51	9 14 12.65	16 36 5.5	1.6	17.4 1.29	12	15 59	9 22 50.48	16 7 5.0	1.9	20.0 1.48
28	18 48	9 14 39.27	16 34 18.0	1.6	17.5 1.29	13	15 55	9 22 44.20	16 7 48.9	1.9	20.0 1.48
29	18 44	9 15 5.29	16 32 33.0	1.6	17.5 1.30	14	15 51	9 22 37.13	16 8 36.5	1.9	20.1 1.49
30	18 41	9 15 30.70	+16 30 50.6	1.6	17.6 1.30	15	15 47	9 22 29.30	+16 9 27.5	1.9	20.2 1.49
31	18 37	9 15 55.50	16 29 10.9	1.7	17.6 1.30	16	15 43	9 22 20.69	16 10 22.2	1.9	20.2 1.49
Nov. 1	18 34	9 16 19.68	16 27 33.8	1.7	17.7 1.31	17	15 39	9 22 11.32	16 11 20.3	1.9	20.3 1.50
2	18 30	9 16 43.23	16 25 59.4	1.7	17.7 1.31	18	15 34	9 22 1.19	16 12 21.9	1.9	20.3 1.50
3	18 26	9 17 6.17	16 24 27.9	1.7	17.8 1.31	19	15 30	9 21 50.28	16 13 26.9	1.9	20.4 1.51
4	18 23	9 17 28.47	+16 22 59.1	1.7	17.8 1.32	20	15 26	9 21 38.63	+16 14 35.3	1.9	20.4 1.51
5	18 19	9 17 50.12	16 21 33.1	1.7	17.9 1.32	21	15 22	9 21 26.24	16 15 47.1	1.9	20.5 1.51
6	18 16	9 18 11.12	16 20 10.1	1.7	17.9 1.33	22	15 18	9 21 13.11	16 17 2.2	1.9	20.5 1.52
7	18 12	9 18 31.47	16 18 49.9	1.7	18.0 1.33	23	15 14	9 20 59.24	16 18 20.7	1.9	20.6 1.52
8	18 9	9 18 51.17	16 17 32.6	1.7	18.1 1.34	24	15 10	9 20 44.64	16 19 42.3	1.9	20.6 1.53
9	18 5	9 19 10.21	+16 16 18.3	1.7	18.1 1.34	25	15 5	9 20 29.33	+16 21 7.1	1.9	20.7 1.53
10	18 1	9 19 28.58	16 15 7.1	1.7	18.2 1.34	26	15 1	9 20 13.30	16 22 35.0	1.9	20.7 1.53
11	17 58	9 19 46.27	16 13 59.1	1.7	18.2 1.35	27	14 57	9 19 56.57	16 24 5.9	1.9	20.8 1.54
12	17 54	9 20 3.26	16 12 54.1	1.7	18.3 1.35	28	14 53	9 19 39.15	16 25 39.8	1.9	20.8 1.54
13	17 50	9 20 19.57	16 11 52.2	1.7	18.3 1.36	29	14 49	9 19 21.06	16 27 16.7	1.9	20.9 1.54
14	17 47	9 20 35.18	+16 10 53.6	1.7	18.4 1.36	30	14 44	9 19 2.30	+16 28 56.4	2.0	20.9 1.54
15	17 43	9 20 50.08	+16 9 58.3	1.7	18.4 1.36	31	14 40	9 18 42.89	+16 30 38.9	2.0	21.0 1.54

Stellar magnitude at opposition in January, 1919, -2.3.

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam. S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam. S. T. of Sem. Pass. Mer.
	h m	h m s	" " "	"	" s		h m	h m s	" " "	"	" s
Jan. 0	15 22 10	149.29	+13 31 4.0	1.0	9.1 0.68	Feb. 15	12 9 50	0.52	+14 40 57.1	1.1	9.4 0.71
1	15 18 10	140.09	13 32 6.7	1.0	9.1 0.68	16	12 5 9	49 41.77	14 42 39.4	1.1	9.4 0.71
2	15 14 10	130.51	13 33 11.2	1.0	9.1 0.68	17	12 1 9	49 23.03	14 44 21.2	1.1	9.4 0.71
3	15 10 10	120.57	13 34 17.7	1.0	9.1 0.69	18	11 57 9	49 4.33	14 46 2.6	1.1	9.4 0.71
4	15 6 10	110.24	13 35 26.0	1.0	9.1 0.69	19	11 52 9	48 45.67	14 47 43.4	1.1	9.4 0.71
5	15 2 10	059.56	+13 36 36.1	1.0	9.1 0.69	20	11 48 9	48 27.05	+14 49 23.6	1.1	9.4 0.71
6	14 57 10	048.53	13 37 47.9	1.0	9.2 0.69	21	11 44 9	48 8.49	14 51 3.3	1.1	9.4 0.71
7	14 53 10	037.15	13 39 1.6	1.0	9.2 0.69	22	11 40 9	47 50.01	14 52 42.3	1.1	9.4 0.71
8	14 49 10	025.43	13 40 16.8	1.0	9.2 0.69	23	11 35 9	47 31.60	14 54 20.4	1.1	9.4 0.71
9	14 45 10	013.36	13 41 33.7	1.0	9.2 0.69	24	11 31 9	47 13.29	14 55 57.8	1.1	9.4 0.71
10	14 41 10	0 0.96	+13 42 52.2	1.0	9.2 0.69	25	11 27 9	46 55.07	+14 57 34.4	1.1	9.4 0.71
11	14 37 9	59 48.24	13 44 12.3	1.0	9.2 0.69	26	11 23 9	46 36.97	14 59 10.3	1.1	9.4 0.71
12	14 33 9	59 35.20	13 45 33.9	1.0	9.2 0.69	27	11 19 9	46 18.99	15 0 44.8	1.1	9.4 0.71
13	14 29 9	59 21.86	13 46 57.0	1.1	9.3 0.70	28	11 14 9	46 1.14	15 2 18.8	1.1	9.4 0.71
14	14 24 9	59 8.20	13 48 21.5	1.1	9.3 0.70	Mar. 1	11 10 9	45 43.42	15 3 51.4	1.1	9.4 0.71
15	14 20 9	58 54.25	+13 49 47.4	1.1	9.3 0.70	2	11 6 9	45 25.88	+15 5 23.0	1.1	9.4 0.71
16	14 16 9	58 40.01	13 51 14.6	1.1	9.3 0.70	3	11 2 9	45 8.49	15 6 53.5	1.1	9.4 0.71
17	14 12 9	58 25.49	13 52 43.2	1.1	9.3 0.70	4	10 57 9	44 51.28	15 8 22.7	1.1	9.4 0.71
18	14 8 9	58 10.68	13 54 12.9	1.1	9.3 0.70	5	10 53 9	44 34.26	15 9 50.6	1.1	9.4 0.71
19	14 4 9	57 55.61	13 55 43.9	1.1	9.3 0.70	6	10 49 9	44 17.42	15 11 17.3	1.1	9.4 0.71
20	13 59 9	57 40.28	+13 57 16.1	1.1	9.3 0.70	7	10 45 9	44 0.80	+15 12 42.8	1.1	9.3 0.71
21	13 55 9	57 24.69	13 58 49.3	1.1	9.3 0.70	8	10 41 9	43 44.38	15 14 6.9	1.1	9.3 0.71
22	13 51 9	57 8.86	14 0 23.6	1.1	9.3 0.70	9	10 36 9	43 28.19	15 15 29.6	1.1	9.3 0.71
23	13 47 9	56 52.80	14 1 58.9	1.1	9.3 0.70	10	10 32 9	43 12.22	15 16 50.9	1.1	9.3 0.71
24	13 43 9	56 36.51	14 3 35.1	1.1	9.4 0.70	11	10 28 9	42 56.49	15 18 10.7	1.1	9.3 0.70
25	13 38 9	56 20.01	+14 5 12.3	1.1	9.4 0.70	12	10 24 9	42 41.02	+15 19 28.9	1.1	9.3 0.70
26	13 34 9	56 3.29	14 6 50.2	1.1	9.4 0.70	13	10 20 9	42 25.79	15 20 45.7	1.1	9.3 0.70
27	13 30 9	55 46.37	14 8 29.0	1.1	9.4 0.71	14	10 15 9	42 10.83	15 22 1.0	1.1	9.3 0.70
28	13 26 9	55 29.26	14 10 8.6	1.1	9.4 0.71	15	10 11 9	41 56.13	15 23 14.5	1.1	9.3 0.70
29	13 21 9	55 11.96	14 11 48.8	1.1	9.4 0.71	16	10 7 9	41 41.72	15 24 26.5	1.1	9.3 0.70
30	13 17 9	54 54.50	+14 13 29.6	1.1	9.4 0.71	17	10 3 9	41 27.57	+15 25 36.8	1.0	9.3 0.70
31	13 13 9	54 36.88	14 15 10.9	1.1	9.4 0.71	18	9 59 9	41 13.71	15 26 45.4	1.0	9.2 0.70
Feb. 1	13 9 9	54 19.10	14 16 52.8	1.1	9.4 0.71	19	9 55 9	41 0.15	15 27 52.4	1.0	9.2 0.70
2	13 5 9	54 1.20	14 18 35.1	1.1	9.4 0.71	20	9 50 9	40 46.90	15 28 57.5	1.0	9.2 0.70
3	13 0 9	53 43.16	14 20 17.8	1.1	9.4 0.71	21	9 46 9	40 33.96	15 30 9.0	1.0	9.2 0.70
4	12 56 9	53 24.99	+14 22 0.8	1.1	9.4 0.71	22	9 42 9	40 21.33	+15 31 2.6	1.0	9.2 0.70
5	12 52 9	53 6.73	14 23 44.0	1.1	9.4 0.71	23	9 38 9	40 9.02	15 32 2.4	1.0	9.2 0.70
6	12 48 9	52 48.36	14 25 27.4	1.1	9.4 0.71	24	9 34 9	39 57.06	15 33 0.4	1.0	9.2 0.70
7	12 43 9	52 29.92	14 27 11.0	1.1	9.4 0.71	25	9 30 9	39 45.42	15 33 56.5	1.0	9.2 0.69
8	12 39 9	52 11.40	14 28 54.6	1.1	9.4 0.71	26	9 26 9	39 34.11	15 34 50.7	1.0	9.2 0.69
9	12 35 9	51 52.81	+14 30 38.2	1.1	9.4 0.71	27	9 22 9	39 23.15	+15 35 43.0	1.0	9.1 0.69
10	12 31 9	51 34.17	14 32 21.8	1.1	9.4 0.71	28	9 17 9	39 12.56	15 36 33.5	1.0	9.1 0.69
11	12 26 9	51 15.48	14 34 5.2	1.1	9.4 0.71	29	9 13 9	39 2.32	15 37 21.9	1.0	9.1 0.69
12	12 22 9	50 56.76	14 35 48.6	1.1	9.4 0.71	30	9 9 9	38 52.45	15 38 8.3	1.0	9.1 0.69
13	12 18 9	50 38.02	14 37 31.8	1.1	9.4 0.71	31	9 5 9	38 42.94	15 38 52.7	1.0	9.1 0.69
14	12 14 9	50 19.27	+14 39 14.6	1.1	9.4 0.71	Apr. 1	9 1 9	38 33.80	+15 39 35.2	1.0	9.1 0.69
15	12 9 9	50 0.52	+14 40 57.1	1.1	9.4 0.71	2	8 57 9	38 25.03	+15 40 15.7	1.0	9.1 0.69

Stellar magnitude at opposition in February, 1919, +0.2.

SATURN, 1919.

549

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam.	S. T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
pr. 1	9 1	9 38 33.80	+15 39 35.2	1.0	9.1	0.69	Nov. 15	19 12	10 50 19.81	+9 8 19.8	0.9	8.1	0.60
2	8 57	9 38 25.03	15 40 15.7	1.0	9.1	0.69	16	19 9	10 50 34.39	9 7 6.0	0.9	8.1	0.60
3	8 53	9 38 16.65	15 40 54.0	1.0	9.0	0.69	17	19 5	10 50 48.63	9 5 54.5	0.9	8.2	0.60
4	8 49	9 38 8.66	15 41 30.4	1.0	9.0	0.69	18	19 1	10 51 2.51	9 4 45.0	0.9	8.2	0.60
5	8 45	9 38 1.07	15 42 4.6	1.0	9.0	0.68	19	18 57	10 51 16.05	9 3 37.9	0.9	8.2	0.60
6	8 41	9 37 53.86	+15 42 36.8	1.0	9.0	0.68	20	18 54	10 51 29.23	+9 2 32.9	0.9	8.2	0.61
7	8 37	9 37 47.05	15 43 7.0	1.0	9.0	0.68	21	18 50	10 51 42.06	9 1 30.1	0.9	8.2	0.61
8	8 33	9 37 40.64	15 43 35.1	1.0	9.0	0.68	22	18 46	10 51 54.52	9 0 29.6	0.9	8.2	0.61
9	8 29	9 37 34.64	15 44 1.1	1.0	9.0	0.68	23	18 43	10 52 6.61	8 59 31.4	0.9	8.2	0.61
10	8 25	9 37 29.03	15 44 25.0	1.0	8.9	0.68	24	18 39	10 52 18.33	8 58 35.5	0.9	8.3	0.61
11	8 21	9 37 23.83	+15 44 46.8	1.0	8.9	0.68	25	18 35	10 52 29.69	+8 57 42.0	0.9	8.3	0.61
12	8 17	9 37 19.04	15 45 6.6	1.0	8.9	0.68	26	18 31	10 52 40.68	8 56 50.8	0.9	8.3	0.61
13	8 13	9 37 14.65	15 45 24.2	1.0	8.9	0.68	27	18 28	10 52 51.29	8 56 1.9	0.9	8.3	0.61
14	8 9	9 37 10.67	15 45 39.6	1.0	8.9	0.67	28	18 24	10 53 1.52	8 55 15.4	0.9	8.3	0.61
15	8 5	9 37 7.10	15 45 53.1	1.0	8.9	0.67	29	18 20	10 53 11.37	8 54 31.4	0.9	8.3	0.62
16	8 1	9 37 3.95	+15 46 4.3	1.0	8.9	0.67	30	18 16	10 53 20.83	+8 53 49.6	0.9	8.3	0.62
17	7 57	9 37 1.20	15 46 13.6	1.0	8.8	0.67	Dec. 1	18 12	10 53 29.91	8 53 10.3	0.9	8.4	0.62
18	7 53	9 36 58.87	15 46 20.6	1.0	8.8	0.67	2	18 9	10 53 38.60	8 52 33.3	0.9	8.4	0.62
19	7 49	9 36 56.96	15 46 25.7	1.0	8.8	0.67	3	18 5	10 53 46.90	8 51 58.8	1.0	8.4	0.62
20	7 45	9 36 55.46	15 46 28.7	1.0	8.8	0.67	4	18 1	10 53 54.81	8 51 26.8	1.0	8.4	0.62
21	7 41	9 36 54.38	+15 46 29.5	1.0	8.8	0.67	5	17 57	10 54 2.33	+8 50 57.2	1.0	8.4	0.62
22	7 37	9 36 53.71	15 46 28.1	1.0	8.8	0.67	6	17 53	10 54 9.45	8 50 30.0	1.0	8.4	0.62
23	7 33	9 36 53.46	15 46 24.8	1.0	8.7	0.66	7	17 50	10 54 16.18	8 50 5.3	1.0	8.4	0.62
24	7 29	9 36 53.63	15 46 19.3	1.0	8.7	0.66	8	17 46	10 54 22.50	8 49 43.2	1.0	8.5	0.62
25	7 25	9 36 54.23	15 46 11.7	1.0	8.7	0.66	9	17 42	10 54 28.43	8 49 23.5	1.0	8.5	0.63
26	7 21	9 36 55.24	+15 46 1.8	1.0	8.7	0.66	10	17 38	10 54 33.96	+8 49 6.2	1.0	8.5	0.63
27	7 17	9 36 56.67	15 45 50.0	1.0	8.7	0.66	11	17 34	10 54 39.07	8 48 51.6	1.0	8.5	0.63
28	7 13	9 36 58.52	15 45 35.9	1.0	8.7	0.66	12	17 30	10 54 43.79	8 48 39.4	1.0	8.5	0.63
29	7 9	9 37 0.79	15 45 19.9	1.0	8.7	0.66	13	17 27	10 54 48.10	8 48 29.8	1.0	8.5	0.63
30	7 6	9 37 3.48	15 45 1.8	1.0	8.6	0.66	14	17 23	10 54 51.99	8 48 22.7	1.0	8.5	0.63
lay 1	7 2	9 37 6.59	+15 44 41.6	1.0	8.6	0.65	15	17 19	10 54 55.47	+8 48 18.1	1.0	8.6	0.63
2	6 58	9 37 10.11	15 44 19.4	1.0	8.6	0.65	16	17 15	10 54 58.54	8 48 16.2	1.0	8.6	0.63
3	6 54	9 37 14.05	15 43 55.0	1.0	8.6	0.65	17	17 11	10 55 1.19	8 48 16.7	1.0	8.6	0.63
4	6 50	9 37 18.41	15 43 28.6	1.0	8.6	0.65	18	17 7	10 55 3.43	8 48 19.8	1.0	8.6	0.64
5	6 46	9 37 23.17	15 43 0.1	1.0	8.6	0.65	19	17 3	10 55 5.25	8 48 25.4	1.0	8.6	0.64
6	6 42	9 37 28.34	+15 42 29.6	1.0	8.5	0.65	20	16 59	10 55 6.66	+8 48 33.7	1.0	8.6	0.64
7	6 38	9 37 33.93	15 41 57.1	1.0	8.5	0.65	21	16 55	10 55 7.65	8 48 44.4	1.0	8.6	0.64
8	6 35	9 37 39.92	15 41 22.5	1.0	8.5	0.65	22	16 52	10 55 8.22	8 48 57.7	1.0	8.7	0.64
9	6 31	9 37 46.31	15 40 46.0	1.0	8.5	0.64	23	16 48	10 55 8.37	8 49 13.5	1.0	8.7	0.64
.....	.....	.....	.....	.....	.....	.....	24	16 44	10 55 8.11	8 49 31.8	1.0	8.7	0.64
lev. 9	19 34	10 48 45.36	+ 9 16 25.8	0.9	8.0	0.59	25	16 40	10 55 7.43	+8 49 52.7	1.0	8.7	0.64
10	19 31	10 49 1.92	9 14 59.7	0.9	8.1	0.60	26	16 36	10 55 6.34	8 50 16.0	1.0	8.7	0.65
11	19 27	10 49 18.15	9 13 35.6	0.9	8.1	0.60	27	16 32	10 55 4.84	8 50 41.9	1.0	8.7	0.65
12	19 23	10 49 34.06	9 12 13.4	0.9	8.1	0.60	28	16 28	10 55 2.93	8 51 10.3	1.0	8.8	0.65
13	19 20	10 49 49.65	9 10 53.5	0.9	8.1	0.60	29	16 24	10 55 0.60	8 51 41.1	1.0	8.8	0.65
14	19 16	10 50 4.90	+ 9 9 35.5	0.9	8.1	0.60	30	16 20	10 54 57.86	+8 52 14.4	1.0	8.8	0.6
15	19 12	10 50 19.87	+ 9 8 19.8	0.9	8.1	0.60	31	16 16	10 54 54.72	+8 52 50.1	1.0	8.8	0

Stellar magnitude at opposition in February, 1919, +0.2.

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam. S. T. of Sem. Trans. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam. S. T. of Sem. Trans. Mer.
	h m	h m s	" " "	"	" s		h m	h m s	" " "	"	" s
June 11	16 57	22 15 54.69	-11 35 17.7	0.4	1.7 0.12	July 27	13 53	22 12 17.83	-11 57 5.0	0.5	1.8 0.12
12	16 53	22 15 53.63	11 35 26.1	0.4	1.7 0.12	28	13 49	22 12 9.98	11 57 50.0	0.5	1.8 0.12
13	16 49	22 15 52.39	11 35 35.6	0.4	1.7 0.12	29	13 45	22 12 2.04	11 58 35.5	0.5	1.8 0.12
14	16 45	22 15 50.98	11 35 46.0	0.4	1.7 0.12	30	13 41	22 11 54.00	11 59 21.3	0.5	1.8 0.12
15	16 41	22 15 49.38	11 35 57.4	0.4	1.7 0.12	31	13 37	22 11 45.88	12 0 7.6	0.5	1.8 0.12
16	16 37	22 15 47.61	-11 36 9.8	0.4	1.7 0.12	Aug. 1	13 32	22 11 37.68	-12 0 54.3	0.5	1.8 0.12
17	16 33	22 15 45.66	11 36 23.2	0.4	1.7 0.12	2	13 28	22 11 29.40	12 1 41.5	0.5	1.8 0.12
18	16 29	22 15 43.53	11 36 37.6	0.4	1.7 0.12	3	13 24	22 11 21.05	12 2 28.9	0.5	1.8 0.12
19	16 25	22 15 41.23	11 36 53.0	0.4	1.7 0.12	4	13 20	22 11 12.62	12 3 16.7	0.5	1.8 0.12
20	16 22	22 15 38.74	11 37 9.3	0.4	1.7 0.12	5	13 16	22 11 4.12	12 4 4.9	0.5	1.8 0.12
21	16 18	22 15 36.09	-11 37 26.7	0.5	1.7 0.12	6	13 12	22 10 55.55	-12 4 53.3	0.5	1.8 0.12
22	16 14	22 15 33.26	11 37 44.9	0.5	1.7 0.12	7	13 8	22 10 46.93	12 5 42.0	0.5	1.8 0.12
23	16 10	22 15 30.25	11 38 4.2	0.5	1.7 0.12	8	13 4	22 10 38.25	12 6 30.9	0.5	1.8 0.12
24	16 6	22 15 27.08	11 38 24.3	0.5	1.7 0.12	9	13 0	22 10 29.52	12 7 20.0	0.5	1.8 0.12
25	16 2	22 15 23.73	11 38 45.4	0.5	1.7 0.12	10	12 56	22 10 20.72	12 8 9.5	0.5	1.8 0.12
26	15 58	22 15 20.21	-11 39 7.5	0.5	1.7 0.12	11	12 52	22 10 11.87	-12 8 59.1	0.5	1.8 0.12
27	15 54	22 15 16.53	11 39 30.4	0.5	1.7 0.12	12	12 48	22 10 2.99	12 9 49.0	0.5	1.8 0.12
28	15 50	22 15 12.68	11 39 54.3	0.5	1.7 0.12	13	12 43	22 9 54.06	12 10 39.0	0.5	1.8 0.12
29	15 46	22 15 8.66	11 40 19.1	0.5	1.7 0.12	14	12 39	22 9 45.10	12 11 29.1	0.5	1.8 0.12
30	15 42	22 15 4.49	11 40 44.8	0.5	1.7 0.12	15	12 35	22 9 36.09	12 12 19.4	0.5	1.8 0.12
July 1	15 38	22 15 0.15	-11 41 11.3	0.5	1.7 0.12	16	12 31	22 9 27.06	-12 13 9.8	0.5	1.8 0.12
2	15 34	22 14 55.65	11 41 38.7	0.5	1.7 0.12	17	12 27	22 9 18.00	12 14 0.2	0.5	1.8 0.12
3	15 30	22 14 51.00	11 42 6.9	0.5	1.7 0.12	18	12 23	22 9 8.91	12 14 50.7	0.5	1.8 0.12
4	15 26	22 14 46.19	11 42 36.0	0.5	1.7 0.12	19	12 19	22 8 59.81	12 15 41.3	0.5	1.8 0.12
5	15 22	22 14 41.23	11 43 5.9	0.5	1.7 0.12	20	12 15	22 8 50.69	12 16 31.9	0.5	1.8 0.12
6	15 18	22 14 36.13	-11 43 36.6	0.5	1.7 0.12	21	12 11	22 8 41.54	-12 17 22.5	0.5	1.8 0.12
7	15 14	22 14 30.87	11 44 8.1	0.5	1.7 0.12	22	12 7	22 8 32.40	12 18 13.1	0.5	1.8 0.12
8	15 10	22 14 25.46	11 44 40.4	0.5	1.7 0.12	23	12 3	22 8 23.24	12 19 3.6	0.5	1.8 0.12
9	15 6	22 14 19.91	11 45 13.5	0.5	1.7 0.12	24	11 59	22 8 14.08	12 19 54.1	0.5	1.8 0.12
10	15 2	22 14 14.22	11 45 47.3	0.5	1.7 0.12	25	11 54	22 8 4.93	12 20 44.5	0.5	1.8 0.12
11	14 57	22 14 8.38	-11 46 21.9	0.5	1.7 0.12	26	11 50	22 7 55.79	-12 21 34.8	0.5	1.8 0.12
12	14 53	22 14 2.40	11 46 57.2	0.5	1.7 0.12	27	11 46	22 7 46.66	12 22 24.9	0.5	1.8 0.12
13	14 49	22 13 56.30	11 47 33.2	0.5	1.7 0.12	28	11 42	22 7 37.54	12 23 14.9	0.5	1.8 0.12
14	14 45	22 13 50.05	11 48 9.9	0.5	1.7 0.12	29	11 38	22 7 28.43	12 24 4.8	0.5	1.8 0.12
15	14 41	22 13 43.68	11 48 47.3	0.5	1.7 0.12	30	11 34	22 7 19.35	12 24 54.4	0.5	1.8 0.12
16	14 37	22 13 37.18	-11 49 25.4	0.5	1.7 0.12	31	11 30	22 7 10.29	-12 25 43.9	0.5	1.8 0.12
17	14 33	22 13 30.55	11 50 4.2	0.5	1.7 0.12	Sept. 1	11 26	22 7 1.27	12 26 33.0	0.5	1.8 0.12
18	14 29	22 13 23.79	11 50 43.6	0.5	1.7 0.12	2	11 22	22 6 52.29	12 27 21.8	0.5	1.8 0.12
19	14 25	22 13 16.92	11 51 23.6	0.5	1.7 0.12	3	11 18	22 6 43.34	12 28 10.5	0.5	1.8 0.12
20	14 21	22 13 9.92	11 52 4.3	0.5	1.7 0.12	4	11 14	22 6 34.43	12 28 58.9	0.5	1.8 0.12
21	14 17	22 13 2.81	-11 52 45.6	0.5	1.7 0.12	5	11 10	22 6 25.56	-12 29 47.0	0.5	1.8 0.12
22	14 13	22 12 55.58	11 53 27.4	0.5	1.7 0.12	6	11 6	22 6 16.74	12 30 34.7	0.5	1.8 0.12
23	14 9	22 12 48.24	11 54 9.8	0.5	1.7 0.12	7	11 1	22 6 7.97	12 31 22.0	0.5	1.8 0.12
24	14 5	22 12 40.80	11 54 52.8	0.5	1.8 0.12	8	10 57	22 5 59.26	12 32 8.9	0.5	1.8 0.12
25	14 1	22 12 33.25	11 55 36.4	0.5	1.8 0.12	9	10 53	22 5 50.61	12 32 55.5	0.5	1.8 0.12
26	13 57	22 12 25.59	-11 56 20.5	0.5	1.8 0.12	10	10 49	22 5 42.02	-12 33 41.7	0.5	1.8 0.12
27	13 53	22 12 17.83	-11 57 5.0	0.5	1.8 0.12	11	10 45	22 5 33.49	-12 34 27.6	0.5	1.8 0.12

Stellar magnitude at opposition in August, 1919, 6.1.

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Sept. 11	10 45 22	5 33.49	-12 34 27.6	0.5	1.8	0.12	Oct. 27	7 40 22	1 7.41	-12 57 15.1	0.5	1.7	0.12
12	10 41 22	5 25.04	12 35 13.0	0.5	1.8	0.12	28	7 36 22	1 5.34	12 57 24.1	0.5	1.7	0.12
13	10 37 22	5 16.65	12 35 57.9	0.5	1.8	0.12	29	7 32 22	1 3.45	12 57 32.1	0.5	1.7	0.12
14	10 33 22	5 8.34	12 36 42.3	0.5	1.8	0.12	30	7 28 22	1 1.76	12 57 38.9	0.5	1.7	0.12
15	10 29 22	5 0.12	12 37 26.3	0.5	1.8	0.12	31	7 24 22	1 0.25	12 57 44.6	0.5	1.7	0.12
16	10 25 22	4 51.97	-12 38 9.7	0.5	1.8	0.12	Nov. 1	7 20 22	0 58.94	-12 57 49.4	0.5	1.7	0.12
17	10 21 22	4 43.91	12 38 52.5	0.5	1.8	0.12	2	7 16 22	0 57.82	12 57 53.2	0.5	1.7	0.12
18	10 17 22	4 35.95	12 39 34.8	0.5	1.8	0.12	3	7 12 22	0 56.90	12 57 55.9	0.5	1.7	0.12
19	10 13 22	4 28.07	12 40 16.6	0.5	1.8	0.12	4	7 8 22	0 56.16	12 57 57.4	0.5	1.7	0.12
20	10 9 22	4 20.29	12 40 57.7	0.5	1.8	0.12	5	7 4 22	0 55.62	12 57 58.0	0.5	1.7	0.12
21	10 4 22	4 12.61	-12 41 38.2	0.5	1.8	0.12	6	7 0 22	0 55.27	-12 57 57.6	0.5	1.7	0.12
22	10 0 22	4 5.04	12 42 18.2	0.5	1.8	0.12	7	6 56 22	0 55.11	12 57 56.1	0.4	1.7	0.12
23	9 56 22	3 57.57	12 42 57.4	0.5	1.7	0.12	8	6 52 22	0 55.16	12 57 53.4	0.4	1.7	0.12
24	9 52 22	3 50.21	12 43 36.1	0.5	1.7	0.12	9	6 49 22	0 55.39	12 57 49.8	0.4	1.7	0.12
25	9 48 22	3 42.97	12 44 14.1	0.5	1.7	0.12	10	6 45 22	0 55.82	12 57 45.2	0.4	1.7	0.12
26	9 44 22	3 35.84	-12 44 51.4	0.5	1.7	0.12	11	6 41 22	0 56.44	-12 57 39.5	0.4	1.7	0.12
27	9 40 22	3 28.84	12 45 28.0	0.5	1.7	0.12	12	6 37 22	0 57.26	12 57 32.7	0.4	1.7	0.12
28	9 36 22	3 21.96	12 46 3.8	0.5	1.7	0.12	13	6 33 22	0 58.26	12 57 24.9	0.4	1.7	0.12
29	9 32 22	3 15.21	12 46 38.9	0.5	1.7	0.12	14	6 29 22	0 59.47	12 57 16.0	0.4	1.7	0.12
30	9 28 22	3 8.58	12 47 13.3	0.5	1.7	0.12	15	6 25 22	1 0.89	12 57 6.1	0.4	1.7	0.12
Oct. 1	9 24 22	3 2.09	-12 47 46.9	0.5	1.7	0.12	16	6 21 22	1 2.49	-12 56 55.1	0.4	1.7	0.12
2	9 20 22	2 55.73	12 48 19.7	0.5	1.7	0.12	17	6 17 22	1 4.29	12 56 43.0	0.4	1.7	0.12
3	9 16 22	2 49.51	12 48 51.7	0.5	1.7	0.12	18	6 13 22	1 6.28	12 56 29.9	0.4	1.7	0.12
4	9 12 22	2 43.43	12 49 22.9	0.5	1.7	0.12	19	6 9 22	1 8.48	12 56 15.6	0.4	1.7	0.12
5	9 8 22	2 37.49	12 49 53.3	0.5	1.7	0.12	20	6 6 22	1 10.87	12 56 0.3	0.4	1.7	0.11
6	9 4 22	2 31.70	-12 50 23.0	0.5	1.7	0.12	21	6 2 22	1 13.45	-12 55 44.1	0.4	1.7	0.11
7	9 0 22	2 26.06	12 50 51.7	0.5	1.7	0.12	22	5 58 22	1 16.23	12 55 26.7	0.4	1.7	0.11
8	8 56 22	2 20.57	12 51 19.6	0.5	1.7	0.12	23	5 54 22	1 19.21	12 55 8.3	0.4	1.7	0.11
9	8 52 22	2 15.23	12 51 46.6	0.5	1.7	0.12	24	5 50 22	1 22.38	12 54 48.8	0.4	1.7	0.11
10	8 48 22	2 10.04	12 52 12.7	0.5	1.7	0.12	25	5 46 22	1 25.75	12 54 28.3	0.4	1.7	0.11
11	8 44 22	2 5.02	-12 52 38.1	0.5	1.7	0.12	26	5 42 22	1 29.31	-12 54 6.8	0.4	1.7	0.11
12	8 40 22	2 0.14	12 53 2.5	0.5	1.7	0.12	27	5 38 22	1 33.06	12 53 44.3	0.4	1.7	0.11
13	8 36 22	1 55.41	12 53 26.0	0.5	1.7	0.12	28	5 35 22	1 37.00	12 53 20.8	0.4	1.7	0.11
14	8 32 22	1 50.86	12 53 48.7	0.5	1.7	0.12	29	5 31 22	1 41.13	12 52 56.1	0.4	1.7	0.11
15	8 28 22	1 46.47	12 54 10.4	0.5	1.7	0.12	30	5 27 22	1 45.45	12 52 30.4	0.4	1.7	0.11
16	8 24 22	1 42.25	-12 54 31.1	0.5	1.7	0.12	Dec. 1	5 23 22	1 49.96	-12 52 3.8	0.4	1.7	0.11
17	8 20 22	1 38.21	12 54 50.9	0.5	1.7	0.12	2	5 19 22	1 54.66	12 51 36.2	0.4	1.7	0.11
18	8 16 22	1 34.33	12 55 9.8	0.5	1.7	0.12	3	5 15 22	1 59.54	12 51 7.6	0.4	1.7	0.11
19	8 12 22	1 30.62	12 55 27.7	0.5	1.7	0.12	4	5 11 22	2 4.61	12 50 38.0	0.4	1.7	0.11
20	8 8 22	1 27.08	12 55 44.6	0.5	1.7	0.12	5	5 8 22	2 9.86	12 50 7.4	0.4	1.7	0.11
21	8 4 22	1 23.73	-12 56 0.5	0.5	1.7	0.12	6	5 4 22	2 15.29	-12 49 35.9	0.4	1.7	0.11
22	8 0 22	1 20.56	12 56 15.5	0.5	1.7	0.12	7	5 0 22	2 20.90	12 49 3.4	0.4	1.7	0.11
23	7 56 22	1 17.56	12 56 29.5	0.5	1.7	0.12	8	4 56 22	2 26.70	12 48 29.8	0.4	1.7	0.11
24	7 52 22	1 14.74	12 56 42.4	0.5	1.7	0.12	9	4 52 22	2 32.66	12 47 55.3	0.4	1.6	0.11
25	7 48 22	1 12.11	12 56 54.4	0.5	1.7	0.12	10	4 48 22	2 38.81	12 47 19.9	0.4	1.6	0.11
26	7 44 22	1 9.67	-12 57 5.3	0.5	1.7	0.12	11	4 45 22	2 45.13	-12 46 43.6	0.4	1.6	0.11
27	7 40 22	1 7.41	-12 57 15.1	0.5	1.7	0.12	12	4 41 22	2 51.63	-12 46 6.3	0.4	1.6	0.11

Stellar magnitude at opposition in August, 1919, 6.1.

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	14 5	8 44 19.64	+18 0 7.5	0.3	1.3	0.09	Feb. 15	10 59	8 39 17.50	+18 19 50.4	0.3	1.3	0.09
1	14 1	8 44 13.83	18 0 30.6	0.3	1.3	0.09	16	10 55	8 39 11.12	18 20 15.2	0.3	1.3	0.09
2	13 57	8 44 7.95	18 0 53.9	0.3	1.3	0.09	17	10 51	8 39 4.80	18 20 39.7	0.3	1.3	0.09
3	13 53	8 44 2.00	18 1 17.6	0.3	1.3	0.09	18	10 47	8 38 58.52	18 21 4.0	0.3	1.3	0.09
4	13 49	8 43 55.98	18 1 41.4	0.3	1.3	0.09	19	10 43	8 38 52.30	18 21 28.0	0.3	1.3	0.09
5	13 45	8 43 49.89	+18 2 5.5	0.3	1.3	0.09	20	10 39	8 38 46.15	+18 21 51.9	0.3	1.3	0.09
6	13 41	8 43 43.74	18 2 29.8	0.3	1.3	0.09	21	10 35	8 38 40.05	18 22 15.5	0.3	1.3	0.09
7	13 37	8 43 37.53	18 2 54.4	0.3	1.3	0.09	22	10 31	8 38 34.01	18 22 38.9	0.3	1.3	0.09
8	13 32	8 43 31.26	18 3 19.1	0.3	1.3	0.09	23	10 27	8 38 28.04	18 23 2.0	0.3	1.3	0.09
9	13 28	8 43 24.94	18 3 44.1	0.3	1.3	0.09	24	10 23	8 38 22.13	18 23 24.9	0.3	1.3	0.09
10	13 24	8 43 18.57	+18 4 9.2	0.3	1.3	0.09	25	10 19	8 38 16.30	+18 23 47.4	0.3	1.3	0.09
11	13 20	8 43 12.15	18 4 34.5	0.3	1.3	0.09	26	10 15	8 38 10.54	18 24 9.7	0.3	1.3	0.09
12	13 16	8 43 5.68	18 5 0.0	0.3	1.3	0.09	27	10 11	8 38 4.86	18 24 31.7	0.3	1.3	0.09
13	13 12	8 42 59.18	18 5 25.6	0.3	1.3	0.09	28	10 6	8 37 59.25	18 24 53.4	0.3	1.3	0.09
14	13 8	8 42 52.64	18 5 51.3	0.3	1.3	0.09	Mar. 1	10 2	8 37 53.72	18 25 14.8	0.3	1.3	0.09
15	13 4	8 42 46.05	+18 6 17.3	0.3	1.3	0.09	2	9 58	8 37 48.28	+18 25 35.9	0.3	1.3	0.09
16	13 0	8 42 39.43	18 6 43.3	0.3	1.3	0.09	3	9 54	8 37 42.92	18 25 56.6	0.3	1.3	0.09
17	12 56	8 42 32.77	18 7 9.3	0.3	1.3	0.09	4	9 50	8 37 37.64	18 26 17.1	0.3	1.3	0.09
18	12 52	8 42 26.08	18 7 35.6	0.3	1.3	0.09	5	9 46	8 37 32.46	18 26 37.2	0.3	1.3	0.09
19	12 48	8 42 19.36	18 8 2.0	0.3	1.3	0.09	6	9 42	8 37 27.36	18 26 56.9	0.3	1.3	0.09
20	12 44	8 42 12.62	+18 8 28.4	0.3	1.3	0.09	7	9 38	8 37 22.36	+18 27 16.2	0.3	1.3	0.09
21	12 40	8 42 5.86	18 8 54.9	0.3	1.3	0.09	8	9 34	8 37 17.46	18 27 35.2	0.3	1.3	0.09
22	12 36	8 41 59.07	18 9 21.4	0.3	1.3	0.09	9	9 30	8 37 12.65	18 27 53.9	0.3	1.3	0.09
23	12 32	8 41 52.26	18 9 48.1	0.3	1.3	0.09	10	9 26	8 37 7.93	18 28 12.2	0.3	1.3	0.09
24	12 28	8 41 45.45	18 10 14.8	0.3	1.3	0.09	11	9 22	8 37 3.32	18 28 30.1	0.3	1.3	0.09
25	12 24	8 41 38.63	+18 10 41.5	0.3	1.3	0.09	12	9 18	8 36 58.81	+18 28 47.7	0.3	1.3	0.09
26	12 20	8 41 31.78	18 11 8.2	0.3	1.3	0.09	13	9 14	8 36 54.41	18 29 4.8	0.3	1.3	0.09
27	12 16	8 41 24.93	18 11 34.9	0.3	1.3	0.09	14	9 10	8 36 50.10	18 29 21.5	0.3	1.3	0.09
28	12 12	8 41 18.08	18 12 1.6	0.3	1.3	0.09	15	9 6	8 36 45.90	18 29 37.9	0.3	1.3	0.09
29	12 8	8 41 11.23	18 12 28.4	0.3	1.3	0.09	16	9 2	8 36 41.81	18 29 53.9	0.3	1.3	0.09
30	12 4	8 41 4.38	+18 12 55.1	0.3	1.3	0.09	17	8 58	8 36 37.83	+18 30 9.4	0.3	1.3	0.09
31	12 0	8 40 57.55	18 13 21.8	0.3	1.3	0.09	18	8 54	8 36 33.96	18 30 24.5	0.3	1.3	0.09
Feb. 1	11 55	8 40 50.72	18 13 48.5	0.3	1.3	0.09	19	8 50	8 36 30.21	18 30 39.2	0.3	1.3	0.09
2	11 51	8 40 43.90	18 14 15.1	0.3	1.3	0.09	20	8 46	8 36 26.56	18 30 53.5	0.3	1.3	0.09
3	11 47	8 40 37.09	18 14 41.6	0.3	1.3	0.09	21	8 42	8 36 23.02	18 31 7.3	0.3	1.3	0.09
4	11 43	8 40 30.30	+18 15 8.0	0.3	1.3	0.09	22	8 38	8 36 19.61	+18 31 20.7	0.3	1.3	0.09
5	11 39	8 40 23.52	18 15 34.3	0.3	1.3	0.09	23	8 34	8 36 16.31	18 31 33.7	0.3	1.3	0.09
6	11 35	8 40 16.77	18 16 0.5	0.3	1.3	0.09	24	8 30	8 36 13.14	18 31 46.3	0.3	1.3	0.09
7	11 31	8 40 10.05	18 16 26.7	0.3	1.3	0.09	25	8 26	8 36 10.08	18 31 58.5	0.3	1.3	0.09
8	11 27	8 40 3.36	18 16 52.7	0.3	1.3	0.09	26	8 22	8 36 7.14	18 32 10.2	0.3	1.3	0.09
9	11 23	8 39 56.69	+18 17 18.5	0.3	1.3	0.09	27	8 18	8 36 4.33	+18 32 21.4	0.3	1.3	0.09
10	11 19	8 39 50.06	18 17 44.2	0.3	1.3	0.09	28	8 14	8 36 1.64	18 32 32.1	0.3	1.3	0.09
11	11 15	8 39 43.47	18 18 9.8	0.3	1.3	0.09	29	8 10	8 35 59.07	18 32 42.4	0.3	1.3	0.09
12	11 11	8 39 36.91	18 18 35.2	0.3	1.3	0.09	30	8 6	8 35 56.64	18 32 52.2	0.3	1.3	0.09
13	11 7	8 39 30.39	18 19 0.5	0.3	1.3	0.09	31	8 2	8 35 54.33	18 33 1.6	0.3	1.3	0.09
14	11 3	8 39 23.92	+18 19 25.5	0.3	1.3	0.09	Apr. 1	7 58	8 35 52.14	+18 33 10.5	0.3	1.3	0.09
15	10 59	8 39 17.50	+18 19 50.4	0.3	1.3	0.09	2	7 55	8 35 50.08	+18 33 18.9	0.3	1.3	0.09

Stellar magnitude at opposition in January, 1919, 7.1.

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m s	h m s	° ' "	"	" s			h m s	h m s	° ' "	"	" s	
pr. 1	7 58	8 35 52.14	+18 33 10.5	0.3	1.3	0.09	Nov. 15	17 18	8 55 59.03	+17 17 25.2	0.3	1.3	0.09
2	7 55	8 35 50.08	18 33 18.9	0.3	1.3	0.09	16	17 14	8 55 58.76	17 17 26.9	0.3	1.3	0.09
3	7 51	8 35 48.16	18 33 26.7	0.3	1.3	0.09	17	17 10	8 55 58.36	17 17 29.2	0.3	1.3	0.09
4	7 47	8 35 46.37	18 33 34.1	0.3	1.3	0.09	18	17 6	8 55 57.82	17 17 32.0	0.3	1.3	0.09
5	7 43	8 35 44.70	18 33 41.0	0.3	1.3	0.09	19	17 2	8 55 57.14	17 17 35.4	0.3	1.3	0.09
6	7 39	8 35 43.17	+18 33 47.5	0.3	1.3	0.09	20	16 58	8 55 56.33	+17 17 39.4	0.3	1.3	0.09
7	7 35	8 35 41.77	18 33 53.4	0.3	1.3	0.09	21	16 55	8 55 55.38	17 17 43.9	0.3	1.3	0.09
8	7 31	8 35 40.51	18 33 58.9	0.3	1.3	0.09	22	16 51	8 55 54.29	17 17 49.0	0.3	1.3	0.09
9	7 27	8 35 39.37	18 34 3.9	0.3	1.3	0.09	23	16 47	8 55 53.07	17 17 54.6	0.3	1.3	0.09
10	7 23	8 35 38.37	18 34 8.4	0.3	1.3	0.09	24	16 43	8 55 51.72	17 18 0.8	0.3	1.3	0.09
11	7 19	8 35 37.51	+18 34 12.4	0.3	1.3	0.09	25	16 39	8 55 50.23	+17 18 7.6	0.3	1.3	0.09
12	7 15	8 35 36.77	18 34 16.0	0.3	1.3	0.09	26	16 35	8 55 48.61	17 18 14.9	0.3	1.3	0.09
13	7 11	8 35 36.17	18 34 19.0	0.3	1.3	0.09	27	16 31	8 55 46.85	17 18 22.7	0.3	1.3	0.09
14	7 7	8 35 35.70	18 34 21.6	0.3	1.3	0.09	28	16 27	8 55 44.97	17 18 31.1	0.3	1.3	0.09
15	7 3	8 35 35.37	18 34 23.7	0.3	1.3	0.09	29	16 23	8 55 42.95	17 18 40.0	0.3	1.3	0.09
16	6 59	8 35 35.17	+18 34 25.3	0.3	1.3	0.09	30	16 19	8 55 40.80	+17 18 49.5	0.3	1.3	0.09
17	6 55	8 35 35.11	18 34 26.3	0.3	1.3	0.09	Dec. 1	16 15	8 55 38.52	17 18 59.5	0.3	1.3	0.09
18	6 51	8 35 35.19	18 34 26.9	0.3	1.3	0.09	2	16 11	8 55 36.12	17 19 10.0	0.3	1.3	0.09
19	6 47	8 35 35.39	18 34 27.0	0.3	1.3	0.09	3	16 7	8 55 33.59	17 19 21.0	0.3	1.3	0.09
20	6 44	8 35 35.73	18 34 26.6	0.3	1.3	0.09	4	16 3	8 55 30.94	17 19 32.5	0.3	1.3	0.09
21	6 40	8 35 36.20	+18 34 25.7	0.3	1.3	0.09	5	15 59	8 55 28.16	+17 19 44.5	0.3	1.3	0.09
22	6 36	8 35 36.81	18 34 24.2	0.3	1.3	0.09	6	15 55	8 55 25.27	17 19 57.0	0.3	1.3	0.09
23	6 32	8 35 37.56	18 34 22.2	0.3	1.3	0.09	7	15 51	8 55 22.25	17 20 10.0	0.3	1.3	0.09
24	6 28	8 35 38.44	18 34 19.8	0.3	1.3	0.09	8	15 47	8 55 19.11	17 20 23.5	0.3	1.3	0.09
.....	.....	.....	.....	.....	.....	.....	9	15 43	8 55 15.85	17 20 37.6	0.3	1.3	0.09
ct. 25	18 40	8 55 33.08	+17 18 59.6	0.3	1.3	0.09	10	15 39	8 55 12.47	+17 20 52.1	0.3	1.3	0.09
26	18 36	8 55 35.67	17 18 49.6	0.3	1.3	0.09	11	15 35	8 55 8.97	17 21 7.1	0.3	1.3	0.09
27	18 33	8 55 38.12	17 18 40.1	0.3	1.3	0.09	12	15 31	8 55 5.35	17 21 22.6	0.3	1.3	0.09
28	18 29	8 55 40.44	17 18 31.1	0.3	1.3	0.09	13	15 27	8 55 1.62	17 21 38.5	0.3	1.3	0.09
29	18 25	8 55 42.62	17 18 22.7	0.3	1.3	0.09	14	15 23	8 54 57.77	17 21 54.9	0.3	1.3	0.09
30	18 21	8 55 44.67	+17 18 14.8	0.3	1.3	0.09	15	15 19	8 54 53.81	+17 22 11.8	0.3	1.3	0.09
31	18 17	8 55 46.59	17 18 7.5	0.3	1.3	0.09	16	15 15	8 54 49.74	17 22 29.1	0.3	1.3	0.09
lov. 1	18 13	8 55 48.37	17 18 0.8	0.3	1.3	0.09	17	15 11	8 54 45.56	17 22 46.9	0.3	1.3	0.09
2	18 9	8 55 50.02	17 17 54.6	0.3	1.3	0.09	18	15 7	8 54 41.27	17 23 5.1	0.3	1.3	0.09
3	18 5	8 55 51.53	17 17 49.0	0.3	1.3	0.09	19	15 3	8 54 36.88	17 23 23.7	0.3	1.3	0.09
4	18 1	8 55 52.90	+17 17 44.0	0.3	1.3	0.09	20	14 59	8 54 32.39	+17 23 42.7	0.3	1.3	0.09
5	17 57	8 55 54.14	17 17 39.5	0.3	1.3	0.09	21	14 55	8 54 27.79	17 24 2.2	0.3	1.3	0.09
6	17 54	8 55 55.24	17 17 35.5	0.3	1.3	0.09	22	14 51	8 54 23.09	17 24 22.1	0.3	1.3	0.09
7	17 50	8 55 56.21	17 17 32.1	0.3	1.3	0.09	23	14 47	8 54 18.29	17 24 42.3	0.3	1.3	0.09
8	17 46	8 55 57.04	17 17 29.3	0.3	1.3	0.09	24	14 43	8 54 13.40	17 25 3.0	0.3	1.3	0.09
9	17 42	8 55 57.74	+17 17 27.0	0.3	1.3	0.09	25	14 39	8 54 8.41	+17 25 24.0	0.3	1.3	0.09
10	17 38	8 55 58.30	17 17 25.3	0.3	1.3	0.09	26	14 35	8 54 3.33	17 25 45.4	0.3	1.3	0.09
11	17 34	8 55 58.72	17 17 24.1	0.3	1.3	0.09	27	14 31	8 53 58.16	17 26 7.1	0.3	1.3	0.09
12	17 30	8 55 59.00	17 17 23.5	0.3	1.3	0.09	28	14 27	8 53 52.90	17 26 29.2	0.3	1.3	0.09
13	17 26	8 55 59.15	17 17 23.5	0.3	1.3	0.09	29	14 23	8 53 47.56	17 26 51.6	0.3	1.3	0.09
14	17 22	8 55 59.16	+17 17 24.1	0.3	1.3	0.09	30	14 19	8 53 42.13	+17 27 14.4	0.3	1.3	0.09
15	17 18	8 55 59.03	+17 17 25.2	0.3	1.3	0.09	31	14 15	8 53 36.62	+17 27 37.3	0.3	1.3	0.09

Stellar magnitude at opposition in January, 1919, 7.7.

11

12

13

14

PART III.

PHENOMENA.

In the year 1919 there will be three eclipses, two of the Sun and one of the Moon.

I.—*A Total Eclipse of the Sun, May 28–29, 1919, invisible at Washington.*

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of δ in right ascension, May 29					
	d	h	m	s	
Sun and Moon's R. A.	4	21	6.93	Hourly motions	10.17 and 161.66
Sun's declination	+21	30	15.1	Hourly motion	+ 0 23.9
Moon's declination	+21	12	12.4	Hourly motion	+ 2 49.7
Sun's equa. hor. parallax			8.7	Sun's true semidiameter	15 46.6
Moon's equa. hor. parallax	61	3.8		Moon's true semidiameter	16 37.5

CIRCUMSTANCES OF THE ECLIPSE.

	Greenwich Mean Time.	Longitude from Greenwich.	Latitude.
	d h m	d h m	d h m
Eclipse begins	May 28 22 33.5	+63 27	-14 6
Central eclipse begins	28 23 30.1	+75 9	-19 43
Central eclipse at local apparent noon	29 1 6.6	+17 23	+ 4 18
Central eclipse ends	29 2 47.4	-42 27	-12 25
Eclipse ends	29 3 44.0	-30 36	- 6 46

II.—*A Partial Eclipse of the Moon, November 7, 1919, visible at Washington; the beginning visible generally in Asia except the eastern portion, Europe, Africa, the eastern part of North America, and South America except the extreme western part; the ending visible generally in western Asia, Europe, Africa, South America, and North America except the extreme western part.*

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of δ in right ascension, Nov. 7					
	d	h	m	s	
Sun's right ascension	14	48	16.89	Hourly motion	9.99
Moon's right ascension	2	48	16.89	Hourly motion	155.96
Sun's declination	-16	12	18.1	Hourly motion	- 0 44.5
Moon's declination	+17	10	9.9	Hourly motion	+ 7 53.9
Sun's equa. hor. parallax			8.9	Sun's true semidiameter	16 8.7
Moon's equa. hor. parallax	61	18.2		Moon's true semidiameter	16 41.4

CIRCUMSTANCES OF THE ECLIPSE.

	Nov.	d	h	m	
Moon enters penumbra	7	9	33.6	} Greenwich Mean Time.	
Moon enters umbra	7	10	58.3		
Middle of the eclipse	7	11	44.1		
Moon leaves umbra	7	12	29.9		
Moon leaves penumbra	7	13	55.0		
Contacts of Umbra with Moon's Limb.	Angles of Position from the North Point.		The Moon being in the Zenith		
			In Longitude from Greenwich,	and in Latitude	
First	143 to E.		-10 42	+17 1	
Last	166 to W.		+11 16	+17 13	

Magnitude of the eclipse=0.184 (Moon's diameter=1.0).

III.—*An Annular Eclipse of the Sun*, November 22, 1919, visible at Washington as a partial eclipse.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ζ in right ascension, November 22				d	h	m	^s
				22	3	7	37.5
Sun and Moon's R. A.	^h	^m	^s	Hourly motions			
	15	48	14.18	10.50 and 124.64			
Sun's declination	–20	0	6.2	Hourly motion			
Moon's declination	–19	35	28.1	Hourly motion			
Sun's equa. hor. parallax	8.9			Sun's true semidiameter			
Moon's equa. hor. parallax	53	56.8		Moon's true semidiameter			
				16 11.7			
				14 41.3			

CIRCUMSTANCES OF THE ECLIPSE.

	November	Greenwich Mean Time.			Longitude from Greenwich.		Latitude.	
		d	h	m	°	'	°	'
Eclipse begins		22	0	14.4	+ 88	35	+22	11
Central eclipse begins		22	1	28.0	+102	31	+31	41
Central eclipse at local apparent noon		22	3	7.6	+ 50	24	+ 7	18
Central eclipse ends		22	5	0.1	– 4	11	+19	11
Eclipse ends		22	6	13.7	+ 10	25	+ 9	33

The regions within which the eclipses of the Sun are visible are laid down in the accompanying charts, from which, by means of the dotted lines, the Greenwich mean times of beginning and ending at any place may be found with an uncertainty which will vary from three or four minutes for a high sun to fifteen or twenty minutes when the Sun is near the horizon.

BESSELIAN ELEMENTS OF THE TOTAL ECLIPSE OF THE SUN,
MAY 28-29, 1919.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radii of Penumbra and Umbra on Fundamental Plane.	
	<i>z</i>	<i>y</i>	Log sin <i>d</i>	Log cos <i>d</i>	<i>μ</i>	<i>h</i>	<i>k</i>
<i>h m</i>							
22 30	-1.51297	-0.40113	+9.56384	+9.96871	338 13.8	+0.53172	-0.01412
40	1.41640	0.39438	9.56386	9.96871	340 43.8	0.53174	0.01411
50	1.31982	0.38763	9.56388	9.96870	343 13.8	0.53176	0.01409
23 0	-1.22325	-0.38069	+9.56390	+9.96870	345 43.8	+0.53177	-0.01407
10	1.12666	0.37416	9.56392	9.96870	348 13.8	0.53179	0.01406
20	1.03008	0.36744	9.56394	9.96869	350 43.8	0.53181	0.01404
30	0.93349	0.36073	9.56396	9.96869	353 13.8	0.53182	0.01403
40	0.83690	0.35402	9.56398	9.96869	355 43.8	0.53184	0.01401
50	0.74030	0.34732	9.56400	9.96868	358 13.8	0.53186	0.01400
0 0	-0.64371	-0.34063	+9.56403	+9.96868	0 43.8	+0.53186	-0.01399
10	0.54711	0.33394	9.56405	9.96868	3 13.8	0.53187	0.01397
20	0.45051	0.32727	9.56407	9.96868	5 43.8	0.53188	0.01396
30	0.35391	0.32060	9.56409	9.96868	8 13.8	0.53189	0.01395
40	0.25730	0.31394	9.56411	9.96867	10 43.8	0.53190	0.01394
50	0.16070	0.30728	9.56413	9.96867	13 13.8	0.53191	0.01393
1 0	-0.06409	-0.30064	+9.56416	+9.96867	15 43.8	+0.53192	-0.01392
10	+0.03251	0.29400	9.56418	9.96867	18 13.8	0.53193	0.01392
20	0.12912	0.28737	9.56420	9.96866	20 43.8	0.53194	0.01391
30	0.22572	0.28075	9.56422	9.96866	23 13.8	0.53194	0.01390
40	0.32233	0.27413	9.56424	9.96866	25 43.8	0.53195	0.01389
50	0.41893	0.26753	9.56426	9.96865	28 13.8	0.53196	0.01389
2 0	+0.51554	-0.26093	+9.56428	+9.96865	30 43.8	+0.53196	-0.01389
10	0.61214	0.25434	9.56430	9.96865	33 13.8	0.53196	0.01389
20	0.70874	0.24775	9.56432	9.96864	35 43.8	0.53196	0.01388
30	0.80533	0.24118	9.56434	9.96864	38 13.8	0.53197	0.01388
40	0.90193	0.23461	9.56437	9.96864	40 43.8	0.53197	0.01388
50	0.99852	0.22805	9.56439	9.96863	43 13.8	0.53197	0.01388
3 0	+1.09511	-0.22150	+9.56441	+9.96863	45 43.8	+0.53197	-0.01388
10	1.19170	0.21496	9.56443	9.96863	48 13.8	0.53197	0.01388
20	1.28828	0.20842	9.56445	9.96862	50 43.8	0.53197	0.01388
30	1.38486	0.20189	9.56447	9.96862	53 13.8	0.53197	0.01388
40	1.48144	0.19537	9.56449	9.96862	55 43.8	0.53196	0.01388
50	+1.57801	-0.18886	+9.56451	+9.96861	58 13.8	+0.53196	-0.01389

Greenwich Mean Time.	Log <i>z'</i> for 1 Minute.	Log <i>y'</i> for 1 Minute.	Log <i>μ'</i> for 1 Minute.	Log Tangents of Angles of Cones.	
				Penumbra.	Umbra.
<i>h m</i>					
22 0	+7.9848	+6.8311	+1.1761	+7.66389	+7.66172
23 0	7.9849	6.8283	1.1761	7.66388	7.66171
0 0	7.9850	6.8253	1.1761	7.66388	7.66171
1 0	7.9850	6.8223	1.1761	7.66388	7.66171
2 0	7.9850	6.8192	1.1761	7.66387	7.66171
3 0	7.9849	6.8161	1.1761	7.66387	7.66170
4 0	+7.9848	+6.8130	+1.1761	+7.66387	+7.66170

BESSELIAN ELEMENTS OF THE ANNULAR ECLIPSE OF 7 NOVEMBER 22, 1919.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius ρ and U Fundam.
	x	y	Log sin δ	Log cos δ	μ	
h m						
0 10	-1.47916	+0.63321	-9.53356	+9.97305	5 59.7	+0.57396
20	1.39590	0.62330	9.53359	9.97305	8 29.7	0.57397
30	1.31265	0.61339	9.53362	9.97304	10 59.7	0.57398
40	1.22939	0.60348	9.53365	9.97304	13 29.7	0.57399
50	1.14612	0.59358	9.53368	9.97304	15 59.7	0.57400
1 0	-1.06285	+0.58368	-9.53371	+9.97303	18 29.7	+0.57401
10	0.97958	0.57379	9.53374	9.97303	20 59.7	0.57402
20	0.89631	0.56391	9.53377	9.97302	23 29.6	0.57403
30	0.81304	0.55403	9.53381	9.97302	25 59.6	0.57404
40	0.72977	0.54416	9.53384	9.97301	28 29.6	0.57404
50	0.64649	0.53430	9.53387	9.97301	30 59.6	0.57405
2 0	-0.56321	+0.52444	-9.53390	+9.97301	33 29.6	+0.57406
10	0.47993	0.51458	9.53393	9.97300	35 59.6	0.57406
20	0.39664	0.50473	9.53396	9.97300	38 29.6	0.57407
30	0.31336	0.49489	9.53399	9.97299	40 59.5	0.57407
40	0.23008	0.48506	9.53402	9.97299	43 29.5	0.57408
50	0.14679	0.47523	9.53405	9.97299	45 59.5	0.57408
3 0	-0.06351	+0.46541	-9.53409	+9.97298	48 29.5	+0.57408
10	+0.01978	0.45559	9.53412	9.97298	50 59.5	0.57408
20	0.10307	0.44578	9.53415	9.97297	53 29.5	0.57409
30	0.18636	0.43597	9.53418	9.97297	55 59.5	0.57409
40	0.26965	0.42618	9.53421	9.97296	58 29.4	0.57409
50	0.35294	0.41639	9.53424	9.97296	60 59.4	0.57409
4 0	+0.43623	+0.40660	-9.53427	+9.97296	63 29.4	+0.57409
10	0.51952	0.39682	9.53430	9.97295	65 59.4	0.57409
20	0.60281	0.38705	9.53434	9.97295	68 29.4	0.57409
30	0.68610	0.37728	9.53437	9.97294	70 59.4	0.57408
40	0.76939	0.36752	9.53440	9.97294	73 29.4	0.57408
50	0.85268	0.35777	9.53443	9.97294	75 59.4	0.57408
5 0	+0.93597	+0.34803	-9.53446	+9.97293	78 29.3	+0.57408
10	1.01926	0.33829	9.53449	9.97293	80 59.3	0.57407
20	1.10254	0.32855	9.53452	9.97292	83 29.3	0.57407
30	1.18583	0.31883	9.53455	9.97292	85 59.3	0.57406
40	1.26911	0.30911	9.53458	9.97292	88 29.3	0.57406
50	1.35239	0.29939	9.53461	9.97291	90 59.3	0.57405
6 0	+1.43567	+0.28968	-9.53465	+9.97291	93 29.3	+0.57404
10	1.51895	0.27998	9.53468	9.97291	95 59.2	0.57404
20	+1.60222	+0.27028	-9.53471	+9.97290	98 29.2	+0.57403

Greenwich Mean Time.	Log x' for 1 Minute.	Log y' for 1 Minute.	Log μ' for 1 Minute.	Log Tangents of Angles	
				Penumbra.	
h m					
0 0	+7.9204	-6.9968	+1.1761	+7.67540	+
1 0	7.9205	6.9953	1.1761	7.67540	
2 0	7.9205	6.9937	1.1761	7.67541	
3 0	7.9206	6.9921	1.1761	7.67541	
4 0	7.9206	6.9904	1.1761	7.67541	
5 0	7.9206	6.9887	1.1761	7.67542	
6 0	7.9205	6.9870	1.1761	7.67542	
7 0	+7.9204	-6.9854	+1.1761	+7.67543	+

LOCAL CIRCUMSTANCES OF THE ECLIPSE OF THE SUN, NOV. 22, 1919.

Place.	Beginning.			Middle.		Ending.		
	Greenwich Mean Time.	Angle from North Point.	Angle from Vertex.	Greenwich Mean Time.	Magni- tude.	Greenwich Mean Time.	Angle from North Point.	Angle from Vertex.
	h m	°	°	h m		h m	°	°
Albany, N. Y.	0 46	253	293	2 0	0.43	3 24	138	154
Allegheny, Pa.	0 35	260	305	1 50	0.53	3 16	133	155
Amherst, Mass.	0 47	253	292	2 2	0.43	3 26	139	153
Ann Arbor, Mich. . . . .	...	...	...	1 48	0.54	3 10	132	158
Appleton, Wis. . . . .	...	...	...	1 46	0.54	3 5	132	160
Atlanta, Ga.	0 22	273	327	1 40	0.72	3 11	122	153
Augusta, Me.	0 56	248	283	2 8	0.37	3 29	142	154
Austin, Tex. . . . .	...	...	...	1 29 ¹	0.94 ¹	2 52	108	154
Baton Rouge, La. . . . .	...	...	...	1 32	0.87	3 1	113	153
Bismarck, N. Dak. . . . .	...	...	...	...	[0.52] ^P	2 56	128	162
Buffalo, N. Y.	0 41	256	298	1 54	0.48	3 16	136	157
Cambridge, Mass.	0 49	252	290	2 4	0.41	3 28	140	152
Charleston, W. Va.	0 30	264	312	1 46	0.59	3 14	129	155
Charlottesville, Va.	0 32	263	310	1 49	0.57	3 20	131	153
Cheyenne, Wyo. . . . .	...	...	...	...	[0.58] ^P	2 51	119	159
Cincinnati, Ohio . . . . .	...	...	...	1 44	0.60	3 10	128	156
Cleveland, Ohio	0 36	260	304	1 49	0.53	3 13	133	157
Columbia, Mo. . . . .	...	...	...	1 38	0.68	3 0	123	158
Columbia, S. C.	0 24	271	323	1 43	0.68	3 17	124	151
Columbus, Ohio	0 32	263	310	1 46	0.57	3 12	130	156
Denver, Colo. . . . .	...	...	...	...	[0.62] ^P	2 50	117	159
Des Moines, Iowa . . . . .	...	...	...	1 40	0.64	3 0	126	159
Dover, Del.	0 37	260	304	1 54	0.52	3 24	134	152
Evanston, Ill. . . . .	...	...	...	1 44	0.57	3 6	130	159
Flagstaff, Ariz. . . . .	...	...	...	...	[0.38] ^P	2 43	107	156
Geneva, N. Y.	0 43	255	296	1 56	0.46	3 19	137	156
Greencastle, Ind. . . . .	...	...	...	1 42	0.62	3 7	128	157
Hanover, N. H.	0 50	251	288	2 3	0.40	3 25	140	154
Harrisburg, Pa.	0 38	259	302	1 53	0.51	3 21	134	154
Helena, Mont. . . . .	...	...	...	...	[0.07] ^P	2 51	122	161
Iowa City, Iowa . . . . .	...	...	...	1 41	0.62	3 2	127	159
Ithaca, N. Y.	0 42	255	296	1 56	0.46	3 20	137	155
Jackson, Miss. . . . .	...	...	...	1 34	0.82	3 2	116	154
Kansas City, Mo. . . . .	...	...	...	1 37	0.70	2 58	122	158
Little Rock, Ark. . . . .	...	...	...	1 34	0.78	3 0	118	156
Louisville, Ky. . . . .	...	...	...	1 42	0.64	3 8	126	156
Madison, Wis. . . . .	...	...	...	1 44	0.57	3 4	130	160
Minneapolis, Minn. . . . .	...	...	...	1 44	0.56	3 1	130	161
Montgomery, Ala. . . . .	...	...	...	1 37	0.77	3 9	119	153
Mount Wilson, Cal. . . . .	...	...	...	...	[0.05] ^P	2 39	102	154
Nashville, Tenn. . . . .	...	...	...	1 39	0.69	3 7	123	155
New Haven, Conn.	0 44	254	295	2 0	0.45	3 26	138	152
New Orleans, La. . . . .	...	...	...	1 33	0.87	3 2	113	153
New York, N. Y.	0 42	256	298	1 58	0.47	3 25	136	153
Oklahoma City, Okla. . . . .	...	...	...	1 32	0.81	2 54	116	157
Omaha, Nebr. . . . .	...	...	...	1 38	0.66	2 58	124	159
Orono, Me.	0 59	246	280	2 10	0.35	3 30	144	153

¹ Duration of annular phase 7^m.1.

² Magnitude at sunrise. Mid-eclipse below horizon.

ECLIPSES, 1919.

563

LOCAL CIRCUMSTANCES OF THE ECLIPSE OF THE SUN, NOV. 22, 1919.

Place.	Beginning.			Middle.		Ending.		
	Greenwich Mean Time.	Angle from North Point.	Angle from Vertex.	Greenwich Mean Time.	Magni- tude.	Greenwich Mean Time.	Angle from North Point.	Angle from Vertex.
	h m	°	°	h m		h m	°	°
Oxford, Miss. . . . .	...	...	...	1 36	0.76	3 4	119	155
Panama, Panama	0 23	309	24	1 45	0.64	3 28	92	133
Philadelphia, Pa. . . .	0 39	258	301	1 55	0.50	3 24	135	153
Phoenix, Ariz. . . . .	...	...	...	...	[0.39] ¹	2 42	104	155
Pierre, S. Dak. . . . .	...	...	...	...	[0.60] ¹	2 55	125	161
Poughkeepsie, N. Y. . .	0 44	255	295	2 0	0.45	3 24	137	153
Raleigh, N. C.	0 28	266	316	1 48	0.62	3 21	128	151
Richmond, Va.	0 32	263	310	1 50	0.57	3 22	131	152
Salt Lake City, Utah . .	...	...	...	...	[0.25] ¹	2 47	114	158
San Juan, P. R.	0 27	284	343	2 7	0.86	4 11	113	113
Santa Fe, N. Mex. . . .	...	...	...	...	[0.68] ¹	2 47	111	157
Springfield, Ill. . . . .	...	...	...	1 40	0.64	3 4	126	158
St. Louis, Mo. . . . .	...	...	...	1 39	0.67	3 3	124	157
Syracuse, N. Y.	0 44	254	294	1 57	0.45	3 20	138	156
Tallahassee, Fla. . . .	0 19	278	335	1 38	0.80	3 12	118	151
Topeka, Kans. . . . .	...	...	...	1 36	0.71	2 57	121	158
Tuscaloosa, Ala. . . . .	...	...	...	1 37	0.77	3 6	119	154
Urbana, Ill. . . . .	...	...	...	1 42	0.62	3 5	127	158
Washington, D. C. . . .	0 35	261	306	1 52	0.54	3 21	132	153
Williams Bay, Wis. . . .	...	...	...	1 44	0.57	3 5	130	159

¹ Magnitude at sunrise. Mid-eclipse below horizon.

MEAN PLACES FOR 1919.0. (January 0^h.915, Greenwich.)

Name of Star.		Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.			Annual Proper Motion.	
			h	m	s	s	°	'	"	"	
36	Piscium	6.2	0	12	24.221	-0.0027	+	7	47	26.30	-0.006
d	Piscium	5.4	0	16	25.733	+0.0003		7	44	25.89	+0.016
51	Piscium	5.6	0	28	12.943	+0.0021		6	30	29.98	+0.009
136 B.	Piscium	6.5	0	37	0.647	-0.0084		8	54	47.64	-0.082
δ	Piscium	4.6	0	44	28.692	+0.0055		7	8	40.23	-0.044
101	Piscium	6.2	1	31	26.435	+0.0010	+	14	14	52.09	-0.002
π	Piscium	5.6	1	32	48.104	-0.0049		11	43	39.27	+0.034
12 H ¹ .	Arietis	6.3	1	58	13.305	-0.0009		13	5	11.79	-0.006
20 H ¹ .	Arietis	6.4	2	4	55.933	+0.0112		16	50	41.93	-0.179
19	Arietis	5.8	2	8	38.034	+0.0071		14	54	2.97	-0.021
27	Arietis	6.4	2	26	24.648	+0.0029	+	17	20	46.41	-0.089
36	Arietis	6.5	2	39	47.736	+0.0036		17	25	18.06	-0.040
40	Arietis	6.0	2	43	59.403	+0.0030		17	56	49.90	-0.019
π	Arietis	5.2	2	44	46.152	+0.0004		17	7	41.35	-0.011
124 B.	Arietis	6.4	2	48	40.645	+0.0012		16	9	12.77	-0.053
45	Arietis	6.0	2	51	15.165	-0.0011	+	18	0	15.51	-0.006
ρ	Arietis	5.6	2	51	51.609	+0.0196		17	42	3.36	-0.208
53	Arietis	6.0	3	2	51.842	-0.0019		17	34	5.15	+0.004
54	Arietis	6.5	3	3	45.379	+0.0018		18	29	6.01	-0.014
δ	Arietis	4.5	3	6	59.641	+0.0110		19	25	16.67	+0.001
ζ	Arietis	5.0	3	10	14.519	-0.0019	+	20	44	42.16	-0.082
τ	Arietis	5.2	3	16	32.848	+0.0023		20	51	21.16	-0.033
63	Arietis	5.2	3	18	5.328	-0.0032		20	27	11.96	-0.009
65	Arietis	6.0	3	19	45.694	+0.0006		20	31	1.01	-0.008
175 B.	Arietis	6.4	3	22	25.590	+0.0026		18	28	24.98	-0.011
14 H ¹ .	Tauri	6.5	3	34	17.838	....	+	20	39	10.05	....
13	Tauri	5.6	3	37	38.476	+0.0003		19	26	30.09	-0.019
14	Tauri	6.2	3	39	6.018	+0.0094		19	24	35.71	-0.049
22 H ¹ .	Tauri	6.1	3	39	45.172	+0.0008		20	40	25.95	-0.006
133 B.	Tauri	5.9	3	45	9.246	+0.0026		21	59	55.21	-0.042
32	Tauri	5.8	3	52	4.678	+0.0045	+	22	14	44.36	-0.112
Δ	Tauri	4.5	3	59	54.226	+0.0069		21	51	41.91	-0.058
39	Tauri	6.1	4	0	32.363	+0.0125		21	47	28.78	-0.131
43	Tauri	5.5	4	4	26.683	+0.0079		19	23	45.30	-0.044
192 B.	Tauri	6.1	4	8	2.814	-0.0016		22	12	22.23	-0.019
ω	Tauri	4.8	4	12	30.744	-0.0022	+	20	22	49.24	-0.055
51	Tauri	5.6	4	13	35.429	+0.0071		21	22	56.28	-0.041
53	Tauri	5.3	4	14	39.529	+0.0028		20	56	50.53	-0.051
56	Tauri	5.2	4	14	48.858	+0.0032		21	34	43.90	-0.040
224 B.	Tauri	6.1	4	17	36.698	-0.0002		20	37	51.45	-0.001
227 B.	Tauri	5.9	4	18	45.856	+0.0019	+	20	47	39.37	-0.031
κ	Tauri	4.1	4	20	32.302	+0.0062		22	6	34.67	-0.042
67	Tauri	5.4	4	20	35.432	+0.0093		22	0	56.91	-0.047
ν	Tauri	4.2	4	21	27.486	+0.0079		22	37	51.34	-0.047
72	Tauri	5.4	4	22	26.667	+0.0004		22	48	53.68	-0.008
247 B.	Tauri	5.8	4	23	12.168	+0.0073	+	21	26	23.75	-0.076
282 B.	Tauri	6.4	4	30	57.495	-0.0028		19	42	56.86	+0.018
284 B.	Tauri	6.0	4	31	36.410	+0.0109		23	10	34.22	-0.102
129 H ¹ .	Tauri	5.8	4	33	29.091	+0.0013		20	31	22.76	-0.010
τ	Tauri	4.3	4	37	22.890	+0.0007		22	48	9.45	-0.020
300 B.	Tauri	6.2	4	40	48.926	+0.0005	+	23	28	50.03	+0.004
ι	Tauri	4.7	4	58	15.176	+0.0056		21	28	31.02	-0.049
330 B.	Tauri	6.3	4	59	31.973	+0.0028		21	9	54.93	-0.034
333 B.	Tauri	6.3	5	0	45.432	-0.0036		19	41	46.61	-0.018
l	Tauri	5.2	5	3	0.712	-0.0033		20	18	44.60	-0.054
105	Tauri	6.0	5	3	4.739	+0.0004	+	21	35	55.26	-0.007
107	Tauri	6.5	5	4	3.496	+0.0002		19	45	20.99	-0.015
108	Tauri	6.2	5	10	35.462	-0.0005	+	22	11	35.54	-0.025

STARS OCCULTED BY THE MOON, 1919. 565

MEAN PLACES FOR 1919.0. (January 0^d.915, Greenwich.)

Name of Star.		Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.	Annual Proper Motion.
			h	m	s	s	° ' "	"
η	Tauri	5.1	5	14	24.564	+0.0021	+22 0 49.93	-0.063
351 B.	Tauri	6.2	5	14	27.140	-0.0014	20 3 2.94	-0.029
353 B.	Tauri	6.5	5	16	9.535	+0.0025	19 44 0.46	-0.024
σ	Tauri	4.8	5	22	46.133	+0.0006	21 52 8.07	-0.010
372 B.	Tauri	6.1	5	28	49.893	-0.0001	20 25 4.22	-0.013
ζ	Tauri	3.0	5	32	48.190	+0.0006	+21 5 39.09	-0.032
175 H ¹ .	Tauri	6.5	5	37	10.043	-0.0020	22 37 16.65	+0.018
394 B.	Tauri	6.0	5	38	24.376	+0.0011	23 10 0.60	-0.042
	B. D. +19°1110	6.0	5	47	35.437	-0.0008	19 50 52.54	-0.031
χ^1	Orionis	4.5	5	49	35.160	-0.0126	20 15 44.28	-0.065
57	Orionis	5.8	5	50	8.948	+0.0003	+19 44 5.63	-0.013
141	Tauri	6.3	5	56	48.112	-0.0009	22 24 0.42	-0.011
64	Orionis	5.1	5	58	39.698	+0.0014	19 41 34.80	-0.021
χ^2	Orionis	4.7	5	59	6.581	+0.0011	20 8 29.42	-0.003
14 B.	Geminorum	6.0	6	4	39.532	+0.0021	22 12 14.32	-0.040
68	Orionis	5.7	6	7	13.528	+0.0012	+19 48 35.00	-0.013
6	Geminorum	6.3	6	7	24.521	+0.0007	22 55 40.54	-0.013
η	Geminorum (<i>var.</i>)	3.2	6	9	59.344	-0.0039	22 31 53.15	-0.016
71	Orionis	5.1	6	10	4.944	-0.0062	19 11 6.08	-0.194
μ	Geminorum	3.2	6	18	3.648	+0.0046	22 33 22.93	-0.114
15	Geminorum	6.5	6	22	56.982	-0.0015	+20 50 24.60	-0.054
16	Geminorum	6.2	6	23	7.668	-0.0019	20 32 45.37	-0.005
ν	Geminorum	4.1	6	24	9.231	-0.0006	20 15 52.52	-0.016
74 B.	Geminorum	6.2	6	42	39.502	+0.0002	18 16 56.12	-0.056
110 B.	Geminorum	6.2	6	57	42.868	....	17 52 17.30	...
ζ	Geminorum (<i>var.</i>)	3.7	6	59	18.369	-0.0002	+20 41 24.79	-0.007
162 B.	Geminorum	5.7	7	27	8.235	+0.0018	17 15 35.18	-0.064
f	Geminorum	5.3	7	34	48.004	-0.0002	17 51 36.55	+0.004
g	Geminorum	5.0	7	41	26.200	-0.0048	18 42 31.29	-0.063
1	Cancri	6.0	7	52	23.613	-0.0021	16 0 27.46	-0.044
2 B.	Cancri	6.0	7	53	54.340	+0.0003	+16 44 16.72	+0.004
3	Cancri	5.7	7	56	8.960	-0.0001	17 31 53.64	-0.010
5	Cancri	5.9	7	56	53.413	+0.0004	16 40 46.86	0.000
30 B.	Cancri	6.1	8	6	25.969	-0.0007	14 52 11.61	-0.013
29	Cancri	5.9	8	24	6.227	-0.0017	14 28 47.07	-0.022
84 B.	Cancri	6.4	8	29	15.944	-0.0023	+13 32 5.11	-0.095
90 B.	Cancri	6.3	8	31	35.306	+0.0006	15 35 40.40	-0.027
A^1	Cancri	5.5	8	38	44.665	-0.0002	12 58 20.01	-0.002
A^2	Cancri	5.7	8	42	29.719	-0.0049	12 24 28.73	-0.057
60	Cancri	5.7	8	51	30.324	-0.0009	11 56 10.36	-0.019
α	Cancri	4.3	8	54	3.562	+0.0024	+12 10 19.25	-0.042
κ	Cancri	5.1	9	3	21.729	-0.0012	10 59 41.70	-0.013
209 B.	Cancri	6.5	9	5	22.485	-0.0007	11 53 41.95	-0.079
222 B.	Cancri	6.3	9	13	28.238	+0.0046	11 50 27.75	-0.007
ω	Leonis	5.5	9	24	7.311	+0.0038	9 24 36.52	-0.012
3	Leonis	5.8	9	24	10.482	-0.0023	+ 8 32 33.15	-0.025
h	Leonis	5.2	9	27	37.225	+0.0001	10 4 25.21	-0.013
σ	Leonis	3.8	9	36	49.779	-0.0096	10 15 41.67	-0.033
10 B.	Sextantis	6.0	9	41	53.808	+0.0009	7 4 58.70	-0.034
25 B.	Sextantis	6.3	9	49	27.892	+0.0013	6 20 26.33	...
89 B.	Leonis	6.2	9	53	50.287	+0.0010	+ 8 42 4.23	-0.029
τ	Leonis	4.9	9	55	56.064	-0.0029	8 26 0.29	-0.027
14	Sextantis	6.3	10	2	33.378	-0.0022	6 0 26.04	-0.002
19	Sextantis	5.9	10	8	35.519	-0.0037	5 0 55.81	-0.006
155 B.	Leonis	6.5	10	19	2.243	-0.0167	6 6 20.02	-0.071
237 B.	Leonis	6.3	10	48	4.062	+0.0002	+ 1 27 16.78	-0.065
55	Leonis	6.1	10	51	32.431	+0.0073	1 10 8.35	-0.013
p^2	Leonis	6.1	10	59	27.860	-0.0045	+ 0 28 8.31	-0.038

MEAN PLACES FOR 1919.0. (January 0^h.915, Greenwich.)

Name of Star.		Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.			Annual Proper Motion.	
			h	m	s	s	°	'	"	"	
p^5	Leonis	5.3	11	9	36.808	-0.0029	+	0	22	17.06	-0.003
388 B.	Leonis	6.3	11	23	45.384	-0.0025	-	1	15	14.00	+0.007
e	Leonis	5.1	11	26	10.587	+0.0018		2	33	22.52	-0.008
431 B.	Leonis	6.2	11	34	15.710	-0.0028		1	59	16.77	+0.047
13 B.	Virginis	5.9	11	46	53.792	+0.0008		4	52	57.76	+0.006
78 B.	Virginis	6.5	12	10	6.466	-0.0051	-	5	16	7.45	+0.114
q	Virginis	5.3	12	29	35.822	-0.0057		9	0	18.94	+0.004
x	Virginis	4.8	12	35	3.824	-0.0056		7	33	0.02	-0.031
370 B.	Virginis	6.0	12	50	5.683	-0.0058		11	12	34.88	-0.037
ψ	Virginis	5.0	12	50	8.303	-0.0024		9	5	57.62	-0.028
49	Virginis	5.2	13	3	39.058	+0.0007	-	10	18	27.46	-0.014
50	Virginis	6.2	13	5	30.837	+0.0003		9	53	51.29	-0.017
α	Virginis (<i>Spica</i>)	1.2	13	20	55.405	-0.0028		10	44	19.88	-0.032
i	Virginis	5.7	13	22	26.238	-0.0096		12	17	11.24	-0.023
550 B.	Virginis	6.0	13	30	21.907	-0.0040		12	47	57.51	-0.014
85	Virginis	6.1	13	41	13.223	-0.0029	-	15	21	39.51	-0.034
86	Virginis	5.6	13	41	37.184	-0.0014		12	1	15.19	+0.012
621 B.	Virginis	6.4	14	0	3.686	-0.0030		14	34	58.03	-0.018
214 G.	Virginis	6.5	14	0	48.840	-0.0036		15	56	54.99	-0.012
40 H.	Virginis	5.1	14	6	24.874	+0.0003		15	55	11.76	-0.014
ι	Librae	4.7	15	7	36.022	-0.0031	-	19	29	10.09	-0.033
25	Librae	6.0	15	8	42.139	-0.0036		19	20	35.51	-0.035
26	Librae	6.3	15	9	59.282	-0.0022		17	28	0.15	-0.016
28	Librae	6.2	15	16	17.891	-0.0015		17	51	54.52	-0.061
147 B.	Librae	6.2	15	25	55.221	+0.0020		20	27	2.11	-0.029
150 B.	Librae	6.1	15	27	3.532	-0.0066	-	19	53	18.74	-0.031
11 H.	Librae	5.4	15	27	57.374	-0.0012		19	23	43.13	-0.036
172 B.	Librae	5.9	15	33	33.363	....		20	44	55.75	....
41	Librae	5.3	15	34	14.644	+0.0069		19	2	8.59	-0.058
κ	Librae	5.0	15	37	16.556	-0.0035		19	25	1.06	-0.106
λ	Librae	5.1	15	48	37.706	-0.0017	-	19	55	33.86	-0.046
47	Librae	5.8	15	50	19.346	-0.0010		19	8	40.65	-0.020
10 G.	Scorpii	5.9	15	52	56.353	+0.0012		20	44	56.56	-0.020
δ	Scorpii	2.5	15	55	32.417	-0.0011		22	23	31.98	-0.035
β	Scorpii	2.9	16	0	43.408	-0.0011		19	35	5.00	-0.028
56 B.	Scorpii	5.0	16	0	43.877	-0.0010	-	19	34	51.22	-0.005
ω^1	Scorpii	4.3	16	2	3.919	-0.0015		20	27	3.32	-0.039
ω^2	Scorpii	4.6	16	2	39.142	+0.0030		20	39	3.83	-0.061
ν	Scorpii	3.9	16	7	17.035	-0.0017		19	15	4.92	-0.041
84 B.	Scorpii	6.3	16	9	42.965	-0.0013		20	54	9.64	-0.043
51 G.	Scorpii	6.5	16	12	12.290	-0.0011	-	21	6	11.98	-0.029
58 G.	Scorpii	6.2	16	14	22.942	+0.0002		20	1	16.31	-0.008
ψ	Ophiuchi	4.6	16	19	21.671	-0.0014		19	50	55.95	-0.060
ω	Ophiuchi	4.5	16	27	19.951	+0.0014		21	17	38.77	+0.026
123 B.	Scorpii	6.5	16	35	47.878	+0.0008		20	15	5.35	+0.037
131 B.	Scorpii	5.5	16	37	7.878	+0.0021	-	19	46	12.22	+0.045
68 B.	Ophiuchi	5.9	16	48	38.166	-0.0032		20	16	51.95	-0.040
24	Ophiuchi	5.5	16	51	54.825	+0.0001		23	1	22.74	-0.034
109 B.	Ophiuchi	6.2	16	59	57.333	+0.0002		20	22	53.87	-0.013
116 B.	Ophiuchi	6.3	17	1	21.473	-0.0022		21	27	12.25	-0.083
ξ	Ophiuchi	4.4	17	16	8.901	+0.0172	-	21	1	36.50	-0.197
190 B.	Ophiuchi	5.9	17	19	51.317	-0.0008		21	22	2.11	-0.045
52	Ophiuchi	6.4	17	30	26.055	-0.0007		21	59	24.31	-0.004
58	Ophiuchi	4.8	17	38	34.552	-0.0002		21	38	41.78	-0.052
16 G.	Sagittarii	6.4	17	55	11.025	+0.0016		20	20	3.81	-0.025
21 G.	Sagittarii	5.7	17	56	59.887	-0.0013	-	22	46	46.13	-0.044
30 G.	Sagittarii	6.2	18	2	19.894	+0.0006		21	27	11.42	-0.003
39 G.	Sagittarii	6.3	18	6	26.648	-0.0027	-	19	51	31.94	-0.040

STARS OCCULTED BY THE MOON, 1919.

567

MEAN PLACES FOR 1919.0. (January 0^d.915, Greenwich.)

Name of Star.		Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.			Annual Proper Motion.
			h	m	s	s	°	'	"	"
μ	Sagittarii	4.0	18	8	55.117	-0.0004	-21	4	52.30	-0.002
14	Sagittarii	5.6	18	9	23.907	-0.0012	21	44	8.89	-0.023
15	Sagittarii	5.3	18	10	22.970	+0.0003	20	45	11.84	+0.006
16	Sagittarii	5.9	18	10	23.814	+0.0005	20	24	47.41	-0.002
Y	Sagittarii (var.)	5.4	18	16	37.071	....	18	53	49.36	-0.001
21	Sagittarii	5.0	18	20	31.571	0.0000	-20	35	9.80	-0.024
95 B.	Sagittarii	5.7	18	25	26.224	+0.0041	18	46	51.53	-0.072
115 B.	Sagittarii	5.7	18	33	3.377	-0.0021	21	27	57.95	-0.100
121 B.	Sagittarii	5.9	18	34	3.655	-0.0056	21	7	11.20	-0.138
128 B.	Sagittarii	6.3	18	40	28.580	+0.0019	21	5	5.78	-0.039
29	Sagittarii	5.3	18	44	51.783	+0.0005	-20	25	4.38	+0.030
33	Sagittarii	5.8	18	49	9.637	-0.0008	21	27	35.96	-0.015
36	Sagittarii	5.1	18	52	31.659	-0.0010	20	45	48.06	-0.011
ξ	Sagittarii	3.7	18	52	53.882	+0.0023	21	12	51.35	-0.023
171 B.	Sagittarii	6.1	18	58	18.176	0.0000	19	21	50.36	-0.035
173 B.	Sagittarii	6.4	18	58	21.691	+0.0020	-19	13	14.96	...
187 B.	Sagittarii	6.4	19	2	24.069	+0.0036	18	51	50.68	-0.056
190 B.	Sagittarii	5.4	19	3	31.210	+0.0001	19	25	5.51	-0.008
195 B.	Sagittarii	6.3	19	5	1.596	+0.0019	19	55	55.75	-0.060
d	Sagittarii	5.0	19	12	53.780	-0.0015	19	5	53.38	-0.017
226 B.	Sagittarii	6.4	19	16	52.400	+0.0002	-19	23	12.32	+0.009
ρ	Sagittarii	4.0	19	16	58.558	-0.0020	18	0	2.87	+0.015
45	Sagittarii	6.0	19	17	7.450	+0.0064	18	27	33.67	-0.082
266 B.	Sagittarii	6.1	19	31	42.798	+0.0003	19	1	57.80	-0.009
267 B.	Sagittarii	5.8	19	32	21.463	+0.0011	18	24	42.94	-0.002
54	Sagittarii	5.4	19	36	5.044	+0.0046	-16	28	48.10	-0.047
e	Sagittarii	5.2	19	37	53.216	+0.0040	16	18	53.51	-0.016
g	Sagittarii	5.1	19	53	21.478	+0.0004	15	42	25.67	-0.081
16 B.	Capricorni	6.2	20	16	13.612	+0.0025	15	2	27.90	+0.004
β	Capricorni	3.2	20	16	27.746	+0.0030	15	2	17.00	+0.007
31 B.	Capricorni	6.4	20	24	9.832	+0.0013	-16	0	37.02	+0.019
27 G.	Capricorni	6.2	20	26	32.022	-0.0058	15	19	41.61	-0.092
45 B.	Capricorni	6.1	20	29	41.204	+0.0035	14	0	2.02	+0.060
τ	Capricorni	5.2	20	34	44.718	+0.0006	15	14	22.82	-0.015
84 B.	Capricorni	6.0	20	46	14.079	+0.0106	12	50	42.92	-0.034
16 B.	Aquarii	6.4	20	48	39.827	+0.0021	-11	52	49.16	+0.065
ν	Aquarii	4.5	21	5	10.986	+0.0057	11	42	1.06	-0.006
51 G.	Aquarii	6.5	21	9	53.816	-0.0010	10	56	27.70	-0.051
17	Aquarii	6.3	21	18	35.789	-0.0022	9	39	55.01	-0.021
19	Aquarii	5.6	21	20	51.977	+0.0012	10	5	38.63	-0.164
ξ	Aquarii	4.8	21	33	26.480	+0.0075	-8	13	5.17	-0.023
c ¹	Capricorni	5.3	21	40	41.216	+0.0004	9	27	17.71	+0.008
c ²	Capricorni	6.3	21	41	57.077	+0.0008	9	39	1.29	+0.001
30	Aquarii	5.6	21	59	0.805	+0.0011	6	54	51.16	+0.016
138 B.	Aquarii	6.4	22	8	30.812	-0.0043	5	7	14.09	-0.028
44	Aquarii	5.7	22	12	52.849	-0.0003	-5	47	31.50	+0.029
51	Aquarii	5.8	22	19	53.756	+0.0011	5	14	50.37	-0.011
187 B.	Aquarii	6.3	22	27	7.104	-0.0051	3	19	34.59	-0.004
κ	Aquarii	5.2	22	33	33.747	-0.0049	4	38	46.24	-0.113
207 B.	Aquarii	6.3	22	36	36.536	....	3	58	32.60	...
6 G.	Piscium	6.2	22	54	5.312	+0.0002	-2	49	45.96	-0.082
3	Piscium	6.3	22	56	28.708	+0.0028	0	14	57.62	+0.014
22 B.	Piscium	6.4	23	19	22.620	+0.0043	-0	9	12.08	+0.038
κ	Piscium	4.9	23	22	46.809	+0.0056	+0	48	43.44	-0.093
9	Piscium	6.4	23	23	5.844	+0.0032	0	40	39.29	-0.029
16	Piscium	5.7	23	32	15.264	-0.0074	+1	39	9.34	+0.057
λ	Piscium	4.6	23	37	54.780	-0.0092	1	20	2.93	-0.154
19	Piscium	5.4	23	42	15.097	-0.0034	3	2	14.61	-0.553
22	Piscium	5.8	23	47	49.002	+0.0009	+2	28	48.34	-0.011

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		"	"	"	d h m	h m				"	"
NEW MOON.											
τ Capricorni	5.2	-0.13	+2.8	15 14.3	3 20 30.5	- 5 12.6	+0.9597	0.5572	+0.1752	+75	+17
84 B. Capricorni	6.0	0.10	3.1	12 50.7	4 1 43.8	- 0 9.9	-0.6024	0.5558	0.1821	+ 1	-80
ν Aquarii	4.5	0.05	3.2	11 42.0	10 23.4	+ 8 12.2	-0.1679	0.5537	0.1926	+25	-48
51 G. Aquarii	6.5	-0.03	+3.3	10 56.4	12 33.3	+10 17.7	-0.5363	0.5532	+0.1949	+ 6	-74
17 Aquarii	6.3	-0.01	3.5	9 39.9	16 33.5	- 9 50.2	-1.0689	0.5522	0.1991	-27	-90
19 Aquarii	5.6	0.00	3.4	10 5.6	17 36.3	- 8 49.5	-0.4155	0.5520	0.2002	+13	-64
ξ Aquarii	4.8	+0.04	3.8	8 13.0	23 25.1	- 3 12.3	-1.1758	0.5508	0.2056	-35	-90
c^1 Capricorni	5.3	0.07	3.5	9 27.2	5 2 46.6	+ 0 2.5	+0.7982	0.5501	0.2085	+81	+ 5
c^2 Capricorni	6.3	+0.08	+3.4	9 39.0	3 21.8	+ 0 36.5	+1.1225	0.5500	+0.2090	+81	+28
30 Aquarii	5.6	0.14	4.0	6 54.8	11 18.1	+ 8 17.1	-0.0190	0.5488	0.2148	+36	-40
138 B. Aquarii	6.4	0.18	4.4	5 7.2	15 44.0	-11 25.8	-0.9078	0.5482	0.2175	-12	-90
44 Aquarii	5.7	0.20	4.2	5 47.5	17 46.3	- 9 27.6	+0.2283	0.5480	0.2187	+51	-26
51 Aquarii	5.8	0.23	4.2	5 14.8	21 3.1	- 6 17.2	+0.3875	0.5477	0.2203	+61	-18
187 B. Aquarii	6.3	+0.26	+4.8	3 19.5	6 0 25.8	- 3 1.1	-0.8397	0.5475	+0.2217	- 8	-90
κ Aquarii	5.2	0.29	4.4	4 38.7	3 26.7	- 0 6.2	+1.1858	0.5473	0.2228	+86	+33
207 B. Aquarii	6.3	0.31	4.5	3 58.5	4 52.2	+ 1 16.5	+0.8156	0.5472	0.2234	+87	+ 6
3 Piscium	6.3	0.41	5.5	0 14.9	14 10.0	+10 15.9	-0.9163	0.5473	0.2254	-11	-90
κ Piscium	4.9	0.54	5.6	0 48.8	7 2 26.5	- 1 51.9	+0.7698	0.5484	0.2256	+90	+ 3
9 Piscium	6.4	+0.54	+5.6	0 40.7	2 35.3	- 1 43.4	+0.9404	0.5484	+0.2256	+90	+14
16 Piscium	5.7	0.60	5.8	1 39.3	6 50.7	+ 2 23.5	+0.9031	0.5491	0.2249	+90	+12
19 Piscium	5.4	0.65	6.1	3 2.3	11 28.7	+ 6 52.3	+0.5294	0.5499	0.2238	+73	-10
36 Piscium	6.2	0.84	7.3	7 47.6	8 1 20.4	- 3 43.9	-1.2459	0.5535	0.2177	-39	-83
d Piscium	5.4	0.86	7.2	7 44.6	3 10.5	- 1 57.5	-0.7961	0.5541	0.2166	- 5	-83
136 B. Piscium	6.5	+0.99	+7.3	8 54.9	12 29.7	+ 7 2.6	+0.0020	0.5573	+0.2099	+39	-36
101 Piscium	6.2	1.36	7.9	14 15.0	9 12 32.6	+ 6 15.1	-0.6420	0.5681	0.1842	+ 3	-73
20 H ¹ . Arietis	6.4	1.59	7.7	16 50.8	10 2 52.1	- 3 56.6	-0.7770	0.5754	0.1631	- 5	-74
27 Arietis	6.4	1.73	7.1	17 20.9	11 52.2	+ 4 43.5	+0.1153	0.5801	0.1476	+45	-23
36 Arietis	6.5	1.81	6.6	17 25.4	17 24.0	+10 3.5	+0.8281	0.5829	0.1372	+90	+18
40 Arietis	6.0	-1.84	+6.5	+17 56.9	19 8.1	+11 43.0	+0.5306	0.5837	+0.1339	+75	+ 1
45 Arietis	6.0	1.88	6.2	18 0.4	22 6.7	- 9 25.2	+0.8625	0.5852	0.1280	+90	+21
ρ Arietis	5.6	1.88	6.1	17 42.2	22 21.6	- 9 10.9	+1.2010	0.5852	0.1275	+90	+48
54 Arietis	6.5	1.96	5.8	18 29.2	11 3 12.2	- 4 31.3	+1.0018	0.5875	0.1176	+90	+31
δ Arietis	4.5	1.99	5.9	19 25.4	4 30.9	- 3 15.6	+0.2074	0.5881	0.1147	+50	-15
ζ Arietis	5.0	+2.03	+6.2	+20 44.8	5 49.8	- 1 59.7	-0.9823	0.5887	+0.1119	-20	-70
τ Arietis	5.2	2.07	5.9	20 51.5	8 22.4	+ 0 26.9	-0.8166	0.5897	0.1065	- 9	-70
63 Arietis	5.2	2.07	5.7	20 27.3	8 59.6	+ 1 2.9	-0.3439	0.5900	0.1051	+19	-44
65 Arietis	6.0	2.08	5.6	20 31.1	9 40.0	+ 1 41.5	-0.3380	0.5903	0.1036	+20	-44
14 H ¹ . Tauri	6.5	2.16	4.9	20 39.2	15 29.4	+ 7 17.4	+0.0901	0.5925	0.0905	+44	-18
22 H ¹ . Tauri	6.1	+2.19	+4.6	+20 40.5	17 39.9	+ 9 22.8	+0.2603	0.5933	+0.0855	+55	- 9
133 B. Tauri	5.9	2.24	4.7	22 0.0	19 48.8	+11 26.7	-0.9019	0.5940	0.0805	-15	-68
32 Tauri	5.8	2.28	4.4	22 14.8	22 33.7	- 9 54.9	-0.9398	0.5948	0.0740	-18	-68
A Tauri	4.5	2.31	3.9	21 51.8	12 1 39.5	- 6 56.4	-0.3334	0.5957	0.0666	+20	-40
39 Tauri	6.1	2.31	3.8	21 47.5	1 54.6	- 6 42.0	-0.2456	0.5958	0.0660	+25	-35
192 B. Tauri	6.1	+2.35	+3.5	+22 12.4	4 52.4	- 3 51.2	-0.4808	0.5965	+0.0588	+11	-49
51 Tauri	5.6	2.36	3.0	21 23.0	7 3.4	- 1 45.3	+0.4763	0.5969	0.0534	+71	+ 6
53 Tauri	5.3	2.36	2.8	20 56.9	7 28.6	- 1 21.2	+0.9391	0.5970	0.0524	+90	+33
56 Tauri	5.2	2.37	2.9	21 34.8	7 32.3	- 1 17.7	+0.3026	0.5970	0.0522	+58	- 4
227 B. Tauri	5.9	2.38	2.5	20 47.7	9 5.6	+ 0 12.0	+1.1759	0.5973	0.0485	+90	+33
κ Tauri	4.1	+2.41	+2.7	+22 6.6	9 47.4	+ 0 52.1	-0.1236	0.5974	+0.0467	+32	-20

OCCULTATIONS, 1919.

569

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declina- tion.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
67 Tauri	5.4	+2.41	+2.7	+22 1.0	12 9 48.6	+0 53.4	-0.0276	0.5974	+0.0466	+37	-21
v Tauri	4.2	2.42	2.8	22 37.9	10 9.1	+1 13.0	-0.6352	0.5975	0.0458	+2	-60
72 Tauri	5.4	2.43	2.8	22 48.9	10 32.4	+1 35.3	-0.8041	0.5976	0.0448	-8	-68
247 B. Tauri	5.8	2.41	2.4	21 26.4	10 50.3	+1 52.6	+0.6026	0.5976	0.0440	+83	+14
284 B. Tauri	6.0	2.48	2.3	23 10.6	14 8.3	+5 2.7	-1.0255	0.5981	0.0358	-25	-67
τ Tauri	4.3	+2.49	+1.9	+22 48.2	16 24.2	+7 13.2	-0.5722	0.5983	+0.0301	+6	-54
300 B. Tauri	6.2	2.52	1.9	23 28.9	17 45.1	+8 30.8	-1.2217	0.5984	0.0267	-47	-67
i Tauri	4.7	2.55	0.3	21 28.5	13 0 35.3	-8 55.2	+0.9374	0.5985	0.0094	+90	+37
330 B. Tauri	6.3	2.55	0.2	21 9.9	1 5.4	-8 26.3	+1.2568	0.5985	0.0082	+79	+66
105 Tauri	6.0	2.57	+0.2	21 35.9	2 28.9	-7 6.1	+0.8258	0.5985	+0.0046	+90	+30
108 Tauri	6.2	+2.60	-0.3	+22 11.6	5 25.8	-4 16.2	+0.2247	0.5983	-0.0028	+52	-3
n Tauri	5.1	2.61	0.6	22 0.8	6 55.8	-2 49.9	+0.4001	0.5982	0.0066	+65	+6
o Tauri	4.8	2.63	1.2	21 52.1	10 13.0	+0 19.6	+0.5126	0.5977	0.0149	+74	+11
z Tauri	3.0	2.65	2.0	21 5.6	14 10.2	+4 7.4	+1.2236	0.5970	0.0248	+87	+60
175 H. Tauri	6.5	2.69	2.0	22 37.2	15 53.6	+5 46.7	-0.3782	0.5966	0.0291	+17	-40
394 B. Tauri	6.0	+2.70	-1.9	+23 10.0	16 23.0	+6 14.9	-0.9486	0.5965	-0.0303	-19	-67
141 Tauri	6.3	2.73	3.3	22 24.0	23 40.8	-10 44.4	-0.4545	0.5945	0.0482	+13	-46
14 B. Geminorum	6.0	2.74	3.8	22 12.2	14 2 48.8	-7 43.8	-0.4175	0.5934	0.0558	+15	-45
6 Geminorum	6.3	2.76	3.9	22 55.6	3 54.8	-6 40.5	-1.2203	0.5930	0.0584	-46	-68
η Gemin. (var.)	3.2	2.76	4.1	22 31.8	4 56.8	-5 40.8	-0.8768	0.5926	0.0608	-13	-68
μ Geminorum	3.2	+2.77	-4.6	+22 35.3	8 11.4	-2 33.8	-1.1128	0.5913	-0.0684	-32	-68
15 Geminorum	6.5	2.74	5.1	20 50.3	10 9.6	+0 40.1	+0.5045	0.5904	0.0730	+73	+5
16 Geminorum	6.2	2.74	5.2	20 32.7	10 14.0	+0 36.0	+0.8006	0.5904	0.0732	+90	+22
ν Geminorum	4.1	2.74	5.2	20 15.8	10 38.8	-0 12.1	+1.0583	0.5902	0.0741	+90	+40
z Gemin. (var.)	3.7	2.77	7.4	20 41.3	15 1 1.9	-10 21.8	-0.6722	0.5828	0.1054	+1	-67
f Geminorum	5.3	+2.72	-9.5	+17 51.5	15 59.2	+4 2.5	+0.4520	0.5735	-0.1341	+68	-4
g Geminorum	5.0	2.73	9.8	18 42.4	18 50.4	+6 47.5	-0.8169	0.5715	0.1391	-8	-72
1 Cancri	6.0	2.69	10.4	16 0.3	23 35.6	+11 22.6	+1.3060	0.5683	0.1470	+76	+63
2 B. Cancri	6.0	2.70	10.4	16 44.1	16 0 15.2	-11 59.3	+0.4501	0.5679	0.1481	+67	-5
3 Cancri	5.7	2.70	10.6	17 31.7	1 14.1	-11 2.4	-0.5206	0.5672	0.1497	+10	-61
5 Cancri	5.9	+2.69	-10.6	+16 40.6	1 33.6	-10 43.5	+0.3163	0.5670	-0.1502	+58	-13
29 Cancri	5.9	2.63	11.8	14 28.6	13 39.9	+0 57.5	+0.6852	0.5586	0.1677	+90	+5
84 B. Cancri	6.4	2.61	11.9	13 31.9	16 0.2	+3 13.0	+1.2789	0.5570	0.1707	+87	+52
90 B. Cancri	6.3	2.63	12.2	15 35.5	17 3.6	+4 14.3	-1.0577	0.5562	0.1721	-24	-75
A ¹ Cancri	5.5	2.59	12.2	12 58.1	20 19.9	+7 23.9	+1.1202	0.5540	0.1760	+90	+34
60 Cancri	5.7	+2.56	-12.6	+11 56.0	17 2 13.8	-10 54.0	+1.1528	0.5500	-0.1826	+90	+35
α Cancri	4.3	2.55	12.7	12 10.1	3 25.3	-9 44.8	+0.6872	0.5491	0.1839	+90	+3
κ Cancri	5.1	2.52	12.9	10 59.5	7 47.3	-5 31.4	+1.1161	0.5462	0.1882	+90	+32
209 B. Cancri	6.5	2.52	13.1	11 53.5	8 44.4	+4 36.2	-0.0122	0.5456	0.1891	+38	-35
222 B. Cancri	6.3	2.50	13.3	11 50.2	12 35.1	-0 52.9	-0.6898	0.5432	0.1926	+1	-78
ω Leonis	5.5	+2.46	-13.3	+9 24.4	17 41.8	+4 4.0	+0.8876	0.5400	-0.1967	+90	+14
h Leonis	5.2	2.45	13.5	10 4.2	19 23.4	+5 42.3	-0.1491	0.5389	0.1979	+30	-44
o Leonis	3.8	2.43	13.8	10 15.5	23 52.4	+10 2.8	-1.2443	0.5362	0.2009	-40	-80
89 B. Leonis	6.2	2.37	13.9	8 41.8	18 8 15.9	-5 49.2	-1.2948	0.5316	0.2057	-46	-82
π Leonis	4.9	2.36	13.9	8 25.8	9 18.5	-4 48.6	-1.2245	0.5310	0.2062	-37	-82
14 Sextantis	6.3	+2.33	-13.5	+6 0.2	12 37.2	-1 36.0	+0.6820	0.5293	-0.2076	+88	0
19 Sextantis	5.9	2.31	13.4	5 0.7	15 39.4	+1 20.8	+1.1124	0.5278	0.2088	+90	+28
155 B. Leonis	6.5	2.28	13.8	6 6.1	20 56.9	+6 28.6	-1.1658	0.5254	0.2105	-31	-84
237 B. Leonis	6.3	2.17	12.9	1 27.1	19 11 53.2	-3 1.6	+0.6771	0.5195	0.2128	-87	-2
55 Leonis	6.1	2.16	12.8	1 9.9	13 41.6	-1 16.5	+0.6020	0.5189	0.2128	+79	-6
p ³ Leonis	6.1	+2.13	-12.7	+0 25.9	17 49.9	+2 44.6	+0.5164	0.5176	-0.2127	+71	-11

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ing Par- allels.	
Name.	Mag.	Red'n's from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y'	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		α	δ	α	d h m	h m					
p^s Leonis	5.3	+2.09	-12.7	+ 0 22.1	19 23 9.4	+ 7 54.9	-0.5458	0.5162	-0.2123	+10-71	
388 B. Leonis	6.3	2.04	12.2	- 1 15.4	20 6 37.0	- 8 50.4	-0.3594	0.5146	0.2111	+19-40	
e Leonis	5.1	2.03	11.8	2 33.6	7 53.9	- 7 35.7	+0.7894	0.5143	0.2108	+88+4	
431 B. Leonis	6.2	1.99	11.9	1 59.5	12 11.0	- 3 26.0	-0.7312	0.5136	0.2096	- 2-40	
13 B. Virginis	5.9	1.95	10.9	4 53.1	18 53.9	+ 3 5.4	+1.0317	0.5128	0.2074	+86+20	
78 B. Virginis	6.5	+1.86	-10.5	- 5 16.3	21 7 15.7	- 8 54.0	-1.0761	0.5122	-0.2018	-25-40	
q Virginis	5.3	1.79	8.9	9 0.5	17 38.1	+ 1 10.6	+0.9700	0.5126	0.1956	+82+16	
x Virginis	4.8	1.76	9.3	7 33.2	20 32.4	+ 3 59.9	-1.1981	0.5129	0.1937	-37-40	
370 B. Virginis	6.0	1.71	7.8	11 12.7	22 4 30.2	+11 43.9	+1.3175	0.5140	0.1878	+80+51	
ψ Virginis	5.0	1.70	8.5	9 6.1	4 31.5	+11 45.1	-1.0153	0.5139	0.1878	-22-40	
49 Virginis	5.2	+1.64	- 7.8	-10 18.6	11 39.0	- 5 19.7	-0.9998	0.5152	-0.1819	-22-40	
i Virginis	5.7	1.57	6.6	12 17.3	21 28.9	+ 4 13.0	-0.5590	0.5176	0.1729	+ 4-76	
550 B. Virginis	6.0	1.54	6.2	12 48.1	23 1 36.1	+ 8 13.1	-0.6958	0.5187	0.1687	- 4-90	
85 Virginis	6.1	1.51	5.0	15 21.7	7 12.7	-10 20.2	+1.2077	0.5204	0.1628	+75+38	
621 B. Virginis	6.4	1.41	4.8	14 35.0	16 51.3	- 0 58.9	-1.1705	0.5237	0.1517	-40-90	
214 G. Virginis	6.5	+1.42	- 4.3	-15 57.0	17 14.3	- 0 36.5	+0.2825	0.5239	-0.1512	+47-25	
40 H. Virginis	5.1	1.39	4.2	15 55.3	20 4.7	+ 2 8.7	-0.1739	0.5249	0.1477	+21-49	
i Libræ	4.7	1.12	1.2	19 29.2	25 2 19.6	+ 7 27.4	-0.0803	0.5379	0.1047	+21-43	
25 Libræ	6.0	1.11	1.3	19 20.6	2 51.5	+ 7 58.3	-0.2931	0.5381	0.1038	+10-57	
147 B. Libræ	6.2	1.04	0.5	20 27.0	11 6.1	- 8 3.0	+0.1251	0.5419	0.0902	+31-32	
150 B. Libræ	6.1	+1.03	- 0.6	-19 53.3	11 38.6	- 7 31.6	-0.5413	0.5422	-0.0893	- 5-76	
11 H. Libræ	5.4	1.02	0.8	19 23.7	12 4.1	- 7 6.9	-1.1212	0.5424	0.0886	-43-90	
172 B. Libræ	5.9	1.00	- 0.2	20 44.9	14 43.3	- 4 32.9	+0.1371	0.5436	0.0840	+31-31	
10 G. Scorpii	5.9	0.91	+ 0.2	20 44.9	23 49.0	+ 4 14.9	-0.5532	0.5477	0.0678	- 8-78	
δ Scorpii	2.5	0.91	0.9	22 23.5	26 1 1.7	+ 5 25.2	+1.1652	0.5483	0.0656	+68+38	
ω^1 Scorpii	4.3	+0.86	+ 0.4	-20 27.0	4 3.3	+ 8 20.8	-1.1491	0.5496	-0.0600	-49-40	
ω^2 Scorpii	4.6	0.86	0.5	20 39.1	4 19.6	+ 8 36.5	-0.9464	0.5497	0.0595	-33-90	
84 B. Scorpii	6.3	0.83	0.7	20 54.1	7 35.2	+11 45.6	-0.8542	0.5511	0.0533	-27-90	
51 G. Scorpii	6.5	0.82	0.8	21 6.2	8 43.9	-11 8.0	-0.6945	0.5516	0.0511	-18-40	
ω Ophiuchi	4.5	0.75	1.2	21 17.6	15 39.1	- 4 26.7	-0.7920	0.5544	0.0377	-25-40	
24 Ophiuchi	5.5	+0.65	+ 2.2	-23 1.3	27 2 45.7	+ 6 17.2	+0.7913	0.5586	-0.0153	+67+8	
116 B. Ophiuchi	6.3	0.60	1.9	21 27.2	6 59.5	+10 22.1	-0.9550	0.5600	-0.0066	-38-90	
190 B. Ophiuchi	5.9	0.53	2.2	21 22.0	15 13.4	- 5 41.1	-1.0283	0.5624	+0.0106	-43-90	
52 Ophiuchi	6.4	0.49	2.5	21 59.4	19 54.2	- 1 10.0	-0.2837	0.5636	0.0205	+ 2-56	
58 Ophiuchi	4.8	0.46	2.5	21 38.7	23 29.6	+ 2 17.8	-0.5669	0.5645	0.0280	-13-79	
21 G. Sagittarii	5.7	+0.39	+ 3.0	-22 46.7	28 7 35.2	+10 6.2	+0.9447	0.5660	+0.0452	+68+18	
30 G. Sagittarii	6.2	0.37	2.8	21 27.1	9 55.4	-11 38.5	-0.3620	0.5664	0.0502	0-62	
μ Sagittarii	4.0	0.34	2.8	21 4.8	12 48.3	- 8 51.7	-0.6050	0.5668	0.0563	-12-83	
14 Sagittarii	5.6	0.34	2.9	21 44.1	13 0.9	- 8 39.6	+0.1052	0.5669	0.0567	+27-33	
15 Sagittarii	5.3	0.34	2.7	20 45.2	13 26.8	- 8 14.6	-0.9180	0.5669	0.0576	-31-40	
21 Sagittarii	5.0	+0.30	+ 2.8	-20 35.1	17 52.7	- 3 58.1	-0.8180	0.5674	+0.0670	-24-40	
115 B. Sagittarii	5.7	0.27	3.0	21 27.9	23 20.8	+ 1 18.3	+0.5148	0.5678	0.0784	+54-10	
121 B. Sagittarii	5.9	0.27	3.0	21 7.1	23 47.0	+ 1 43.7	+0.1819	0.5678	0.0793	+33-28	
128 B. Sagittarii	6.3	0.25	3.0	21 5.0	29 2 34.9	+ 4 25.5	+0.3744	0.5679	0.0851	+45-18	
29 Sagittarii	5.3	0.23	3.0	20 25.0	4 29.7	+ 6 16.2	-0.1655	0.5680	0.0890	+15-49	
33 Sagittarii	5.8	+0.23	+ 3.2	-21 27.5	6 22.1	+ 8 4.6	+1.1065	0.5680	+0.0928	+69+31	
36 Sagittarii	5.1	0.22	3.1	20 45.8	7 50.2	+ 9 29.7	+0.5082	0.5680	0.0958	+55-10	
ξ Sagittarii	3.7	0.22	3.1	21 12.8	8 0.0	+ 9 39.0	+0.9999	0.5680	0.0961	+69+22	
171 B. Sagittarii	6.1	0.20	2.9	19 21.8	10 21.4	+11 55.5	-0.7212	0.5680	0.1008	-15-40	
173 B. Sagittarii	6.4	+0.20	+ 2.8	-19 13.2	10 22.9	+11 56.9	-0.8697	0.5680	+0.1009	-24-40	
NEW MOON.											

NEW MOON.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y'	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
B. Aquarii	6.3	+0.20	+3.2	- 3 58.5	2 11 40.0	+ 9 51.8	+0.6590	0.5563	+0.2253	+83	- 3
Piscium	6.3	0.26	3.7	0 14.9	20 42.5	- 5 24.1	-1.0679	0.5562	0.2275	-23	-90
B. Piscium	6.4	0.33	3.6	- 0 9.1	3 7 7.0	+ 4 39.3	+1.2059	0.5566	0.2278	+90	+35
Piscium	4.9	0.34	3.8	+ 0 48.8	8 39.6	+ 6 8.7	+0.5816	0.5567	0.2276	+76	- 7
Piscium	6.4	0.35	3.8	0 40.7	8 48.2	+ 6 17.0	+0.7503	0.5567	0.2276	+90	+ 2
Piscium	5.7	+0.38	+3.9	+ 1 39.2	12 57.3	+10 17.6	+0.7080	0.5571	+0.2268	+90	0
Piscium	5.4	0.42	4.2	3 2.3	17 28.6	- 9 20.3	+0.3327	0.5577	0.2256	+58	-20
Piscium	5.4	0.58	5.0	7 44.5	4 8 50.2	+ 5 29.8	-0.9975	0.5604	0.2181	-19	-82
B. Piscium	6.5	0.68	5.1	8 54.9	17 59.7	- 9 39.9	-0.2134	0.5627	0.2112	+27	-48
Piscium	6.2	1.00	5.9	14 15.0	5 17 46.7	-10 43.6	-0.8663	0.5703	0.1846	-10	-76
H. Arietis	6.4	+1.22	+5.9	+16 50.8	6 8 4.1	+ 3 2.7	-1.0034	0.5755	+0.1630	-21	-73
Arietis	5.8	1.23	5.2	14 54.1	9 37.8	+ 4 33.0	+1.2160	0.5761	0.1604	+90	+46
Arietis	6.4	1.35	5.5	17 20.9	17 5.6	+11 44.3	-0.1092	0.5788	0.1474	+32	-35
Arietis	6.5	1.44	5.1	17 25.4	22 39.9	- 6 53.9	+0.6072	0.5807	0.1370	+82	+ 5
Arietis	6.0	1.47	5.1	17 56.9	7 0 24.2	- 5 13.5	+0.3099	0.5814	0.1336	+57	-11
Arietis	5.2	+1.46	+4.8	+17 7.8	0 43.6	- 4 55.0	+1.1833	0.5815	+0.1330	+90	+46
Arietis	6.0	1.51	4.9	18 0.3	3 24.3	- 2 20.2	+0.6446	0.5823	0.1277	+86	+ 9
Arietis	5.6	1.52	4.7	17 42.1	3 39.3	- 2 5.8	+0.9843	0.5824	0.1272	+90	+30
Arietis	6.5	1.60	4.6	18 29.2	8 33.0	+ 2 36.8	+0.7879	0.5840	0.1173	+90	+18
Arietis	4.5	1.63	4.8	19 25.4	9 52.6	+ 3 53.4	-0.0087	0.5844	0.1145	+38	-26
Arietis	5.0	+1.66	+5.1	+20 44.8	11 12.4	+ 5 10.1	-1.2028	0.5848	+0.1117	-42	-70
Arietis	5.2	1.70	4.9	20 51.4	13 47.0	+ 7 38.9	-1.0351	0.5856	0.1063	-25	-69
Arietis	5.2	1.71	4.7	20 27.3	14 24.7	+ 8 15.2	-0.5597	0.5858	0.1049	+ 7	-59
Arietis	6.0	1.72	4.7	20 31.1	15 5.6	+ 8 54.6	-0.5534	0.5859	0.1034	+ 7	-58
H. Tauri	6.5	1.81	4.1	20 39.2	21 0.2	- 9 24.5	-0.1186	0.5874	0.0904	+31	-29
Tauri	5.6	+1.81	+3.5	+19 26.6	22 21.6	- 8 6.2	+1.2347	0.5877	+0.0874	+88	+57
H. Tauri	6.1	1.84	3.8	20 40.5	23 12.9	- 7 16.9	+0.0544	0.5879	0.0855	+41	-20
B. Tauri	5.9	1.90	4.0	22 0.0	8 1 24.0	- 5 10.8	-1.1134	0.5884	0.0805	-33	-68
Tauri	5.8	1.94	3.8	22 14.8	4 11.8	- 2 29.4	-1.1494	0.5890	0.0741	-37	-68
Tauri	4.5	1.98	3.3	21 51.8	7 21.2	+ 0 32.7	-0.5360	0.5895	0.0668	+ 7	-54
Tauri	6.1	+1.99	+3.2	+21 47.5	7 36.5	+ 0 47.3	-0.4473	0.5895	+0.0662	+13	-47
B. Tauri	6.1	2.03	3.0	22 12.4	10 37.8	+ 3 41.7	-0.6815	0.5899	0.0591	- 1	-65
Tauri	5.6	2.05	2.4	21 23.0	12 51.6	+ 5 50.3	+0.2854	0.5902	0.0538	+56	- 4
Tauri	5.3	2.05	2.2	20 56.9	13 17.4	+ 6 15.1	+0.7525	0.5902	0.0528	+90	+22
Tauri	5.2	2.06	2.4	21 34.8	13 21.1	+ 6 18.7	+0.1109	0.5903	0.0527	+45	-13
B. Tauri	6.1	+2.06	+2.0	+20 37.9	14 28.6	+ 7 23.6	+1.1370	0.5903	+0.0500	+90	+50
B. Tauri	5.9	2.07	2.0	20 47.7	14 56.4	+ 7 50.2	+0.9932	0.5904	0.0489	+90	+39
Tauri	4.1	2.10	2.3	22 6.6	15 39.1	+ 8 31.3	-0.3164	0.5904	0.0472	+20	-37
Tauri	5.4	2.10	2.3	22 1.0	15 40.4	+ 8 32.6	-0.2196	0.5904	0.0471	+26	-31
Tauri	4.2	2.12	2.5	22 37.9	16 1.3	+ 8 52.6	-0.8319	0.5905	0.0463	-11	-67
Tauri	5.4	+2.13	+2.5	+22 48.9	16 25.1	+ 9 15.5	-1.0018	0.5905	+0.0453	-23	-67
B. Tauri	5.8	2.11	2.0	21 26.4	16 43.3	+ 9 33.0	+0.4171	0.5905	0.0446	+66	+ 3
B. Tauri	6.0	2.18	2.1	23 10.6	20 5.8	-11 12.3	-1.2214	0.5907	0.0365	-48	-67
Tauri	4.3	2.21	1.7	22 48.2	22 24.8	- 8 58.7	-0.7615	0.5908	0.0309	- 6	-67
Tauri	4.7	2.30	+0.1	21 28.5	9 6 47.7	- 0 55.4	+0.7728	0.5906	0.0106	+90	+27
3. Tauri	6.3	+2.30	-0.1	+21 9.9	7 18.5	- 0 25.8	+1.0960	0.5905	+0.0094	+90	+49
Tauri	6.0	2.32	0.2	21 35.9	8 44.1	+ 0 56.5	+0.6627	0.5904	+0.0059	+90	+21
Tauri	6.2	2.37	0.4	22 11.6	11 45.4	+ 3 50.8	+0.0597	0.5901	-0.0014	+42	-12
Tauri	5.1	2.39	0.7	22 0.8	13 17.7	+ 5 19.6	+0.2391	0.5899	0.0051	-53	- 3
Tauri	4.8	2.42	1.2	21 52.1	16 40.0	+ 8 34.0	+0.3575	0.5894	0.0132	+61	+ 3
Tauri	3.0	+2.46	-2.1	+21 5.6	20 43.4	-11 32.0	+1.0821	0.5886	-0.0229	+90	+4

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallax	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
175 H ¹ Tauri	6.5	+2.50	-1.9	+22 37.2	9 22 29.5	-9 49.9	-0.5342	0.5882	-0.0272	+8	-50
394 B. Tauri	6.0	2.52	1.8	23 10.0	22 59.6	-9 20.9	-1.1099	0.5881	0.0284	-33	-67
141 Tauri	6.3	2.58	3.2	22 24.0	10 6 28.9	-2 8.7	-0.5991	0.5861	0.0459	+4	-57
14 B. Geminorum	6.0	2.61	3.7	22 12.2	9 41.9	+0 56.9	-0.5564	0.5851	0.0532	+6	-54
η Gemin. (var.)	3.2	2.64	3.9	22 31.8	11 53.3	+3 3.4	-1.0172	0.5843	0.0582	-24	-67
μ Geminorum	3.2	+2.67	-4.4	+22 33.3	15 12.9	+6 15.4	-1.2501	0.5831	-0.0657	-52	-67
15 Geminorum	6.5	2.66	5.2	20 50.3	17 14.2	+8 12.1	+0.3885	0.5824	0.0702	+63	0
16 Geminorum	6.2	2.65	5.2	20 32.7	17 18.6	+8 16.3	+0.6879	0.5823	0.0703	+90	+16
ν Geminorum	4.1	2.65	5.4	20 15.8	17 44.2	+8 41.0	+0.9492	0.5822	0.0712	+90	+33
ζ Gemin. (var.)	3.7	2.77	7.4	20 41.3	11 8 28.7	-1 7.3	-0.7732	0.5755	0.1021	-6	-69
<i>f</i> Geminorum	5.3	+2.80	-10.0	+17 51.4	23 46.2	-10 22.6	+0.3932	0.5675	-0.1306	+63	-6
<i>g</i> Geminorum	5.0	2.83	10.3	18 42.4	12 2 41.0	-7 34.3	-0.8818	0.5658	0.1355	-13	-71
1 Cancr	6.0	2.80	11.3	16 0.3	7 31.7	-2 53.6	+1.2711	0.5630	0.1435	+85	+56
2 B. Cancr	6.0	2.82	11.2	16 44.1	8 12.0	-2 14.8	+0.4089	0.5626	0.1445	+64	-7
3 Cancr	5.7	2.83	11.2	17 31.7	9 12.0	-1 16.8	-0.5684	0.5621	0.1461	+7	-64
5 Cancr	5.9	+2.82	-11.4	+16 40.6	9 31.8	-0 57.6	+0.2766	0.5619	-0.1466	+55	-14
29 Cancr	5.9	2.82	13.0	14 28.6	21 50.3	+10 55.6	+0.6755	0.5548	0.1643	+89	+5
84 B. Cancr	6.4	2.82	13.4	13 31.9	13 0 12.6	-10 46.8	+1.2791	0.5534	0.1673	+87	+33
90 B. Cancr	6.3	2.84	13.2	15 35.5	1 16.8	-9 44.7	-1.0729	0.5528	0.1687	-26	-74
<i>A</i> ¹ Cancr	5.5	2.82	13.8	12 58.1	4 35.7	-6 32.4	+1.1287	0.5509	0.1728	+90	+35
60 Cancr	5.7	+2.81	-14.4	+11 55.9	10 33.9	-0 46.1	+1.1748	0.5476	-0.1795	+90	+38
α Cancr	4.3	2.82	14.5	12 10.1	11 46.2	+0 23.9	+0.7087	0.5468	0.1808	+90	+5
κ Cancr	5.1	2.81	15.0	10 59.4	16 10.8	+4 40.1	+1.1503	0.5444	0.1853	+90	+35
209 B. Cancr	6.5	2.82	15.0	11 53.4	17 8.3	+5 35.6	+0.0176	0.5439	0.1862	+39	-33
222 B. Cancr	6.3	2.82	15.3	11 50.2	21 1.0	+9 20.8	-0.6545	0.5418	0.1898	+2	-76
ω Leonis	5.5	+2.79	-15.7	+9 24.3	14 2 9.9	-9 40.1	+0.9432	0.5392	-0.1940	+90	+18
h Leonis	5.2	2.80	15.8	10 4.2	3 52.0	-8 1.3	-0.0945	0.5383	0.1954	-33	-41
σ Leonis	3.8	2.79	16.0	10 15.4	8 22.3	-3 39.4	-1.1834	0.5361	0.1986	-34	-80
89 B. Leonis	6.2	2.77	16.5	8 41.8	16 47.4	+4 30.1	-1.2129	0.5322	0.2036	-37	-81
π Leonis	4.9	2.77	16.6	8 25.7	17 50.1	+5 30.8	-1.1399	0.5317	0.2042	-30	-82
14 Sextantis	6.3	+2.75	-16.7	+6 0.2	21 9.0	+8 43.7	+0.7803	0.5304	-0.2057	+90	+6
19 Sextantis	5.9	2.74	16.8	5 0.7	15 0 11.2	+11 40.4	+1.2187	0.5291	0.2070	+90	+38
155 B. Leonis	6.5	2.73	17.0	6 6.1	5 28.5	-7 11.9	-1.0525	0.5271	0.2089	-23	-84
237 B. Leonis	6.3	2.68	16.9	1 27.0	20 22.1	+7 15.1	+0.8268	0.5222	0.2118	+90	+7
55 Leonis	6.1	2.68	16.9	1 9.9	22 10.0	+8 59.8	+0.7554	0.5219	0.2119	+90	+3
p^a Leonis	6.1	+2.67	-16.8	+0 25.9	16 2 16.9	-11 0.5	+0.6784	0.5207	-0.2120	+86	-1
p^b Leonis	5.3	2.66	16.8	+0 22.0	7 34.5	-5 52.3	-0.3731	0.5195	0.2117	+18	-60
388 B. Leonis	6.3	2.62	16.6	-1 15.5	14 59.1	+1 19.5	-0.1717	0.5181	0.2106	+29	-47
<i>e</i> Leonis	5.1	2.62	16.4	2 33.6	16 15.4	+2 33.6	+0.9791	0.5179	0.2104	+87	+17
431 B. Leonis	6.2	2.60	16.4	1 59.6	20 30.6	+6 41.4	-0.5326	0.5173	0.2093	+9	-72
13 B. Virginis	5.9	+2.58	-15.8	-4 53.2	17 3 10.4	-10 50.3	+1.2411	0.5166	-0.2073	+85	+39
78 B. Virginis	6.5	2.53	15.3	5 16.4	15 26.1	+1 4.2	-0.8444	0.5160	0.2017	-10	-90
<i>q</i> Virginis	5.3	2.50	14.1	9 0.6	18 1 43.6	+11 3.9	+1.2144	0.5163	0.1956	+81	+37
χ Virginis	4.8	2.48	14.3	7 33.2	4 36.6	-10 8.1	-0.9475	0.5165	0.1936	-17	-90
ψ Virginis	5.0	2.44	13.5	9 6.2	12 32.4	-2 26.1	-0.7553	0.5173	0.1879	-6	-90
49 Virginis	5.2	+2.41	-12.8	-10 18.7	19 37.2	+4 26.3	-0.7325	0.5182	-0.1819	-6	-90
<i>i</i> Virginis	5.7	2.36	11.6	12 17.4	19 5 24.4	-10 3.7	-0.2831	0.5200	0.1727	+18	-56
550 B. Virginis	6.0	2.34	11.2	12 48.1	9 30.7	-6 4.6	-0.4169	0.5208	0.1686	+11	-64
621 B. Virginis	6.4	2.25	9.6	14 35.1	20 0 44.6	+8 42.1	-0.8836	0.5248	0.1514	-18	-90
214 G. Virginis	6.5	2.26	9.1	15 57.1	1 7.5	+9 4.4	+0.5709	0.5249	0.1509	+65	-6
40 H. Virginis	5.1	+2.24	-8.9	-15 55.3	3 58.1	+11 49.8	-0.1151	0.5257	-0.1474	+37	-32

OCCULTATIONS, 1919.

573

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
Librae	4.7	+2.02	-5.1	19 29.3	21 10 21.8	- 6 42.7	+0.2114	0.5360	-0.1043	+37	-26
Librae	6.0	2.02	5.1	19 20.7	10 53.9	- 6 11.6	-0.0023	0.5362	0.1034	+25	-38
3. Librae	6.2	1.95	4.0	20 27.1	19 13.4	+ 1 52.0	+0.4152	0.5392	0.0899	+48	-15
3. Librae	6.1	1.93	4.1	19 53.4	19 46.2	+ 2 23.7	-0.2541	0.5395	0.0890	+10	-54
1. Librae	5.4	1.92	4.2	19 23.8	20 12.0	+ 2 48.7	-0.8365	0.5396	0.0883	-23	-90
3. Librae	5.9	+1.92	-3.5	-20 45.0	22 53.0	+ 5 24.6	+0.4259	0.5406	-0.0837	+48	-14
Librae	5.0	1.88	3.8	19 25.1	22 0 39.6	+ 7 7.8	-1.1886	0.5412	0.0807	-52	-90
Librae	5.1	1.83	3.2	19 55.6	6 3.3	-11 39.0	-1.0366	0.5432	0.0713	-39	-90
3. Scorpii	5.9	1.82	2.7	20 45.0	8 5.6	- 9 40.7	-0.2721	0.5440	0.0677	+ 7	-55
Scorpii	4.3	1.77	2.4	20 27.1	12 23.4	- 5 31.3	-0.8737	0.5455	0.0599	-28	-90
Scorpii	4.6	+1.77	-2.3	-20 39.1	12 40.0	- 5 15.2	-0.6700	0.5456	-0.0594	-16	-90
3. Scorpii	6.3	1.74	1.9	20 54.2	15 58.5	- 2 3.2	-0.5797	0.5467	0.0533	-11	-80
3. Scorpii	6.5	1.73	1.8	21 6.2	17 8.2	- 0 55.8	-0.4200	0.5472	0.0512	- 3	-66
Ophiuchi	4.5	1.65	-1.1	21 17.7	23 0 9.9	+ 5 51.8	-0.5236	0.5495	0.0380	- 9	-74
Ophiuchi	5.5	1.54	+0.5	23 1.4	11 27.9	- 7 12.8	+1.0587	0.5531	0.0160	+67	+27
3. Ophiuchi	6.3	+1.47	+0.3	-21 27.2	15 46.2	- 3 3.3	-0.7024	0.5544	-0.0075	-23	-90
Ophiuchi	4.4	1.39	0.7	21 1.6	22 28.6	+ 3 25.4	-1.1685	0.5562	+0.0060	-56	-90
3. Ophiuchi	5.9	1.38	0.9	21 22.0	24 0 9.0	+ 5 2.4	-0.7855	0.5566	0.0094	-28	-90
Ophiuchi	6.4	1.33	1.5	21 59.4	4 55.0	+ 9 38.6	-0.0422	0.5577	0.0191	+14	-40
Ophiuchi	4.8	1.28	1.7	21 38.7	8 34.3	-10 49.6	-0.3318	0.5585	0.0265	- 1	-59
3. Sagittarii	5.7	+1.20	+2.6	-22 46.7	16 48.6	- 2 52.3	+1.1771	0.5601	+0.0434	+67	+41
3. Sagittarii	6.2	1.16	2.3	21 27.2	19 11.3	- 0 34.6	-0.1403	0.5605	0.0483	+12	-46
Sagittarii	4.0	1.12	2.4	21 4.8	22 7.2	+ 2 15.3	-0.3889	0.5610	0.0542	- 1	-63
Sagittarii	5.6	1.13	2.6	21 44.1	22 20.0	+ 2 27.6	+0.3248	0.5610	0.0547	+39	-20
Sagittarii	5.3	1.11	2.3	20 45.2	22 46.3	+ 2 52.9	-0.7046	0.5611	0.0556	-18	-90
Sagittarii	5.9	+1.11	+2.2	-20 24.8	22 46.7	+ 2 53.3	-1.0689	0.5611	+0.0556	-42	-90
Sagittarii	5.0	1.06	2.6	20 35.1	25 3 16.7	+ 7 13.9	-0.6110	0.5617	0.0647	-12	-83
3. Sagittarii	5.7	1.00	3.2	21 27.9	8 50.1	-11 24.3	+0.7193	0.5624	0.0760	+68	+ 3
3. Sagittarii	5.9	1.00	3.1	21 7.1	9 16.8	-10 58.6	+0.3841	0.5624	0.0768	+45	-16
3. Sagittarii	6.3	0.97	3.2	21 5.0	12 7.3	- 8 14.0	+0.5726	0.5627	0.0826	+58	- 5
Sagittarii	5.3	+0.94	+3.2	-20 25.0	14 3.8	- 6 21.6	+0.0269	0.5628	+0.0864	+24	-36
Sagittarii	5.1	0.90	3.4	20 45.7	17 27.2	- 3 5.2	+0.6973	0.5631	0.0931	+68	+ 2
Sagittarii	3.7	0.90	3.5	21 12.8	17 37.0	- 2 55.8	+1.1908	0.5631	0.0935	+69	+41
3. Sagittarii	6.1	0.87	3.1	19 21.8	20 0.4	- 0 37.4	-0.5418	0.5632	0.0981	- 5	-76
3. Sagittarii	6.4	0.87	3.1	19 13.2	20 2.0	- 0 35.9	-0.6908	0.5633	0.0982	-13	-90
3. Sagittarii	6.4	+0.85	+3.0	-18 51.8	21 49.1	+ 1 7.5	-0.8892	0.5633	+0.1017	-25	-90
3. Sagittarii	5.4	0.85	3.2	19 25.0	22 18.8	+ 1 36.2	-0.2524	0.5633	0.1026	+11	-53
3. Sagittarii	6.3	0.84	3.4	19 55.9	22 58.7	+ 2 14.7	+0.3598	0.5634	0.1039	+45	-18
Sagittarii	5.0	0.80	3.3	19 5.8	2 27.4	+ 5 36.0	-0.1483	0.5635	0.1106	+17	-47
3. Sagittarii	6.4	0.79	3.5	19 23.1	4 12.8	+ 7 17.7	+0.3531	0.5636	0.1139	+46	-18
Sagittarii	4.0	+0.78	+3.1	-18 0.0	4 15.6	+ 7 20.4	-1.1022	0.5636	+0.1140	-40	-90
Sagittarii	6.0	0.78	3.2	18 27.5	4 19.5	+ 7 24.2	-0.6115	0.5636	0.1141	- 7	-82
3. Sagittarii	6.1	0.72	3.6	19 1.9	10 46.3	-10 22.5	+0.7656	0.5637	0.1261	+71	+ 6
3. Sagittarii	5.8	0.72	3.5	18 24.7	11 3.4	-10 6.1	+0.1500	0.5637	0.1266	+35	-30
3. Capricorni	6.2	0.54	3.3	15 2.4	27 6 28.0	+ 8 38.0	-0.5741	0.5634	0.1600	0	-77
Capricorni	3.2	+0.54	+3.3	-15 2.2	6 34.2	+ 8 43.9	-0.5604	0.5634	+0.1601	+ 1	-76
3. Capricorni	6.4	0.52	3.6	16 0.6	9 59.1	-11 58.4	+1.0019	0.5633	0.1655	+74	+21
3. Capricorni	6.2	0.51	3.5	15 19.6	11 2.2	-10 57.5	+0.4708	0.5632	0.1671	+59	-12
3. Capricorni	6.1	0.50	3.3	14 0.0	12 26.1	- 9 36.5	-0.6661	0.5632	0.1682	- 5	-87
Capricorni	5.2	0.48	3.5	15 14.3	14 40.8	- 7 26.5	+0.9966	0.5630	0.1726	+75	+21
3. Capricorni	6.0	+0.45	+3.2	-12 50.7	19 46.9	- 2 31.0	-0.5709	0.5629	+0.1799	+ 2	-7

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS
MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	z'	
		$\Delta\alpha$	$\Delta\delta$						
		s	"	"	d h m	h m			
					MOON.				
136 B. Piscium	6.5	+0.47	+3.2	+ 8 54.8	4 1 41.4	- 0 10.5	-0.3990	0.5735 +0	
101 Piscium	6.2	0.69	3.7	14 14.9	5 0 42.2	- 2 0.5	-1.0824	0.5807 0	
20 H ¹ . Arietis	6.4	0.85	3.8	16 50.8	14 33.9	+11 20.1	-1.2361	0.5850 0	
19 Arietis	5.8	+0.86	+3.2	+14 54.1	16 5.0	-11 12.3	+0.9516	0.5855 +0	
27 Arietis	6.4	0.96	3.5	17 20.8	23 20.6	- 4 13.3	-0.3630	0.5875 0	
36 Arietis	6.5	1.02	3.2	17 25.4	6 4 46.5	+ 1 0.2	+0.3404	0.5890 0	
40 Arietis	6.0	1.05	3.3	17 56.9	6 28.3	+ 2 38.1	+0.0455	0.5894 0	
π Arietis	5.2	1.04	3.0	17 7.7	6 47.2	+ 2 56.2	+0.9084	0.5895 0	
45 Arietis	6.0	+1.09	+3.1	+18 0.3	9 24.2	+ 5 27.1	+0.3745	0.5900 +0	
ρ Arietis	5.6	1.09	3.0	17 42.1	9 38.9	+ 5 41.3	+0.7102	0.5901 0	
54 Arietis	6.5	1.15	2.9	18 29.1	14 26.0	+10 17.3	+0.5138	0.5911 0	
δ Arietis	4.5	1.18	3.1	19 25.3	15 44.0	+11 32.3	-0.2749	0.5913 0	
τ Arietis	5.2	1.25	3.3	20 51.4	19 33.8	- 8 46.9	-1.2926	0.5920 0	
63 Arietis	5.2	+1.25	+3.1	+20 27.3	20 10.8	- 8 11.3	-0.8223	0.5921 +0	
65 Arietis	6.0	1.26	3.1	20 31.1	20 50.9	- 7 32.8	-0.8164	0.5922 0	
14 H ¹ . Tauri	6.5	1.34	2.6	20 39.2	7 2 39.3	- 1 58.0	-0.3878	0.5929 0	
13 Tauri	5.6	1.35	2.1	19 26.5	3 59.3	- 0 41.1	+0.9533	0.5930 0	
14 Tauri	6.2	1.36	2.0	19 24.6	4 34.2	- 0 7.5	+1.0364	0.5931 0	
22 H ¹ . Tauri	6.1	+1.37	+2.5	+20 40.5	4 49.8	+ 0 7.4	-0.2168	0.5931 +0	
λ Tauri	4.5	1.50	2.1	21 51.7	12 51.3	+ 7 50.1	-0.8038	0.5935 0	
39 Tauri	6.1	1.51	2.1	21 47.5	13 6.5	+ 8 4.7	-0.7158	0.5935 0	
192 B. Tauri	6.1	1.55	2.0	22 12.4	16 5.7	+10 56.8	-0.9486	0.5935 0	
ω Tauri	4.8	1.56	1.1	20 22.8	17 52.3	-11 20.7	+1.0049	0.5934 0	
51 Tauri	5.6	+1.58	+1.4	+21 23.0	18 18.1	-10 55.9	+0.0120	0.5934 +0	
53 Tauri	5.3	1.57	1.2	20 56.9	18 43.6	-10 31.4	+0.4762	0.5934 0	
56 Tauri	5.2	1.58	1.5	21 34.8	18 47.3	-10 27.8	-0.1613	0.5934 0	
224 B. Tauri	6.1	1.59	1.0	20 37.9	19 54.1	- 9 23.6	+0.8585	0.5933 0	
227 B. Tauri	5.9	1.60	1.0	20 47.7	20 21.6	- 8 57.3	+0.7158	0.5933 0	
κ Tauri	4.1	+1.63	+1.4	+22 6.6	21 4.0	- 8 16.5	-0.5858	0.5933 +0	
67 Tauri	5.4	1.62	1.4	22 1.0	21 5.2	- 8 15.2	-0.4895	0.5933 0	
ν Tauri	4.2	1.64	1.5	22 37.9	21 26.0	- 7 55.4	-1.0981	0.5933 0	
72 Tauri	5.4	1.64	1.6	22 48.9	21 49.5	- 7 32.8	-1.2671	0.5932 0	
247 B. Tauri	5.8	1.63	1.0	21 26.4	22 7.6	- 7 15.4	+0.1436	0.5931 0	
129 H ¹ . Tauri	5.8	+1.68	+0.3	+20 31.4	8 2 13.4	- 3 19.1	+1.2415	0.5928 +0	
τ Tauri	4.3	1.73	+0.9	22 48.2	3 46.7	- 1 49.5	-1.0278	0.5927 0	
ι Tauri	4.7	1.83	-0.5	21 28.5	12 7.3	+ 6 11.6	+0.5032	0.5912 0	
330 B. Tauri	6.3	1.83	0.7	21 9.9	12 38.1	+ 6 41.2	+0.8256	0.5912 0	
105 Tauri	6.0	1.86	0.7	21 35.9	14 3.4	+ 8 3.3	+0.3945	0.5909 +0	
108 Tauri	6.2	+1.91	-0.8	+22 11.6	17 4.6	+10 57.4	-0.2052	0.5901 -0	
n Tauri	5.1	1.93	1.1	22 0.8	18 36.8	-11 33.9	-0.0254	0.5897 0	
o Tauri	4.8	1.97	1.5	21 52.1	21 59.2	- 8 19.4	+0.0949	0.5888 0	
ζ Tauri	3.0	2.01	2.3	21 5.6	9 2 3.1	- 4 24.9	+0.8215	0.5875 0	
175 H ¹ . Tauri	6.5	2.06	2.0	22 37.2	3 49.5	- 2 42.6	-0.7919	0.5869 0	
141 Tauri	6.3	+2.16	-3.1	+22 24.0	11 51.2	+ 5 0.8	-0.8512	0.5838 -0	
14 B. Geminorum	6.0	2.20	3.6	22 12.2	15 5.5	+ 8 7.8	-0.8059	0.5825 0	
η Gemin. (var.)	3.2	2.23	3.7	22 31.8	17 17.9	+10 15.2	-1.2654	0.5815 0	
15 Geminorum	6.5	2.26	5.0	20 50.3	22 41.6	- 8 33.2	+0.1478	0.5790 0	
16 Geminorum	6.2	2.26	5.1	20 32.7	22 48.1	- 8 28.9	+0.4479	0.5790 0	
ν Geminorum	4.1	+2.26	-5.2	+20 15.8	23 11.8	- 8 4.1	+0.7103	0.5788 -0	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declina- tion.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	"	d h m	h m				"	"
Gemin. (<i>var.</i>)	3.7	+2.43	-7.0	+20 41.3	10 14 6.6	+6 18.0	-0.9991	0.5710	-0.0997	-22	-70
B. Geminorum	5.7	2.49	9.5	17 15.4	11 2 14.0	-6 0.4	+1.2477	0.5642	0.1218	+88	+55
Geminorum	5.3	2.53	9.7	17 51.4	5 37.5	-2 44.0	+0.1953	0.5623	0.1275	+50	-17
Geminorum	5.0	2.56	9.8	18 42.4	8 35.0	+0 7.3	-1.0819	0.5606	0.1324	-28	-72
Cancr	6.0	2.57	11.2	16 0.3	13 30.4	+4 52.6	+1.0920	0.5578	0.1401	+90	+36
B. Cancr	6.0	+2.58	-11.0	+16 44.1	14 11.4	+5 32.2	+0.2260	0.5574	-0.1412	+52	-17
Cancr	5.7	2.60	10.9	17 31.7	15 12.4	+6 31.1	-0.7554	0.5568	0.1427	-4	-73
Cancr	5.9	2.59	11.2	16 40.6	15 32.6	+6 50.7	+0.0953	0.5566	0.1432	+44	-24
Cancr	5.9	2.65	13.0	14 28.6	12 4 3.5	-5 3.6	+0.5207	0.5495	0.1605	+73	-4
B. Cancr	6.4	2.66	13.5	13 31.9	6 28.2	-2 43.7	+1.1332	0.5482	0.1635	+90	+36
B. Cancr	6.3	+2.69	-13.0	+15 35.5	7 33.5	-1 40.6	-1.2323	0.5476	-0.1649	-42	-75
Cancr	5.5	2.68	14.0	12 58.1	10 55.8	+1 35.1	+0.9912	0.5458	0.1689	+90	+24
Cancr	5.7	2.68	14.3	12 24.2	12 42.4	+3 18.3	+1.2903	0.5448	0.1709	+86	+54
Cancr	5.7	2.70	14.8	11 55.9	17 0.0	+7 27.4	+1.0508	0.5426	0.1755	+90	+28
Cancr	4.3	2.71	14.8	12 10.1	18 13.4	+8 38.6	+0.5842	0.5420	0.1768	+78	-1
Cancr	5.1	+2.72	-15.4	+10 59.4	22 42.3	-11 1.1	+1.0389	0.5397	-0.1813	+90	+26
B. Cancr	6.5	2.74	15.3	11 53.4	23 40.8	-10 4.4	-0.0994	0.5392	0.1822	+33	-40
B. Cancr	6.3	2.76	15.6	11 50.2	13 37.1	-6 15.5	-0.7670	0.5373	0.1857	-4	-79
Leonis	5.5	2.76	16.4	9 24.3	8 50.7	-1 11.7	+0.8539	0.5349	0.1900	+90	+12
Leonis	5.2	2.77	16.4	10 4.1	10 34.3	+0 28.6	-0.1865	0.5342	0.1914	+28	-46
Leonis	3.8	+2.79	-16.6	+10 15.4	15 8.6	+4 54.5	-1.2715	0.5322	-0.1946	-44	-80
B. Leonis	6.2	2.81	17.3	8 41.8	23 40.4	-10 49.3	-1.2796	0.5289	0.1998	-45	-82
Leonis	4.9	2.81	17.4	8 25.7	14 0 44.0	-9 47.8	-1.2034	0.5285	0.2003	-36	-82
Sextantis	6.3	2.81	17.9	6 0.1	4 5.3	-6 32.4	+0.7373	0.5273	0.2020	+90	+3
Sextantis	5.9	2.81	18.2	5 0.6	7 9.6	-3 33.6	+1.1861	0.5263	0.2033	+90	+35
B. Leonis	6.5	+2.83	-18.2	+6 6.0	12 30.4	+1 37.6	-1.0846	0.5246	-0.2053	-25	-84
B. Leonis	6.3	2.85	19.0	1 27.0	15 3 31.9	-7 47.4	+0.8440	0.5209	0.2086	+90	+9
Leonis	6.1	2.86	19.0	1 9.8	5 20.6	-6 1.9	+0.7770	0.5206	0.2088	+90	+4
Leonis	6.1	2.86	19.1	0 25.8	9 29.1	-2 0.6	+0.7104	0.5198	0.2090	+90	0
Leonis	5.3	2.87	19.1	+0 22.0	14 48.5	+3 9.4	-0.3318	0.5189	0.2089	+20	-58
B. Leonis	6.3	+2.88	-19.1	-1 15.6	22 15.2	+10 23.2	-0.1103	0.5181	-0.2081	+32	-44
Leonis	5.1	2.88	19.1	2 33.7	23 31.7	+11 37.6	+1.0479	0.5180	0.2078	+88	+22
B. Leonis	6.2	2.89	19.0	1 59.6	16 3 47.7	-8 13.9	-0.4583	0.5177	0.2069	+13	-67
B. Virginis	5.9	2.90	18.8	4 53.3	10 28.3	-1 44.8	+1.3377	0.5174	0.2050	+81	+54
B. Virginis	6.5	2.90	18.4	5 16.4	22 44.6	+10 10.2	-0.7239	0.5175	0.1999	-2	-90
Virginis	4.8	+2.91	-17.6	-7 33.3	17 11 54.2	-1 2.9	-0.7968	0.5185	-0.1922	-8	-90
Virginis	5.0	2.91	17.0	9 6.2	19 49.2	+6 38.2	-0.5873	0.5195	0.1864	+4	-78
Virginis	5.2	2.91	16.4	10 18.7	18 2 53.0	-10 30.2	-0.5499	0.5206	0.1806	+5	-74
Virginis	6.2	2.91	16.4	9 54.1	3 51.2	-9 33.8	-1.1785	0.5208	0.1798	-37	-90
Virginis	5.7	2.91	15.4	12 17.4	12 38.6	-1 1.8	-0.0816	0.5224	0.1716	+29	-43
B. Virginis	6.0	+2.91	-14.9	-12 48.2	16 44.3	+2 56.6	-0.2083	0.5233	-0.1675	+22	-50
B. Virginis	6.4	2.88	13.2	14 35.2	19 7 56.2	-6 18.7	-0.6516	0.5270	0.1504	-4	-87
Virginis	6.5	2.90	12.9	15 57.1	8 19.1	-5 56.5	+0.8059	0.5271	0.1499	+74	+7
H. Virginis	5.1	2.89	12.6	15 55.4	11 9.4	-3 11.4	+0.3535	0.5279	0.1465	+51	-19
Librae	4.7	2.78	8.3	19 29.3	20 17 34.8	+2 18.0	+0.4846	0.5366	0.1033	+55	-11
Librae	6.0	+2.78	-8.3	-19 20.7	18 7.0	+2 49.2	+0.2707	0.5368	-0.1025	+41	-23
B. Librae	6.2	2.74	7.0	20 27.2	21 2 28.8	+10 55.0	+0.6963	0.5392	0.0890	+69	+2
B. Librae	6.1	2.72	7.0	19 53.4	3 1.8	+11 27.0	+0.0248	0.5394	0.0881	+25	-37
H. Librae	5.4	2.71	7.1	19 23.8	3 27.8	+11 52.2	-0.5597	0.5395	0.0874	-6	-77
B. Librae	5.9	2.72	6.4	20 45.0	6 9.8	-9 31.1	+0.7098	0.5403	0.0823	+69	+2
Librae	5.3	+2.69	-6.9	-19 2.3	6 29.6	-9 11.8	-1.2149	0.5404	-0.0823	-54	-97

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallax.
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	
		$\Delta\alpha$	$\Delta\delta$		d h m	h m				N. S.
κ Libræ	5.0	+2.68	-6.6	-19 25.1	21 7 57.0	-7 47.2	-0.9107	0.5408	-0.0798	-28-90
λ Libræ	5.1	2.85	5.7	19 55.7	13 23.2	-2 31.5	-0.7554	0.5423	0.0705	-19-90
10 G. Scorpii	5.9	2.64	5.2	20 45.0	15 26.5	-0 32.2	+0.0138	0.5429	0.0669	+23-37
ω^1 Scorpii	4.3	2.60	4.8	20 27.1	19 46.8	+3 39.7	-0.5892	0.5440	0.0592	-11-81
ω^2 Scorpii	4.6	2.60	4.7	20 39.1	20 3.5	+3 55.9	-0.3844	0.5441	0.0587	0-63
84 B. Scorpii	6.3	+2.58	-4.2	-20 54.2	23 24.0	+7 9.8	-0.2925	0.5449	-0.0527	+5-58
51 G. Scorpii	6.5	2.57	4.0	21 6.3	22 0 34.5	+8 18.2	-0.1315	0.5452	0.0505	+13-46
ω Ophiuchi	4.5	2.51	2.9	21 17.7	7 41.3	-8 49.0	-0.2341	0.5470	0.0374	+7-52
116 B. Ophiuchi	6.3	2.34	0.9	21 27.2	23 31.6	+6 29.9	-0.4138	0.5504	-0.0074	-6-65
ξ Ophiuchi	4.4	2.27	-0.3	21 1.6	23 6 21.2	-10 54.4	-0.8849	0.5515	+0.0059	-34-90
190 B. Ophiuchi	5.9	+2.25	+0.1	-21 22.0	8 3.5	-9 15.4	-0.4991	0.5518	+0.0092	-11-72
52 Ophiuchi	6.4	2.20	0.9	21 59.4	12 55.1	-4 33.6	+0.2492	0.5525	0.0187	+31-24
58 Ophiuchi	4.8	2.15	1.2	21 38.7	16 38.9	-0 57.3	-0.0440	0.5530	0.0260	+15-41
16 G. Sagittarii	6.4	2.04	1.6	20 20.0	24 0 14.3	+6 22.7	-1.2142	0.5539	0.0409	-58-90
30 G. Sagittarii	6.2	2.02	2.3	21 27.2	3 29.9	+9 31.7	+0.1445	0.5542	0.0472	+28-30
μ Sagittarii	4.0	+1.98	+2.5	-21 4.8	6 29.9	-11 34.4	-0.1082	0.5545	+0.0531	+14-44
14 Sagittarii	5.6	1.98	2.8	21 44.1	6 43.0	-11 21.7	+0.6122	0.5545	0.0535	+59-3
15 Sagittarii	5.3	1.96	2.5	20 45.2	7 9.9	-10 55.7	-0.4274	0.5546	0.0544	-3-66
16 Sagittarii	5.9	1.96	2.4	20 24.8	7 10.3	-10 55.3	-0.7953	0.5546	0.0544	-24-90
21 Sagittarii	5.0	1.90	2.9	20 35.1	11 46.7	-6 28.4	-0.3359	0.5549	0.0633	+3-59
115 B. Sagittarii	5.7	+1.84	+3.7	-21 27.9	17 28.3	-0 58.3	+1.0039	0.5552	+0.0743	+69+23
121 B. Sagittarii	5.9	1.83	3.6	21 7.1	17 55.7	-0 31.9	+0.6648	0.5553	0.0752	+65 0
128 B. Sagittarii	6.3	1.80	3.9	21 5.0	20 50.4	+2 16.9	+0.8530	0.5554	0.0807	+69+12
29 Sagittarii	5.3	1.76	3.9	20 25.0	22 49.8	+4 12.3	+0.3000	0.5554	0.0845	+40-21
36 Sagittarii	5.1	1.72	4.3	20 45.7	25 2 18.5	+7 33.9	+0.9742	0.5556	0.0910	+70+20
171 B. Sagittarii	6.1	+1.67	+4.1	-19 21.8	4 55.6	+10 5.7	-0.2802	0.5557	+0.0958	+10-55
173 B. Sagittarii	6.4	1.67	4.0	19 13.2	4 57.2	+10 7.2	-0.4308	0.5557	0.0959	0-66
187 B. Sagittarii	6.4	1.65	4.0	18 51.8	6 47.1	+11 53.4	-0.6332	0.5558	0.0993	-9-85
190 B. Sagittarii	5.4	1.64	4.3	19 25.0	7 17.5	-11 37.2	+0.0098	0.5558	0.1002	+25-37
195 B. Sagittarii	6.3	1.64	4.5	19 55.9	7 58.5	-10 57.7	+0.6276	0.5558	0.1015	+65-3
d Sagittarii	5.0	+1.59	+4.5	-19 5.8	11 32.6	-7 30.9	+0.1105	0.5559	+0.1080	+32-32
226 B. Sagittarii	6.4	1.57	4.8	19 23.1	13 20.7	-5 46.4	+0.6150	0.5559	0.1112	+65-4
ρ Sagittarii	4.0	1.55	4.3	18 0.0	13 23.5	-5 43.7	-0.8554	0.5559	0.1113	-22-80
45 Sagittarii	6.0	1.56	4.4	18 27.5	13 27.5	-5 39.9	-0.3597	0.5559	0.1114	+7-61
266 B. Sagittarii	6.1	1.48	5.2	19 1.9	20 4.3	+0 43.5	+1.0237	0.5559	0.1231	+71+24
267 B. Sagittarii	5.8	+1.47	+5.0	-18 24.6	20 21.8	+1 0.3	+0.4014	0.5560	+0.1236	+51-16
g Sagittarii	5.1	1.33	4.7	15 42.4	26 5 53.0	+10 12.1	-1.2006	0.5560	0.1397	-46-90
16 B. Capricorni	6.2	1.20	5.1	15 2.4	16 15.3	-3 46.7	-0.3588	0.5561	0.1562	+12-60
β Capricorni	3.2	1.20	5.1	15 2.2	16 21.7	-3 40.6	-0.3453	0.5561	0.1564	+12-59
31 B. Capricorni	6.4	1.17	5.6	16 0.5	19 51.3	-0 18.1	+1.2253	0.5561	0.1617	+74+42
27 G. Capricorni	6.2	+1.15	+5.4	-15 19.6	20 55.8	+0 44.1	+0.6876	0.5562	+0.1633	+74 0
45 B. Capricorni	6.1	1.13	5.1	13 59.9	22 21.6	+2 7.1	-0.4618	0.5562	0.1653	+7-88
τ Capricorni	5.2	1.11	5.5	15 14.3	27 0 39.3	+4 20.1	+1.2111	0.5562	0.1687	+75+39
84 B. Capricorni	6.0	1.05	5.0	12 50.6	5 51.9	+9 22.1	-0.3795	0.5564	0.1759	+13-61
16 B. Aquarii	6.4	1.03	4.8	11 52.7	6 58.0	+10 25.9	-1.1844	0.5564	0.1774	-40-90
ν Aquarii	4.5	+0.96	+5.0	-11 41.9	14 27.4	-6 19.9	-0.0026	0.5568	+0.1869	+34-38
51 G. Aquarii	6.5	0.93	4.9	10 56.4	16 35.5	-4 16.2	-0.3822	0.5569	0.1895	+14-62
17 Aquarii	6.3	0.89	4.7	9 39.8	20 32.0	-0 27.8	-0.9359	0.5572	0.1941	-18-90
19 Aquarii	5.6	0.88	4.8	10 5.6	21 33.6	+0 31.7	-0.2955	0.5573	0.1953	+19-56
ξ Aquarii	4.8	0.83	4.5	8 13.0	28 3 14.9	+6 1.3	-1.0854	0.5578	0.2013	-28-90
ϵ^1 Capricorni	5.3	+0.80	+4.9	-9 27.2	6 31.3	+9 11.1	+0.8417	0.5582	+0.2045	+81+9

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

THE STAR'S				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N. S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m				
Capricorni	6.3	+0.79	+5.0	9 38.9	28 7 5.6	+ 944.2	+1.1574	0.5583	+0.2050	+81 +32
Aquarii	5.6	0.73	4.5	6 54.8	14 47.1	- 650.1	-0.0236	0.5593	0.2118	+35 -39
B. Aquarii	6.4	0.69	4.1	5 7.2	19 3.4	- 242.6	-0.9274	0.5599	0.2150	-15 -90
Aquarii	5.7	0.68	4.3	5 47.5	21 1.0	- 049.0	+0.1747	0.5602	0.2164	+47 -29
Aquarii	5.8	0.66	4.2	5 14.8	29 0 9.7	+ 213.2	+0.3081	0.5608	0.2183	+55 -22
B. Aquarii	6.3	+0.64	+3.9	3 19.5	3 23.6	+ 520.5	-0.9180	0.5615	+0.2203	-14 -90
Aquarii	5.2	0.62	4.1	4 38.7	6 16.3	+ 8 7.1	+1.0451	0.5621	0.2217	+86 +22
B. Aquarii	6.3	+0.61	+4.0	3 58.5	7 37.8	+ 925.8	+0.6727	0.5624	+0.2223	+84 - 2
				NEW MOON.						

APRIL.

Arietis	6.5	+0.74	+1.6	+17 25.3	2 13 26.0	+11 27.5	+0.1614	0.6004	+0.1389	+48 -19
Arietis	6.0	0.76	1.6	17 56.9	15 4.3	-10 58.1	-0.1316	0.6009	0.1355	+31 -35
Arietis	5.2	+0.76	+1.4	+17 7.7	15 22.6	-10 40.6	+0.7169	0.6010	+0.1348	+90 +12
Arietis	6.0	0.78	1.5	18 0.3	17 54.2	- 8 15.1	+0.1873	0.6016	0.1294	+49 -17
Arietis	5.6	0.79	1.4	17 42.1	18 8.4	- 8 1.4	+0.5172	0.6017	0.1289	+73 + 1
Arietis	6.0	0.82	1.1	17 34.1	22 25.0	- 3 55.1	+1.1809	0.6027	0.1196	+90 +48
Arietis	6.5	0.83	1.3	18 29.1	22 45.8	- 3 35.2	+0.3166	0.6027	0.1188	+58 - 9
Arietis	4.5	+0.85	+1.4	+19 25.3	3 0 1.1	- 2 22.8	-0.4611	0.6030	+0.1160	+12 -53
Arietis	5.2	0.90	1.4	20 27.2	4 18.7	+ 1 44.4	-1.0058	0.6037	0.1061	-23 -70
Arietis	6.0	0.90	1.4	20 31.0	4 57.4	+ 2 21.6	-1.0008	0.6038	0.1047	-22 -70
B. Arietis	6.4	0.90	0.8	18 28.4	5 59.2	+ 3 20.9	+1.1287	0.6040	0.1022	+90 +44
H. Tauri	6.5	0.96	1.0	20 39.2	10 33.9	+ 7 44.4	-0.5870	0.6044	0.0914	+ 5 -60
Tauri	5.6	+0.97	+0.6	+19 26.5	11 51.2	+ 8 58.5	+0.7305	0.6045	+0.0883	+90 +17
Tauri	6.2	0.97	0.6	19 24.6	12 25.0	+ 9 30.9	+0.8114	0.6045	0.0870	+90 +22
H. Tauri	6.1	0.98	0.9	20 40.4	12 40.0	+ 9 45.4	-0.4214	0.6046	0.0864	+14 -48
Tauri	4.5	1.08	0.6	21 51.7	20 25.4	- 6 48.0	-1.0082	0.6047	0.0674	-24 -69
Tauri	6.1	1.09	0.6	21 47.5	20 40.1	- 6 34.0	-0.9218	0.6046	0.0667	-17 -69
3. Tauri	6.1	+1.12	+0.5	+22 12.4	23 33.5	- 3 47.6	-1.1541	0.6045	+0.0596	-38 -68
Tauri	4.8	1.12	-0.2	20 22.8	4 1 16.6	- 2 8.7	+0.7663	0.6043	0.0552	+90 +22
Tauri	5.6	1.14	+0.1	21 22.9	1 41.5	- 1 44.8	-0.2111	0.6042	0.0542	+26 -32
Tauri	5.3	1.14	-0.1	20 56.8	2 6.2	- 1 21.2	+0.2452	0.6042	0.0532	+53 - 7
Tauri	5.2	1.14	+0.1	21 34.7	2 9.8	- 1 17.7	-0.3822	0.6042	0.0530	+16 -42
1. Tauri	6.1	+1.15	-0.2	+20 37.9	3 14.5	- 0 15.6	+0.6204	0.6041	+0.0503	+85 +14
1. Tauri	5.9	1.15	-0.2	20 47.7	3 41.1	+ 0 9.9	+0.4795	0.6040	0.0492	+70 + 6
Tauri	4.1	1.18	+0.1	22 6.6	4 22.2	+ 0 49.3	-0.8022	0.6039	0.0475	- 9 -68
Tauri	5.4	1.18	+0.1	22 1.0	4 23.4	+ 0 50.5	-0.7074	0.6039	0.0475	- 3 -67
1. Tauri	5.8	1.18	-0.2	21 26.4	5 23.8	+ 1 48.5	-0.0853	0.6038	0.0449	+33 -24
1. Tauri	5.8	+1.22	-0.8	+20 31.4	9 22.0	+ 5 37.0	+0.9921	0.6031	+0.0349	+90 +39
Tauri	4.3	1.26	0.2	22 48.2	10 52.4	+ 7 3.8	-1.2434	0.6028	0.0311	-52 -68
Tauri	4.7	1.35	1.4	21 28.5	18 58.2	- 9 10.0	+0.2582	0.6007	0.0108	+54 - 2
1. Tauri	6.3	1.35	1.5	21 9.9	19 28.1	- 8 41.3	+0.5756	0.6005	0.0095	+80 +15
Tauri	6.0	1.37	1.5	21 35.9	20 51.1	- 7 21.4	+0.1499	0.6001	+0.0061	+47 - 8
Tauri	6.2	+1.41	-1.6	+22 11.6	23 47.2	- 4 32.5	-0.4430	0.5990	-0.0012	+13 -42
Tauri	5.1	1.43	1.8	22 0.8	5 1 16.9	- 3 6.3	-0.2667	0.5985	0.0049	+23 -31
Tauri	4.8	1.47	2.2	21 52.1	4 34.0	+ 0 3.0	-0.1498	0.5971	0.0130	+29 -25
Tauri	3.0	1.51	2.8	21 5.6	8 31.7	+ 3 51.3	+0.5654	0.5954	0.0225	+79 +13
H. Tauri	6.5	1.55	2.5	22 37.2	10 15.5	+ 5 31.0	-1.0277	0.5946	0.0268	-26 -68
Orionis	4.5	+1.58	-3.8	+20 15.7	15 12.5	+10 16.4	+1.2104	0.5921	-0.0385	+90 +4

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>
		$\Delta\alpha$	$\Delta\delta$						
		<i>s</i>	<i>"</i>	<i>°</i>	<i>d h m</i>	<i>h m</i>			
141 Tauri	6.3	+1.64	-3.3	+22 24.0	5 18 6.2	-10 56.6	-1.0898	0.5906	-0.0452
χ^2 Orionis	4.7	1.63	4.2	20 8.4	19 2.0	-10 3.0	+1.1722	0.5901	0.0473
14 B. Geminorum	6.0	1.68	3.8	22 12.2	21 16.4	-7 53.8	-1.0461	0.5888	0.0524
15 Geminorum	6.5	1.75	5.0	20 50.3	6 4 43.8	-0 43.6	-0.1042	0.5844	0.0689
16 Geminorum	6.2	1.75	5.1	20 32.7	4 48.1	-0 39.4	+0.1928	0.5843	0.0691
ν Geminorum	4.1	+1.75	-5.2	+20 15.8	5 13.4	-0 15.0	+0.4524	0.5841	-0.0700
ζ Gemin. (<i>var.</i>)	3.7	1.93	6.6	20 41.3	19 54.6	-10 6.5	-1.2406	0.5745	0.0998
162 B. Geminorum	5.7	2.02	9.0	17 15.4	7 7 54.4	+1 27.3	+0.9943	0.5662	0.1215
<i>f</i> Geminorum	5.3	2.07	9.1	17 51.5	11 16.3	+4 42.2	-0.0499	0.5640	0.1271
1 Cancr	6.0	2.13	10.5	16 0.3	19 6.4	-11 44.1	+0.8474	0.5585	0.1393
2 B. Cancr	6.0	+2.14	-10.3	+16 44.1	19 47.3	-11 4.6	-0.0142	0.5580	-0.1404
3 Cancr	5.7	2.16	10.1	17 31.7	20 48.0	-10 6.0	-0.9907	0.5574	0.1419
5 Cancr	5.9	2.16	10.4	16 40.6	21 8.1	-9 46.5	-0.1434	0.5571	0.1424
30 B. Cancr	6.1	2.18	11.4	14 52.0	8 1 28.2	-5 35.3	+1.1309	0.5543	0.1485
29 Cancr	5.9	2.26	12.3	14 28.6	9 37.3	+2 17.6	+0.2913	0.5489	0.1591
84 B. Cancr	6.4	+2.27	-12.8	+13 31.9	12 2.0	+4 37.5	+0.9049	0.5473	-0.1621
<i>A</i> ¹ Cancr	5.5	2.30	13.3	12 58.1	16 29.9	+8 56.6	+0.7682	0.5446	0.1672
<i>A</i> ² Cancr	5.7	2.32	13.6	12 24.3	18 16.6	+10 39.9	+1.0690	0.5435	0.1691
60 Cancr	5.7	2.35	14.1	11 55.9	22 34.9	+9 10.1	+0.8351	0.5409	0.1736
α Cancr	4.3	2.36	14.1	12 10.1	23 48.5	-7 58.9	+0.3705	0.5402	0.1748
κ Cancr	5.1	+2.39	-14.8	+10 59.4	9 4 18.4	-3 37.6	+0.8309	0.5377	-0.1791
209 B. Cancr	6.5	2.41	14.5	11 53.5	5 17.2	-2 40.6	-0.3057	0.5372	0.1800
222 B. Cancr	6.3	2.44	14.8	11 50.2	9 14.6	+1 9.3	-0.9683	0.5351	0.1834
ω Leonis	5.5	2.46	15.8	9 24.3	14 29.9	+6 14.8	+0.6607	0.5325	0.1875
<i>h</i> Leonis	5.2	2.48	15.7	10 4.2	16 14.2	+7 55.9	-0.3780	0.5316	0.1888
14 Sextantis	6.3	+2.59	-17.7	+6 0.1	10 9 52.8	+1 2.5	+0.5757	0.5243	-0.1990
19 Sextantis	5.9	2.61	18.1	5 0.6	12 58.7	+4 2.9	+1.0311	0.5233	0.2003
155 B. Leonis	6.5	2.65	18.0	6 6.0	18 22.2	+9 16.8	-1.2354	0.5216	0.2022
237 B. Leonis	6.3	2.74	19.3	1 27.0	11 9 31.7	-0 0.2	+0.7276	0.5180	0.2054
55 Leonis	6.1	2.75	19.4	1 9.8	11 21.3	+1 46.2	+0.6640	0.5177	0.2056
<i>p</i> ³ Leonis	6.1	+2.77	-19.5	+0 25.8	15 32.0	+5 49.7	+0.6056	0.5170	-0.2058
<i>p</i> ⁵ Leonis	5.3	2.80	19.5	+0 22.0	20 54.2	+11 2.5	-0.4289	0.5163	0.2057
388 B. Leonis	6.3	2.85	19.8	-1 15.6	12 4 24.4	-5 40.1	-0.1911	0.5157	0.2050
<i>e</i> Leonis	5.1	2.86	20.0	2 33.7	5 41.6	-4 25.1	+0.9737	0.5157	0.2048
431 B. Leonis	6.2	2.88	19.8	1 59.6	9 59.6	-0 14.5	-0.5285	0.5155	0.2039
13 B. Virginis	5.9	+2.93	-20.1	-4 53.3	16 43.0	+6 17.4	+1.2876	0.5155	-0.2021
78 B. Virginis	6.5	2.99	19.6	5 16.4	13 5 3.8	-5 43.1	-0.7541	0.5162	0.1972
χ Virginis	4.8	3.06	19.2	7 33.3	18 17.2	+7 7.6	-0.7989	0.5178	0.1898
ψ Virginis	5.0	3.11	18.8	9 6.3	14 2 13.7	-9 9.7	-0.5722	0.5192	0.1843
49 Virginis	5.2	3.14	18.3	10 18.8	9 18.6	-2 17.2	-0.5203	0.5207	0.1787
50 Virginis	6.2	+3.14	-18.2	-9 54.2	10 17.0	-1 20.5	-1.1482	0.5209	-0.1778
<i>i</i> Virginis	5.7	3.19	17.4	12 17.5	19 5.1	+7 12.1	-0.0315	0.5230	0.1699
550 B. Virginis	6.0	3.21	17.0	12 48.2	23 11.0	+11 10.8	-0.1506	0.5241	0.1658
621 B. Virginis	6.4	3.26	15.4	14 35.2	15 14 23.0	+1 55.7	-0.5667	0.5284	0.1490
214 G. Virginis	6.5	3.29	15.3	15 57.2	14 45.9	+2 17.8	+0.8939	0.5285	0.1485
40 H. Virginis	5.1	+3.29	-15.0	-15 55.4	17 36.1	+5 2.9	+0.4456	0.5293	-0.1450
<i>i</i> Libræ	4.7	3.35	10.5	19 29.3	16 23 59.6	+10 30.1	+0.6245	0.5384	0.1022
25 Libræ	6.0	3.34	10.4	19 20.8	17 0 31.8	+11 1.4	+0.4110	0.5386	0.1014
147 B. Libræ	6.2	3.35	9.0	20 27.2	8 53.3	-4 52.9	+0.8487	0.5410	0.0879
150 B. Libræ	6.1	3.34	9.0	19 53.5	9 26.3	-4 21.0	+0.1764	0.5411	0.0870
11 H. Libræ	5.4	+3.32	-9.0	-19 23.9	9 52.3	-3 55.8	-0.4089	0.5412	-0.0883

OCCULTATIONS, 1919.

579

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R.A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		s	"	° '	d h m	h m				°	°
B. Libræ	5.9	+3.35	-8.4	20 45.1	17 12 34.2	- 1 19.0	+0.8668	0.5420	-0.0818	+70	+13
Libræ	5.3	3.31	8.6	19 2.3	12 54.1	- 0 59.8	-1.0618	0.5420	0.0812	-39	-90
Libræ	5.0	3.31	8.3	19 25.2	14 21.6	+ 0 25.0	-0.7553	0.5424	0.0788	-19	-90
Libræ	5.1	3.30	7.4	19 55.7	19 47.9	+ 5 40.8	-0.5934	0.5438	0.0694	-10	-81
G. Scorpïi	5.9	3.31	6.9	20 45.1	21 51.4	+ 7 40.3	+0.1802	0.5443	0.0658	+32	-28
Scorpïi	4.3	+3.28	-6.2	20 27.2	18 2 12.0	+11 52.5	-0.4199	0.5452	-0.0582	- 2	-66
Scorpïi	4.6	3.29	6.2	20 39.2	2 28.7	-11 51.4	-0.2142	0.5453	0.0577	+ 9	-51
B. Scorpïi	6.3	3.28	5.6	20 54.3	5 49.7	- 8 36.9	-0.1185	0.5460	0.0516	+14	-45
G. Scorpïi	6.5	3.28	5.3	21 6.3	7 0.3	- 7 28.7	+0.0441	0.5463	0.0495	+22	-35
G. Scorpïi	6.2	3.24	5.4	20 1.4	8 2.1	- 6 28.8	-1.2044	0.5465	0.0477	-57	-90
Ophiuchi	4.5	+3.24	-4.1	21 17.7	14 8.5	- 0 34.4	-0.0520	0.5476	-0.0364	+16	-41
B. Ophiuchi	6.3	3.12	1.5	21 27.2	19 6 3.8	- 9 10.5	-0.2197	0.5499	-0.0065	+ 4	-51
Ophiuchi	4.4	3.07	0.5	21 1.6	12 56.6	- 2 31.4	-0.6889	0.5506	+0.0066	-22	-90
B. Ophiuchi	5.9	3.05	-0.1	21 22.0	14 39.9	- 0 51.5	-0.3001	0.5507	0.0099	0	-57
Ophiuchi	6.4	3.02	+0.9	21 59.4	19 34.2	+ 3 53.1	+0.4557	0.5510	0.0193	+45	-12
Ophiuchi	4.8	+2.98	+1.3	21 38.7	23 20.5	+ 7 31.8	+0.1626	0.5512	+0.0265	+27	-29
G. Sagittarii	6.4	2.87	2.1	20 20.0	20 7 1.5	- 9 2.4	-1.0126	0.5514	0.0412	-40	-90
G. Sagittarii	6.2	2.86	3.0	21 27.1	10 19.8	- 5 50.8	+0.3576	0.5514	0.0474	+41	-18
Sagittarii	4.0	2.82	3.3	21 4.8	13 22.5	- 2 54.2	+0.1039	0.5514	0.0532	+26	-32
Sagittarii	5.6	2.83	3.5	21 44.1	13 35.8	- 2 41.3	+0.8304	0.5514	0.0536	+69	+11
Sagittarii	5.3	+2.80	+3.3	20 45.1	14 3.1	- 2 14.9	-0.2176	0.5514	+0.0544	+ 9	-51
Sagittarii	5.9	2.80	3.2	20 24.7	14 3.5	- 2 14.5	-0.5885	0.5514	0.0545	-12	-81
Sagittarii	5.0	2.75	3.9	20 35.1	18 44.4	+ 2 17.0	-0.1241	0.5513	0.0632	+15	-45
B. Sagittarii	5.7	2.70	5.0	21 27.9	21 0 31.9	+ 7 52.9	+1.2293	0.5511	0.0739	+69	+48
B. Sagittarii	5.9	2.68	4.9	21 7.1	0 59.8	+ 8 19.9	+0.8872	0.5511	0.0748	+69	+15
B. Sagittarii	6.3	+2.65	+5.3	21 5.0	3 57.8	+11 11.9	+1.0778	0.5509	+0.0802	+69	+30
Sagittarii	5.3	2.62	5.4	20 25.0	5 59.5	-10 50.4	+0.5199	0.5508	0.0839	+55	-10
Sagittarii	5.1	2.58	6.0	20 45.7	9 32.4	- 7 24.6	+1.2015	0.5506	0.0902	+70	+43
B. Sagittarii	6.1	2.52	5.8	19 21.7	12 12.8	- 4 49.5	-0.0657	0.5504	0.0950	+21	-42
B. Sagittarii	6.4	2.52	5.8	19 13.2	12 14.4	- 4 48.0	-0.2179	0.5504	0.0950	+13	-51
B. Sagittarii	6.4	+2.49	+5.8	18 51.7	14 6.7	- 2 59.4	-0.4223	0.5503	+0.0983	+ 2	-65
B. Sagittarii	5.4	2.49	6.1	19 25.0	14 37.8	- 2 29.4	+0.2274	0.5503	0.0992	+38	-25
B. Sagittarii	6.3	2.49	6.3	19 55.8	15 19.7	- 1 48.9	+0.8518	0.5502	0.1004	+71	+12
Sagittarii	5.0	2.44	6.5	19 5.8	18 58.6	+ 1 42.7	+0.3291	0.5500	0.1068	+45	-20
B. Sagittarii	6.4	2.41	6.8	19 23.1	20 49.2	+ 3 29.7	+0.8392	0.5499	0.1099	+71	+11
Sagittarii	4.0	+2.39	+6.4	17 59.9	20 52.1	+ 3 32.5	-0.6478	0.5499	+0.1100	- 9	-87
Sagittarii	6.0	2.40	6.5	18 27.5	20 56.2	+ 3 36.4	-0.1465	0.5499	0.1101	+18	-47
B. Sagittarii	6.1	2.32	7.4	19 1.8	22 3 42.6	+10 9.4	+1.2521	0.5494	0.1214	+71	+49
B. Sagittarii	5.8	2.31	7.3	18 24.6	4 0.6	+10 26.9	+0.6224	0.5494	0.1219	+66	- 3
Sagittarii	5.4	2.26	6.8	16 28.7	5 44.5	-11 52.7	-1.2350	0.5492	0.1248	-52	-90
Sagittarii	5.1	+2.15	+7.3	15 42.3	13 46.8	- 4 6.3	-1.0020	0.5486	+0.1375	-29	-90
B. Capricorni	6.2	2.00	8.0	15 2.3	23 0 26.5	+ 6 12.2	-0.1545	0.5481	0.1534	+22	-47
Capricorni	3.2	2.00	8.0	15 2.2	0 33.1	+ 6 18.6	-0.1409	0.5481	0.1536	+23	-46
G. Capricorni	6.2	1.94	8.4	15 19.6	5 15.2	+10 51.4	+0.9032	0.5479	0.1602	+75	+14
B. Capricorni	6.1	1.92	8.1	13 59.9	6 43.6	-11 43.1	-0.2626	0.5479	0.1622	+18	-53
B. Capricorni	6.0	+1.81	+8.2	12 50.6	14 27.5	- 4 14.5	-0.1846	0.5478	+0.1724	+24	-49
B. Aquarii	6.4	1.79	8.0	11 52.7	15 35.6	- 3 8.6	-1.0015	0.5478	0.1738	-24	-90
Aquarii	4.5	1.70	8.4	11 41.9	23 18.8	+ 4 19.3	+0.1901	0.5479	0.1831	+45	-27
G. Aquarii	6.5	1.66	8.2	10 56.3	24 1 30.9	+ 6 27.1	-0.1968	0.5480	0.1856	+24	-49
Aquarii	6.3	1.60	8.0	9 39.8	5 34.6	+10 22.8	-0.7620	0.5483	0.1900	- 7	-90
Aquarii	5.6	+1.59	+8.1	10 5.5	6 38.2	+11 24.3	-0.1138	0.5483	+0.1911	+29	-4

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ing Par- allax.
Name.	Mag.	Red'ns from 1919.0.		Apparent Declina- tion.	Greenwich Mean Time.	Hour Angle, H	γ	γ'	γ''	
		$\Delta\alpha$	$\Delta\delta$		d h m	h m				N. S.
ξ Aquarii	4.8	+1.52	+7.8	-8 13.0	24 12 30.0	-6 55.5	-0.9208	0.5488	+0.1970	-16-40
ϵ^1 Capricorni	5.3	1.48	8.3	9 27.2	15 52.4	-3 39.8	+1.0285	0.5492	0.2001	+81-21
ϵ^2 Capricorni	6.3	1.47	8.4	9 38.9	16 27.7	-3 5.7	+1.3478	0.5493	0.2006	+74-46
30 Aquarii	5.6	1.38	7.7	6 54.7	25 0 23.0	+4 33.9	+0.1410	0.5505	0.2072	+45-30
138 B. Aquarii	6.4	1.32	7.3	5 7.1	4 46.8	+8 48.9	-0.7804	0.5514	0.2104	-6-30
44 Aquarii	5.7	+1.30	+7.5	-5 47.4	6 47.8	+10 45.8	+0.3330	0.5518	+0.2117	-57-30
51 Aquarii	5.8	1.27	7.4	5 14.7	10 1.8	-10 6.7	+0.4633	0.5524	0.2137	-60-11
187 B. Aquarii	6.3	1.23	6.9	3 19.5	13 21.0	-6 54.1	-0.7826	0.5533	0.2156	-5-30
κ Aquarii	5.2	1.20	7.3	4 38.7	16 18.2	-4 2.8	+1.1993	0.5540	0.2171	+86-35
207 B. Aquarii	6.3	1.19	7.1	3 58.4	17 41.9	-2 42.0	+0.8202	0.5545	0.2177	-8-7
3 Piscium	6.3	+1.10	+6.1	-0 14.9	26 2 44.4	+6 2.2	-0.9685	0.5574	+0.2209	-17-40
22 B. Piscium	6.4	1.01	6.1	0 9.1	13 2.5	-8 1.1	+1.2208	0.5613	0.2226	+90-38
κ Piscium	4.9	1.00	5.8	+0 48.8	14 33.7	-6 33.0	+0.5899	0.5619	0.2226	+77-6
9 Piscium	6.4	1.00	5.8	0 40.8	14 42.1	-6 24.9	+0.7561	0.5620	0.2226	+90-3
16 Piscium	5.7	0.97	5.6	1 39.2	18 46.3	-2 29.2	+0.6840	0.5638	0.2225	+87-0
19 Piscium	5.4	+0.94	+5.2	+3 2.3	23 11.2	+1 46.4	+0.2806	0.5659	+0.2219	+54-22
d Piscium	5.4	+0.85	+4.0	+7 44.5	27 14 2.0	-7 54.4	-1.1303	0.5736	+0.2163	-29-33
NEW MOON.										

MAY.

129 H ¹ Tauri	5.8	+0.98	-1.7	+20 31.4	1 18 55.9	-7 1.0	+0.8689	0.6137	+0.0344	+90-31
ι Tauri	4.7	1.06	2.3	21 28.5	2 4 14.1	+1 53.9	+0.1349	0.6117	0.0099	+46-9
330 B. Tauri	6.3	1.06	2.4	21 9.9	4 43.0	+2 21.6	+0.4470	0.6115	0.0087	+68-8
105 Tauri	6.0	+1.07	-2.4	-21 35.9	6 3.3	+3 38.6	+0.0264	0.6111	+0.0052	+39-14
108 Tauri	6.2	1.10	2.5	22 11.6	8 53.7	+6 22.0	-0.5603	0.6101	-0.0022	+6-51
n Tauri	5.1	1.11	2.7	22 0.8	10 20.6	+7 45.2	-0.3882	0.6096	0.0059	+16-38
o Tauri	4.8	1.14	3.0	21 52.1	13 31.2	+10 48.0	-0.2761	0.6083	0.0141	+22-32
372 B. Tauri	6.1	1.15	3.5	20 25.0	15 49.9	-10 59.0	+1.1319	0.6073	0.0200	+90-52
ξ Tauri	3.0	+1.16	-3.5	+21 5.6	17 21.0	-9 31.5	+0.4242	0.6066	-0.0239	+66-6
175 H ¹ Tauri	6.5	1.20	3.2	22 37.2	19 1.4	-7 55.3	-1.1451	0.6057	0.0280	-37-68
χ^1 Orionis	4.5	1.21	4.2	20 15.7	23 48.6	-3 19.7	+1.0532	0.6032	0.0399	+90-43
141 Tauri	6.3	1.26	3.9	22 23.9	3 2 36.6	-0 38.5	-1.2126	0.6016	0.0467	-46-68
χ^2 Orionis	4.7	1.25	4.6	20 8.4	3 30.5	+0 13.3	+1.0126	0.6010	0.0488	+90-39
14 B. Geminorum	6.0	+1.29	-4.2	+22 12.2	5 40.5	+2 18.0	-1.1721	0.5997	-0.0540	-40-68
68 Orionis	5.7	1.28	4.9	19 48.5	6 40.8	+3 16.0	+1.1813	0.5991	0.0564	+90-54
15 Geminorum	6.5	1.35	5.2	20 50.2	12 53.2	+9 13.6	-0.2504	0.5950	0.0707	+24-36
16 Geminorum	6.2	1.35	5.3	20 32.7	12 57.4	+9 17.6	+0.0418	0.5949	0.0709	+41-19
ν Geminorum	4.1	1.35	5.4	20 15.8	13 21.9	+9 41.2	+0.2971	0.5946	0.0718	+56-6
162 B. Geminorum	5.7	+1.59	-8.5	+17 15.4	4 15 14.0	+10 34.6	+0.8188	0.5748	-0.1234	+90-13
f Geminorum	5.3	1.63	8.6	17 51.5	18 30.3	-10 16.2	-0.2114	0.5722	0.1290	+26-39
1 Cancr	6.0	1.69	9.8	16 0.3	5 2 7.9	-2 55.0	+0.6721	0.5660	0.1412	+89-8
2 B. Cancr	6.0	1.70	9.6	16 44.1	2 47.7	-2 16.5	-0.1783	0.5655	0.1422	+28-39
3 Cancr	5.7	1.72	9.4	17 31.7	3 46.9	-1 19.5	-1.1420	0.5647	0.1437	-34-73
5 Cancr	5.9	+1.72	-9.7	+16 40.6	4 6.5	-1 0.5	-0.3059	0.5644	-0.1441	+21-47
30 B. Cancr	6.1	1.74	10.6	14 52.0	8 20.2	+3 4.3	+0.9516	0.5610	0.1502	+90-24
29 Cancr	5.9	1.82	11.3	14 28.6	16 18.2	+10 46.0	+0.1225	0.5548	0.1606	+45-25
84 B. Cancr	6.4	1.84	11.8	13 31.9	18 39.8	-10 57.1	+0.7292	0.5531	0.1635	+90-8
A^1 Cancr	5.5	1.88	12.3	12 58.1	23 2.3	-6 43.5	+0.5948	0.5498	0.1685	+73-0
Cancr	5.7	+1.89	-12.6	+12 24.3	6 0 47.0	-5 2.3	+0.8927	0.5485	-0.1704	+90-33

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S						AT CONJUNCTION IN R. A.						Limiting Parallels.	
	Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H .	Y .	x' .	y' .	N.	S.	
			$\Delta\alpha$	$\Delta\delta$									
			s	"	"	d h m	h m				"	"	
60	Cancer	5.7	+1.93	-13.0	+11 56.0	6 5 0.4	- 0 57.1	+0.6625	0.5456	-0.1747	+86	+ 3	
α	Cancer	4.3	1.95	13.0	12 10.1	6 12.7	+ 0 12.8	+0.2030	0.5447	0.1759	+50	-22	
κ	Cancer	5.1	1.98	13.7	10 59.5	10 38.1	+ 4 29.6	+0.6602	0.5417	0.1800	+86	+ 2	
209 B.	Cancer	6.5	2.00	13.4	11 53.5	11 35.9	+ 5 25.6	-0.4656	0.5411	0.1808	+13	-62	
222 B.	Cancer	6.3	2.04	13.6	11 50.2	15 29.7	+ 9 11.9	-1.1211	0.5385	0.1841	-29	-79	
ω	Leonis	5.5	+2.07	-14.7	+ 9 24.4	20 40.6	- 9 47.0	+0.4956	0.5354	-0.1880	+70	- 9	
h	Leonis	5.2	2.09	14.6	10 4.2	22 23.5	- 8 7.3	-0.5341	0.5344	0.1892	+ 9	-68	
10 B.	Sextantis	6.0	2.15	15.9	7 4.7	7 5 27.4	- 1 16.5	+1.3058	0.5305	0.1936	+87	+52	
14	Sextantis	6.3	2.24	16.6	6 0.2	15 51.6	+ 8 48.6	+0.4225	0.5255	0.1987	+64	-14	
19	Sextantis	5.9	2.27	17.0	5 0.6	18 56.1	+11 47.7	+0.8776	0.5242	0.1998	+90	+12	
237 B.	Leonis	6.3	+2.46	-18.5	+ 1 27.0	8 15 23.7	+ 7 39.2	+0.5930	0.5175	-0.2043	+77	- 6	
55	Leonis	6.1	2.48	18.6	1 9.8	17 13.1	+ 9 25.4	+0.5312	0.5170	0.2044	+72	- 9	
p^3	Leonis	6.1	2.52	18.8	0 25.8	21 23.6	-10 31.3	+0.4771	0.5162	0.2045	+68	-13	
p^5	Leonis	5.3	2.57	18.8	+ 0 22.0	9 2 45.5	- 5 18.7	-0.5500	0.5153	0.2043	+ 8	-74	
388 B.	Leonis	6.3	2.64	19.1	- 1 15.6	10 16.0	+ 1 59.0	-0.3054	0.5143	0.2034	+21	-56	
ϵ	Leonis	5.1	+2.66	-19.5	- 2 33.7	11 33.3	+ 3 14.0	+0.8591	0.5142	-0.2032	+88	+10	
431 B.	Leonis	6.2	2.69	19.2	1 59.6	15 51.7	+ 7 25.0	-0.6367	0.5139	0.2023	+ 3	-82	
13 B.	Virginis	5.9	2.77	19.9	4 53.3	22 36.0	-10 2.2	+1.1851	0.5138	0.2004	+86	+35	
78 B.	Virginis	6.5	2.88	19.4	5 16.4	10 10 58.9	+ 1 59.4	-0.8419	0.5144	0.1954	-10	-90	
q	Virginis	5.3	2.99	19.7	9 0.6	21 21.1	-11 56.1	+1.2849	0.5156	0.1898	+81	+47	
χ	Virginis	4.8	+3.00	-19.2	- 7 33.3	11 0 15.1	- 9 7.1	-0.8718	0.5161	-0.1880	-13	-90	
ψ	Virginis	5.0	3.08	19.0	9 6.3	8 13.3	- 1 22.7	-0.6359	0.5176	0.1826	0	-83	
49	Virginis	5.2	3.15	18.7	10 18.8	15 19.6	+ 5 31.3	-0.5758	0.5192	0.1770	+ 3	-77	
50	Virginis	6.2	3.16	18.5	9 54.2	16 18.2	+ 6 28.2	-1.2029	0.5195	0.1762	-40	-90	
i	Virginis	5.7	3.25	18.1	12 17.5	12 1 7.9	- 8 57.6	-0.0754	0.5218	0.1683	+29	-42	
550 B.	Virginis	6.0	+3.29	-17.8	-12 48.3	5 14.5	- 4 58.2	-0.1898	0.5230	-0.1644	+22	-49	
621 B.	Virginis	6.4	3.42	16.2	14 35.2	20 28.1	+ 9 48.2	-0.5890	0.5279	0.1478	- 1	-79	
214 G.	Virginis	6.5	3.45	16.3	15 57.2	20 51.0	+10 10.3	+0.8727	0.5280	0.1473	+75	+12	
40 H.	Virginis	5.1	3.47	16.0	15 55.5	23 41.4	-11 4.4	+0.4273	0.5290	0.1439	+56	-14	
ι	Librae	4.7	3.69	11.7	19 29.4	14 6 4.2	- 5 37.9	+0.6372	0.5395	0.1014	+66	- 2	
25	Librae	6.0	+3.69	-11.6	-19 20.8	6 36.4	- 5 6.6	+0.4241	0.5396	-0.1006	+51	-14	
147 B.	Librae	6.2	3.75	10.1	20 27.2	14 56.8	+ 2 58.0	+0.8694	0.5423	0.0872	+70	+14	
150 B.	Librae	6.1	3.73	10.0	19 53.5	15 29.7	+ 3 29.8	+0.1977	0.5425	0.0863	+35	-27	
11 H.	Librae	5.4	3.72	10.0	19 23.9	15 55.6	+ 3 54.9	-0.3872	0.5426	0.0856	+ 3	-63	
172 B.	Librae	5.9	3.76	9.4	20 45.1	18 37.2	+ 6 31.4	+0.8909	0.5434	0.0811	+70	+15	
41	Librae	5.3	+3.72	-9.4	-19 2.3	18 57.0	+ 6 50.5	-1.0375	0.5435	-0.0806	-38	-90	
κ	Librae	5.0	3.73	9.2	19 25.2	20 24.2	+ 8 15.0	-0.7296	0.5440	0.0781	-17	-90	
λ	Librae	5.1	3.75	8.2	19 55.7	15 49.6	-10 30.1	-0.5631	0.5455	0.0688	- 8	-78	
10 G.	Scorpii	5.9	3.78	7.7	20 45.1	3 52.8	- 8 31.0	+0.2122	0.5460	0.0652	+34	-26	
ω^1	Scorpii	4.3	3.77	7.0	20 27.2	8 12.6	- 4 19.5	-0.3843	0.5471	0.0575	0	-63	
ω^2	Scorpii	4.6	+3.78	-6.9	-20 39.2	8 29.2	- 4 3.4	-0.1783	0.5472	-0.0570	+11	-49	
84 B.	Scorpii	6.3	3.78	6.3	20 54.3	11 49.6	- 0 49.6	-0.0801	0.5480	0.0510	+16	-43	
51 G.	Scorpii	6.5	3.79	6.0	21 6.3	13 0.0	+ 0 18.5	+0.0835	0.5482	0.0489	+25	-33	
58 G.	Scorpii	6.2	3.76	5.9	20 1.4	14 1.6	+ 1 18.2	-1.1644	0.5485	0.0470	-52	-90	
ω	Ophiuchi	4.5	3.79	4.6	21 17.7	20 6.7	+ 7 11.3	-0.0073	0.5497	0.0358	+18	-38	
116 B.	Ophiuchi	6.3	+3.75	-1.5	-21 27.2	16 11 59.2	- 1 27.6	-0.1642	0.5520	-0.0059	+ 7	-48	
ϵ	Ophiuchi	4.4	3.72	-0.3	21 1.6	18 50.9	+ 5 10.4	-0.6298	0.5526	+0.0072	-18	-86	
190 B.	Ophiuchi	5.9	3.72	+0.2	21 22.0	20 34.0	+ 6 50.1	-0.2394	0.5527	0.0105	+ 3	-53	
52	Ophiuchi	6.4	3.71	1.2	21 59.4	17 1 27.8	+11 34.0	+0.5202	0.5529	0.0199	+49	- 8	
58	Ophiuchi	4.8	3.68	1.9	21 38.7	5 13.8	- 8 47.4	+0.2288	0.5529	0.0271	+31	-25	
16 G.	Sagittarii	6.4	+3.60	+3.1	-20 20.0	12 54.6	- 1 22.0	-0.9450	0.5528	+0.0418	-35	-5	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
30 G. Sagittarii	6.2	+3.60	+ 3.9	-21 27.1	17 16 12.9	+ 1 49.7	+0.4298	0.5527	+0.0480	+46	-14
39 G. Sagittarii	6.3	3.54	3.9	19 51.5	18 7.0	+ 3 40.0	-1.2217	0.5526	0.0516	-59	-59
μ Sagittarii	4.0	3.57	4.4	21 4.8	19 15.7	+ 4 46.4	+0.1770	0.5525	0.0537	+31	-28
14 Sagittarii	5.6	3.58	4.6	21 44.1	19 29.1	+ 4 59.3	+0.9055	0.5525	0.0542	+69	+16
15 Sagittarii	5.3	3.56	4.5	20 45.1	19 56.4	+ 5 25.8	-0.1452	0.5525	0.0550	+13	-47
16 Sagittarii	5.9	+3.55	+ 4.4	-20 24.7	19 56.8	+ 5 26.1	-0.5171	0.5525	+0.0550	- 7	-73
21 Sagittarii	5.0	3.51	5.2	20 35.1	18 0 38.1	+ 9 58.1	-0.0494	0.5521	0.0637	+19	-41
121 B. Sagittarii	5.9	3.47	6.4	21 7.1	6 54.5	- 7 58.0	+0.9681	0.5515	0.0752	+69	+21
128 B. Sagittarii	6.3	3.45	7.0	21 5.0	9 53.2	- 5 5.2	+1.1609	0.5511	0.0806	+69	+38
29 Sagittarii	5.3	3.42	7.2	20 25.0	11 55.5	- 3 6.9	+0.6015	0.5510	0.0842	+61	- 4
36 Sagittarii	5.1	+3.39	+ 7.8	-20 45.7	15 29.3	+ 0 19.7	+1.2875	0.5505	+0.0905	+68	+64
171 B. Sagittarii	6.1	3.33	7.9	19 21.7	18 10.6	+ 2 55.8	+0.0154	0.5501	0.0952	+25	-37
173 B. Sagittarii	6.4	3.33	7.9	19 13.1	18 12.3	+ 2 57.4	-0.1375	0.5501	0.0952	+17	-46
187 B. Sagittarii	6.4	3.30	8.1	18 51.7	20 5.3	+ 4 46.6	-0.3425	0.5498	0.0985	+ 7	-59
190 B. Sagittarii	5.4	3.31	8.3	19 25.0	20 36.6	+ 5 16.9	+0.3107	0.5497	0.0994	+43	-20
195 B. Sagittarii	6.3	+3.31	+ 8.5	-19 55.8	21 18.8	+ 5 57.7	+0.9386	0.5496	+0.1006	+71	+18
d Sagittarii	5.0	3.26	8.9	19 5.7	19 0 59.2	+ 9 30.8	+0.4143	0.5491	0.1068	+50	-15
226 B. Sagittarii	6.4	3.24	9.3	19 23.0	2 50.8	+11 18.8	+0.9279	0.5488	0.1100	+71	+17
ρ Sagittarii	4.0	3.21	8.9	17 59.9	2 53.6	+11 21.0	-0.5677	0.5488	0.1100	- 5	-78
45 Sagittarii	6.0	3.22	9.0	18 27.4	2 57.8	+11 25.5	-0.0634	0.5488	0.1101	+23	-42
267 B. Sagittarii	5.8	+3.14	+10.0	-18 24.5	10 6.1	- 5 40.2	+0.7119	0.5477	+0.1217	+72	+ 2
54 Sagittarii	5.4	3.09	9.7	16 28.6	11 51.1	- 3 58.7	-1.1578	0.5473	0.1245	-43	-90
e Sagittarii	5.2	3.08	9.8	16 18.7	12 42.0	- 3 9.4	-1.2296	0.5472	0.1259	-51	-90
g Sagittarii	5.1	2.98	10.5	15 42.3	19 59.2	+ 3 53.5	-0.9230	0.5460	0.1370	-23	-90
16 B. Capricorni	6.2	2.85	11.6	15 2.3	20 6 48.4	- 9 38.4	-0.0681	0.5444	0.1524	+27	-42
β Capricorni	3.2	+2.84	+11.6	-15 2.1	6 55.1	- 9 31.9	-0.0542	0.5444	+0.1526	+28	-42
27 G. Capricorni	6.2	2.79	12.1	15 19.5	11 42.0	- 4 54.3	+1.0000	0.5437	0.1590	+75	+21
45 B. Capricorni	6.1	2.76	12.0	13 59.8	13 12.0	- 3 27.1	-0.1772	0.5436	0.1610	+22	-48
84 B. Capricorni	6.0	2.65	12.2	12 50.5	21 5.0	+ 4 10.6	-0.0988	0.5427	0.1707	+27	-44
16 B. Aquarii	6.4	2.62	12.0	11 52.6	22 14.5	+ 5 17.9	-0.9247	0.5425	0.1721	-19	-90
ν Aquarii	4.5	+2.53	+12.6	-11 41.8	21 6 7.9	-11 4.0	+0.2794	0.5420	+0.1810	+50	-23
51 G. Aquarii	6.5	2.49	12.5	10 56.3	8 23.2	- 8 53.0	-0.1125	0.5418	0.1834	+28	-44
17 Aquarii	6.3	2.43	12.3	9 39.7	12 32.9	- 4 51.3	-0.6856	0.5417	0.1876	- 3	-89
19 Aquarii	5.6	2.42	12.5	10 5.4	13 38.0	- 3 48.4	-0.0294	0.5417	0.1886	+33	-40
ξ Aquarii	4.8	2.34	12.2	8 12.9	19 39.0	+ 2 1.0	-0.8484	0.5417	0.1942	-12	-90
e^1 Capricorni	5.3	+2.30	+12.8	- 9 27.1	23 7.0	+ 5 22.4	+1.1261	0.5417	+0.1971	+81	+29
30 Aquarii	5.6	2.18	12.4	6 54.6	22 7 52.2	-10 9.2	+0.2242	0.5424	0.2038	+49	-26
138 B. Aquarii	6.4	2.12	11.9	5 7.0	12 24.0	- 5 46.3	-0.7120	0.5429	0.2068	- 2	-90
44 Aquarii	5.7	2.10	12.2	5 47.3	14 28.7	- 3 45.5	+0.4169	0.5432	0.2081	+62	-15
51 Aquarii	5.8	2.06	12.1	5 14.6	17 48.7	- 0 32.0	+0.5479	0.5437	0.2100	+72	- 8
187 B. Aquarii	6.3	+2.01	+11.4	- 3 19.4	21 14.2	+ 2 46.8	-0.7179	0.5444	+0.2116	- 2	-90
κ Aquarii	5.2	1.98	11.9	4 38.6	23 0 17.2	+ 5 43.8	+1.2927	0.5450	0.2131	+86	+46
207 B. Aquarii	6.3	1.96	11.7	3 58.3	1 43.5	+ 7 7.4	+0.9073	0.5453	0.2137	+87	+13
3 Piscium	6.3	1.86	10.6	0 14.8	11 3.9	- 7 50.6	-0.9132	0.5478	0.2167	-13	-90
22 B. Piscium	6.4	1.74	10.5	0 9.0	21 42.7	+ 2 27.1	+1.3045	0.5515	0.2182	+90	+48
π Piscium	4.9	+1.72	+10.1	+ 0 48.9	23 16.9	+ 3 58.1	+0.6630	0.5522	+0.2182	+85	- 2
9 Piscium	6.4	1.72	10.2	0 40.8	23 25.6	+ 4 6.6	+0.8316	0.5522	0.2182	+90	+ 8
16 Piscium	5.7	1.68	9.8	1 39.3	24 3 38.0	+ 8 10.4	+0.7560	0.5540	0.2181	+90	+ 4
19 Piscium	5.4	1.63	9.3	3 2.4	8 11.6	-11 25.3	+0.3436	0.5561	0.2174	+58	-19
d^1 Piscium	5.4	1.50	7.4	7 44.6	23 31.1	+ 3 22.6	-1.0969	0.5641	0.2122	-27	-83
51 Piscium	5.6	+1.45	+ 7.6	+ 6 30.6	25 4 42.1	+ 8 22.8	+1.2306	0.5672	+0.2091	+90	+41

OCCULTATIONS, 1919.

583

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y'</i>	<i>z'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
B. Piscium	6.5	+1.42	+ 6.7	+ 8 54.9	25 8 32.0	-11 55.6	-0.3797	0.5696	+0.2065	+17	-58
Piscium	6.2	1.28	4.2	14 14.9	26 7 32.9	+10 14.6	-1.1683	0.5850	0.1830	-35	-76
Arietis	5.8	+1.18	+ 3.2	+14 54.1	22 36.5	+ 0 43.5	+0.7792	0.5953	+0.1601	+90	+13
NEW MOON.											

JUNE.

B. Geminorum	5.7	+1.34	- 8.2	+17 15.4	1 0 32.0	- 219.4	+0.7788	0.5845	-0.1256	+90	+16
Geminorum	5.3	1.37	8.2	17 51.5	3 42.6	+ 0 44.1	-0.2382	0.5818	0.1313	+25	-41
Cancer	6.0	+1.41	- 9.2	+16 0.3	11 6.6	+ 7 51.7	+0.6327	0.5756	-0.1436	+84	+ 5
B. Cancer	6.0	1.42	9.1	16 44.1	11 45.2	+ 8 28.9	-0.2061	0.5750	0.1446	+26	-40
Cancer	5.7	1.43	8.9	17 31.7	12 42.6	+ 9 24.2	-1.1568	0.5742	0.1461	-35	-73
Cancer	5.9	1.43	9.2	16 40.6	13 1.6	+ 9 42.5	-0.3322	0.5738	0.1466	+20	-48
B. Cancer	6.1	1.45	9.9	14 52.0	17 7.8	-10 20.2	+0.9080	0.5704	0.1527	+90	+21
Cancer	5.9	+1.51	-10.5	+14 28.6	2 0 51.6	- 2 52.8	+0.0899	0.5640	-0.1632	+43	-26
B. Cancer	6.4	1.52	10.9	13 31.9	3 9.0	- 0 40.2	+0.6883	0.5621	0.1661	+90	+ 6
Cancer	5.5	1.56	11.3	12 58.1	7 23.7	+ 3 25.7	+0.5559	0.5586	0.1711	-75	- 2
Cancer	5.7	1.57	11.6	12 24.3	9 5.4	+ 5 4.0	+0.8498	0.5573	0.1730	+90	+15
Cancer	5.7	1.61	11.9	11 56.0	13 11.5	+ 9 1.8	+0.6229	0.5540	0.1774	+82	+ 1
Cancer	4.3	+1.62	-11.9	+12 10.1	14 21.8	+10 9.7	+0.1695	0.5532	-0.1785	+48	-23
Cancer	5.1	1.65	12.5	10 59.5	18 39.7	- 9 41.0	+0.6210	0.5499	0.1826	+81	0
B. Cancer	6.5	1.67	12.2	11 53.5	19 35.9	- 8 46.7	-0.4899	0.5492	0.1834	+11	-64
B. Cancer	6.3	1.70	12.4	11 50.3	23 23.4	- 5 6.7	-1.1371	0.5464	0.1866	-31	-79
Leonis	5.5	1.74	13.4	9 24.4	3 4 26.0	- 0 13.9	+0.4596	0.5429	0.1905	+67	-11
Leonis	5.2	+1.76	-13.2	+10 4.2	6 6.2	+ 1 23.2	-0.5570	0.5417	-0.1916	+ 8	-70
B. Sextantis	6.0	1.81	14.5	7 4.7	12 59.5	+ 8 3.3	+1.2612	0.5373	0.1959	+90	+45
B. Sextantis	6.3	1.85	14.8	6 20.2	16 41.3	+11 38.1	+1.3215	0.5350	0.1978	+84	+54
Sextantis	6.3	1.91	15.1	6 0.2	23 9.1	- 6 6.1	+0.3903	0.5314	0.2007	+62	-15
Sextantis	5.9	1.94	15.5	5 0.7	4 2 9.6	- 3 11.1	+0.8410	0.5298	0.2018	+90	+10
B. Leonis	6.3	+2.15	-16.9	+ 1 27.0	22 14.2	- 7 42.7	+0.5641	0.5212	-0.2056	+75	- 7
Leonis	6.1	2.17	17.0	1 9.9	5 0 1.9	- 5 58.2	+0.5034	0.5207	0.2056	+70	-11
Leonis	6.1	2.21	17.3	0 25.9	4 8.5	- 1 58.8	+0.4506	0.5194	0.2056	+66	-14
Leonis	5.3	2.27	17.2	+ 0 22.0	9 26.0	+ 3 9.3	-0.5671	0.5180	0.2052	+ 7	-75
B. Leonis	6.3	2.35	17.7	- 1 15.5	16 51.1	+10 21.6	-0.3231	0.5165	0.2040	+20	-57
Leonis	5.1	+2.37	-18.1	- 2 33.7	18 7.5	+11 35.8	+0.8335	0.5163	-0.2037	+88	+ 8
B. Leonis	6.2	2.41	17.8	1 59.6	22 23.2	- 8 15.9	-0.6513	0.5156	0.2027	+ 2	-83
B. Virginis	5.9	2.50	18.6	4 53.3	6 5 3.9	- 1 46.8	+1.1608	0.5150	0.2006	+86	+32
B. Virginis	6.5	2.64	18.1	5 16.4	17 21.8	+10 9.9	-0.8528	0.5147	0.1954	-10	-90
Virginis	5.3	2.78	18.9	9 0.6	7 3 41.2	- 3 48.4	+1.2668	0.5154	0.1896	+81	+44
Virginis	4.8	+2.80	-18.2	- 7 33.3	6 34.7	- 1 0.0	-0.8812	0.5157	-0.1877	-13	-90
Virginis	5.0	2.91	18.2	9 6.3	14 31.8	+ 6 43.3	-0.6452	0.5168	0.1821	0	-84
Virginis	5.2	3.00	17.9	10 18.8	21 37.6	-10 23.2	-0.5843	0.5183	0.1765	+ 3	-78
Virginis	6.2	3.01	17.7	9 54.2	22 36.1	- 9 26.5	-1.2098	0.5185	0.1757	-41	-90
Virginis	5.7	3.14	17.6	12 17.5	8 7 25.7	- 0 52.3	-0.0840	0.5206	0.1678	+29	-43
B. Virginis	6.0	+3.19	-17.3	-12 48.2	11 32.3	+ 3 7.1	-0.1977	0.5217	-0.1638	+22	-50
B. Virginis	6.4	3.38	16.0	14 35.2	9 2 46.6	- 6 5.8	-0.5950	0.5266	0.1473	- 1	-79
G. Virginis	6.5	3.41	16.3	15 57.2	3 9.6	- 5 43.6	+0.8644	0.5267	0.1469	+75	+11
H. Virginis	5.1	3.44	15.9	15 55.5	6 0.1	- 2 58.2	+0.4200	0.5277	0.1434	+55	-15
Libre	4.7	3.81	12.0	19 29.4	10 12 23.8	+ 2 29.3	+0.6300	0.5389	0.1014	-65	- 2
Libre	6.0	+3.81	-11.8	-19 20.8	12 56.0	+ 3 0.5	+0.4172	0.5391	-0.1006	+50	-9

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
147 B. Libræ	6.2	+3.91	-10.5	-20 27.2	10 21 16.1	+11 4.8	+0.8615	0.5421	-0.0873	+70	+13
150 B. Libræ	6.1	3.90	10.3	19 53.5	21 49.0	+11 36.7	+0.1907	0.5423	0.0863	+35	-27
11 H. Libræ	5.4	3.89	10.2	19 23.9	22 14.9	-11 58.2	-0.3933	0.5424	0.0856	+ 3	-63
172 B. Libræ	5.9	3.94	9.8	20 45.1	11 0 56.2	- 9 22.1	+0.8827	0.5433	0.0812	+70	+14
41 Libræ	5.3	3.90	9.6	19 2.3	1 16.0	- 9 3.0	-1.0428	0.5434	0.0806	-38	-90
κ Libræ	5.0	+3.92	- 9.4	-19 25.2	2 43.1	- 7 38.7	-0.7355	0.5440	-0.0782	-17	-90
λ Libræ	5.1	3.97	8.3	19 55.7	8 7.9	- 2 24.4	-0.5696	0.5457	0.0689	- 9	-78
10 G. Scorpii	5.9	4.01	8.0	20 45.1	10 10.7	- 0 25.5	+0.2042	0.5464	0.0653	+33	-26
ω^1 Scorpii	4.3	4.03	7.1	20 27.2	14 29.8	+ 3 45.2	-0.3918	0.5477	0.0577	0	-63
ω^2 Scorpii	4.6	4.04	7.1	20 39.2	14 46.4	+ 4 1.2	-0.1862	0.5478	0.0572	+11	-49
84 B. Scorpii	6.3	+4.06	- 6.4	-20 54.3	18 6.1	+ 7 14.4	-0.0885	0.5488	-0.0512	+15	-43
51 G. Scorpii	6.5	4.07	6.2	21 6.3	19 16.3	+ 8 22.3	+0.0746	0.5491	0.0491	+24	-34
58 G. Scorpii	6.2	4.04	5.9	20 1.4	20 17.7	+ 9 21.7	-1.1711	0.5494	0.0472	-53	-90
ω Ophiuchi	4.5	4.11	4.7	21 17.7	12 2 21.4	- 8 46.6	-0.0170	0.5509	0.0361	+18	-39
116 B. Ophiuchi	6.3	4.16	- 1.4	21 27.2	18 9.0	+ 6 29.6	-0.1763	0.5540	-0.0061	+ 6	-49
ξ Ophiuchi	4.4	+4.16	+ 0.1	-21 1.6	13 0 58.2	-10 54.8	-0.6422	0.5549	+0.0071	-19	-88
190 B. Ophiuchi	5.9	4.17	0.6	21 22.0	2 40.6	- 9 15.9	-0.2532	0.5551	0.0103	+ 3	-53
52 Ophiuchi	6.4	4.19	1.6	21 59.4	7 32.4	- 4 33.9	+0.5035	0.5554	0.0198	+48	- 9
58 Ophiuchi	4.8	4.17	2.4	21 38.7	11 16.8	- 0 56.9	+0.2119	0.5556	0.0270	+30	-26
16 G. Sagittarii	6.4	4.13	4.0	20 20.0	18 54.1	+ 6 24.9	-0.9611	0.5558	0.0417	-36	-90
30 G. Sagittarii	6.2	+4.15	+ 4.8	-21 27.1	22 10.9	+ 9 35.1	+0.4096	0.5557	+0.0480	+44	-15
39 G. Sagittarii	6.3	4.10	5.1	19 51.4	14 0 4.1	+11 24.5	-1.2387	0.5557	0.0516	-61	-86
μ Sagittarii	4.0	4.14	5.4	21 4.8	1 12.2	-11 29.6	+0.1565	0.5557	0.0538	+29	-29
14 Sagittarii	5.6	4.15	5.5	21 44.1	1 25.5	-11 16.9	+0.8834	0.5556	0.0542	+69	+15
15 Sagittarii	5.3	4.12	5.5	20 45.1	1 52.6	-10 50.6	-0.1651	0.5556	0.0551	+12	-48
16 Sagittarii	5.9	+4.11	+ 5.5	-20 24.7	1 53.0	-10 50.3	-0.5361	0.5556	+0.0551	- 8	-75
21 Sagittarii	5.0	4.10	6.5	20 35.1	6 32.0	- 6 20.6	-0.0709	0.5553	0.0638	+17	-42
121 B. Sagittarii	5.9	4.09	7.8	21 7.1	12 45.4	- 0 19.7	+0.9428	0.5548	0.0754	+69	+19
128 B. Sagittarii	6.3	4.08	8.4	21 5.0	15 42.7	+ 2 31.7	+1.1343	0.5544	0.0808	+69	+35
29 Sagittarii	5.3	4.05	8.8	20 24.9	17 44.0	+ 4 28.9	+0.5754	0.5542	0.0844	+58	- 6
36 Sagittarii	5.1	+4.04	+ 9.5	-20 45.6	21 16.2	+ 7 54.0	+1.2593	0.5538	+0.0907	+70	+53
171 B. Sagittarii	6.1	3.99	9.8	19 21.7	23 56.3	+10 28.7	-0.0116	0.5534	0.0955	+24	-38
173 B. Sagittarii	6.4	3.98	9.8	19 13.1	23 57.9	+10 30.3	-0.1643	0.5533	0.0955	+16	-48
187 B. Sagittarii	6.4	3.97	10.1	18 51.7	15 0 0.0	-11 41.3	-0.3696	0.5530	0.0988	+ 5	-61
190 B. Sagittarii	5.4	3.97	10.3	19 24.9	2 21.1	-11 11.2	+0.2824	0.5529	0.0997	+41	-22
195 B. Sagittarii	6.3	+3.98	+10.4	-19 55.8	3 3.0	-10 30.7	+0.9093	0.5528	+0.1009	+71	+16
d Sagittarii	5.0	3.94	11.0	19 5.7	6 41.8	- 6 59.2	+0.3845	0.5523	0.1071	+48	-16
226 B. Sagittarii	6.4	3.93	11.4	19 23.0	8 32.6	- 5 12.0	+0.8970	0.5519	0.1102	+71	+15
p Sagittarii	4.0	3.90	11.2	17 59.9	8 35.5	- 5 9.2	-0.5971	0.5519	0.1103	- 7	-81
45 Sagittarii	6.0	3.91	11.3	18 27.4	8 39.6	- 5 5.3	-0.0934	0.5519	0.1104	+21	-43
267 B. Sagittarii	5.8	+3.86	+12.5	-18 24.5	15 45.1	+ 1 46.2	+0.6791	0.5506	+0.1221	+70	0
54 Sagittarii	5.4	3.80	12.5	16 28.6	17 29.5	+ 3 27.2	-1.1901	0.5502	0.1249	-47	-90
e Sagittarii	5.2	3.79	12.6	16 18.7	18 20.0	+ 4 15.9	-1.2622	0.5501	0.1262	-56	-86
g Sagittarii	5.1	3.72	13.6	15 42.2	16 1 34.9	+11 16.6	-0.9588	0.5486	0.1373	-26	-90
16 B. Capricorni	6.2	3.62	15.0	15 2.2	12 21.7	- 2 17.8	-0.1078	0.5464	0.1527	+25	-44
β Capricorni	3.2	+3.61	+15.0	-15 2.0	12 28.4	- 2 11.3	-0.0940	0.5464	+0.1528	+26	-43
27 G. Capricorni	6.2	3.57	15.7	15 19.4	17 14.7	+ 2 25.7	+0.9601	0.5454	0.1592	+75	+18
45 B. Capricorni	6.1	3.54	15.7	13 59.8	18 44.5	+ 3 52.7	-0.2194	0.5451	0.1611	+20	-51
84 B. Capricorni	6.0	3.45	16.2	12 50.4	17 2 37.3	+11 30.2	-0.1437	0.5436	0.1707	+25	-46
16 B. Aquarii	6.4	3.42	16.2	11 52.6	3 46.9	-11 22.4	-0.9723	0.5434	0.1721	-22	-90
Aquarii	4.5	+3.34	+16.9	-11 41.7	11 41.3	- 3 43.2	+0.2327	0.5421	+0.1807	+47	-25

OCCULTATIONS, 1919.

585

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.			
Name.		Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.	
			$\Delta\alpha$	$\Delta\delta$									
			s	$"$	s	d	h	m	h	m	s	$"$	
51 G.	Aquarii	6.5	+3.30	+16.9	-10 56.2	17	13	57.0	-1 31.8	-0.1614	0.5418	+0.1830	+25 -47
17	Aquarii	6.3	3.24	16.9	9 39.6		18	7.8	+2 30.9	-0.7385	0.5413	0.1871	-6 -90
19	Aquarii	5.6	3.24	17.0	10 5.4		19	13.4	+3 34.5	-0.0797	0.5412	0.1881	+30 -43
ξ	Aquarii	4.8	3.16	17.0	8 12.8	18	1	16.6	+9 26.1	-0.9050	0.5406	0.1935	-15 -90
ϵ^1	Capricorni	5.3	3.13	17.6	9 27.0		4	46.2	-11 11.0	+1.0799	0.5403	0.1963	+81 +26
30	Aquarii	5.6	+3.02	+17.4	-6 54.6		13	36.8	-2 37.4	+0.1705	0.5400	+0.2027	+46 -28
138 B.	Aquarii	6.4	2.95	17.0	5 7.0		18	11.8	+1 48.9	-0.7740	0.5401	0.2055	-6 -90
44	Aquarii	5.7	2.94	17.3	5 47.2		20	18.2	+3 51.3	+0.3633	0.5401	0.2067	+59 -18
51	Aquarii	5.8	2.90	17.3	5 14.6		23	41.1	+7 7.8	+0.4949	0.5402	0.2084	+68 -11
187 B.	Aquarii	6.3	2.85	16.7	3 19.3	19	3	9.8	+10 29.7	-0.7828	0.5405	0.2100	-5 -90
κ	Aquarii	5.2	+2.82	+17.2	-4 38.5		6	15.8	-10 30.2	+1.2459	0.5408	+0.2113	+86 +40
207 B.	Aquarii	6.3	2.80	17.1	3 58.3		7	43.6	-9 5.2	+0.8567	0.5410	0.2118	+87 +9
3	Piscium	6.3	2.70	16.0	0 14.7		17	14.8	+0 7.7	-0.9837	0.5424	0.2144	-18 -90
22 B.	Piscium	6.4	2.58	15.9	0 8.9	20	4	8.0	+10 39.9	+1.2589	0.5450	0.2155	+90 +42
κ	Piscium	4.9	2.56	15.5	+0 49.0		5	44.5	-11 46.8	+0.6096	0.5455	0.2155	+79 -5
9	Piscium	6.4	+2.56	+15.6	+0 40.9		5	53.5	-11 38.0	+0.7804	0.5455	+0.2155	+90 +5
16	Piscium	5.7	2.51	15.2	1 39.4		10	12.2	-7 27.8	+0.7040	0.5469	0.2152	+90 0
19	Piscium	5.4	2.47	14.6	3 2.5		14	53.2	-2 56.1	+0.2866	0.5485	0.2145	+55 -22
d	Piscium	5.4	2.32	12.3	7 44.6	21	6	39.5	-11 41.4	-1.1731	0.5553	0.2089	-33 -83
51	Piscium	5.6	2.26	12.5	6 30.7		12	0.2	-6 31.6	+1.1896	0.5580	0.2059	+90 +37
136 B.	Piscium	6.5	+2.23	+11.4	+8 55.0		15	57.5	-2 42.4	-0.4441	0.5601	+0.2032	+14 -62
101	Piscium	6.2	2.04	8.0	14 15.0	22	15	44.6	-3 45.8	-1.2381	0.5747	0.1800	-43 -76
19	Arietis	5.8	1.90	6.4	14 54.2	23	7	18.4	+11 13.3	+0.7454	0.5851	0.1578	+90 +11
27	Arietis	6.4	1.86	5.0	17 20.9		14	33.6	-5 48.0	-0.5958	0.5899	0.1454	+5 -66
36	Arietis	6.5	1.81	4.4	17 25.4		19	56.8	-0 37.3	+0.0866	0.5934	0.1355	+43 -23
40	Arietis	6.0	+1.80	+4.1	+17 56.9		21	37.3	+0 59.3	-0.2122	0.5945	+0.1323	+26 -39
π	Arietis	5.2	1.79	4.3	17 7.8		21	55.9	+1 17.1	+0.6442	0.5947	0.1317	+86 +8
45	Arietis	6.0	1.78	3.8	18 0.3	24	0	30.6	+3 45.8	+0.1051	0.5962	0.1266	+44 -21
ρ	Arietis	5.6	1.78	3.8	17 42.1		0	45.0	+3 59.6	+0.4374	0.5964	0.1261	+66 -3
53	Arietis	6.0	1.73	3.4	17 34.1		5	5.6	+8 9.9	+1.0976	0.5989	0.1172	+90 +40
54	Arietis	6.5	+1.74	+3.2	+18 29.2		5	26.6	+8 30.1	+0.2271	0.5991	+0.1165	+51 -13
δ	Arietis	4.5	1.75	2.8	19 25.3		6	42.9	+9 43.4	-0.5569	0.5998	0.1138	+7 -60
63	Arietis	5.2	1.72	2.1	20 27.2		11	2.8	-10 7.1	-1.1084	0.6022	0.1044	-32 -70
65	Arietis	6.0	1.72	2.0	20 31.0		11	41.8	-9 29.7	-1.1040	0.6025	0.1030	-32 -70
175 B.	Arietis	6.4	1.68	2.4	18 28.5		12	43.8	-8 30.2	+1.0299	0.6031	0.1007	+90 +36
14 H ¹ .	Tauri	6.5	+1.68	+1.4	+20 39.2		17	19.1	-4 6.0	-0.6946	0.6053	+0.0902	-2 -68
13	Tauri	5.6	1.65	1.5	19 26.5		18	36.3	-2 51.9	+0.6210	0.6059	0.0872	+84 +11
14	Tauri	6.2	1.65	1.4	19 24.6		19	10.0	-2 19.7	+0.7010	0.6061	0.0859	+90 +16
22 H ¹ .	Tauri	6.1	1.66	+1.1	20 40.5		19	25.0	-2 5.2	-0.5312	0.6062	0.0853	+8 -55
A	Tauri	4.5	1.62	0.0	21 51.7	25	3	7.0	+5 17.9	-1.1222	0.6092	0.0667	-34 -69
39	Tauri	6.1	+1.62	0.0	+21 47.5		3	21.5	+5 31.8	-1.0364	0.6093	+0.0661	-26 -69
192 B.	Tauri	6.1	1.60	-0.3	22 12.4		6	12.6	+8 15.8	-1.2688	0.6102	0.0591	-59 -68
ω	Tauri	4.8	1.56	0.2	20 22.8		7	54.1	+9 53.2	+0.6372	0.6107	0.0548	+87 +15
51	Tauri	5.6	1.58	0.4	21 22.9		8	18.6	+10 16.7	-0.3336	0.6108	0.0538	+19 -39
53	Tauri	5.3	1.57	0.4	20 56.8		8	42.9	+10 39.9	+0.1190	0.6109	0.0528	+45 -13
56	Tauri	5.2	+1.58	-0.5	+21 34.7		8	46.4	+10 43.3	-0.5037	0.6109	+0.0526	+9 -51
NEW MOON.													
29	Canceri	5.9	+1.42	-9.9	+14 28.6	29	10	38.3	+8 42.0	+0.1563	0.5708	-0.1644	+47 -23
84 B.	Canceri	6.4	1.42	10.2	13 31.9		12	52.9	+10 51.8	+0.7519	0.5690	0.1674	+90 +7
A^1	Canceri	5.5	+1.44	-10.5	+12 58.2		17	2.3	-9 7.6	+0.6238	0.5658	-0.1723	+82

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
<i>A</i> ² Cancr	5.7	+1.44	-10.7	+12 24.3	29 18 41.8	- 7 31.5	+0.9166	0.5645	-0.1745	+90	+19
60 Cancr	5.7	1.47	11.0	11 56.0	22 42.6	- 3 39.1	+0.6947	0.5614	0.1790	+90	+ 5
α Cancr	4.3	1.48	11.0	12 10.1	23 51.3	- 2 32.8	+0.2463	0.5606	0.1802	+52	-20
κ Cancr	5.1	1.49	11.4	10 59.5	30 4 3.3	+ 1 30.6	+0.6970	0.5574	0.1844	+90	+ 4
209 B. Cancr	6.5	1.51	11.3	11 53.5	4 58.2	+ 2 23.6	-0.4028	0.5568	0.1853	+16	-58
222 B. Cancr	6.3	+1.53	-11.4	+11 50.3	8 40.4	+ 5 58.3	-1.0406	0.5541	-0.1886	-23	-79
ω Leonis	5.5	1.55	12.1	9 24.4	13 35.8	+10 43.9	+0.5444	0.5505	0.1925	+74	- 6
<i>h</i> Leonis	5.2	1.57	12.0	10 4.2	15 13.6	-11 41.4	-0.4609	0.5494	0.1937	+13	-63
10 B. Sextantis	6.0	+1.60	-13.0	+ 7 4.8	21 56.9	- 5 11.4	+1.3439	0.5449	-0.1981	+77	+61

JULY.

14 Sextantis	6.3	+1.68	-13.5	+ 6 0.2	1 7 51.6	+ 4 24.3	+0.4885	0.5388	-0.2030	+69	-10
19 Sextantis	5.9	1.70	13.9	5 0.7	10 47.8	+ 7 15.0	+0.9364	0.5372	0.2041	+90	+15
155 B. Leonis	6.5	1.74	13.7	6 6.1	15 55.1	-11 47.4	-1.2641	0.5344	0.2056	-43	-84
237 B. Leonis	6.3	+1.88	-15.2	+ 1 27.0	2 6 24.3	+ 2 15.2	+0.6733	0.5277	-0.2077	+86	- 1
55 Leonis	6.1	1.90	15.2	1 9.9	8 9.6	+ 3 57.2	+0.6140	0.5270	0.2078	+80	- 5
<i>p</i> ¹ Leonis	6.1	1.94	15.4	0 25.9	12 10.9	+ 7 51.3	+0.5636	0.5256	0.2077	+75	- 7
<i>p</i> ² Leonis	5.3	1.99	15.4	0 22.0	17 21.8	-11 7.0	-0.4424	0.5238	0.2072	+14	-65
388 B. Leonis	6.3	2.07	15.8	- 1 15.5	3 0 38.0	- 4 3.9	-0.1985	0.5219	0.2059	+27	-49
<i>e</i> Leonis	5.1	+2.08	-16.2	- 2 33.6	1 53.0	- 2 51.1	+0.9480	0.5215	-0.2056	+88	+15
431 B. Leonis	6.2	2.13	15.9	1 59.5	6 4.0	+ 1 12.5	-0.5225	0.5205	0.2044	+ 9	-71
13 B. Virginis	5.9	2.22	16.8	4 53.2	12 37.8	+ 7 34.8	+1.2754	0.5193	0.2022	+86	+44
78 B. Virginis	6.5	2.36	16.4	5 16.4	4 0 44.5	- 4 39.7	-0.7210	0.5181	0.1966	- 2	-90
χ Virginis	4.8	2.53	16.6	7 33.3	13 47.7	+ 8 0.7	-0.7505	0.5180	0.1887	- 5	-90
ψ Virginis	5.0	+2.64	-16.6	- 9 6.2	21 40.2	- 8 20.6	-0.5174	0.5186	-0.1829	+ 7	-71
49 Virginis	5.2	2.74	16.4	10 18.7	5 4 42.6	- 1 30.6	-0.4587	0.5195	0.1772	+10	-66
50 Virginis	6.2	2.75	16.2	9 54.1	5 40.7	- 0 34.3	-1.0812	0.5196	0.1763	-29	-90
<i>i</i> Virginis	5.7	2.89	16.3	12 17.5	14 27.1	+ 7 56.7	+0.0360	0.5212	0.1683	+36	-36
550 B. Virginis	6.0	2.95	16.1	12 48.2	18 32.6	+11 54.9	-0.0787	0.5220	0.1643	+29	-42
621 B. Virginis	6.4	+3.17	-15.0	-14 35.2	6 9 44.2	+ 2 39.4	-0.4817	0.5260	-0.1476	+ 5	-69
214 G. Virginis	6.5	3.20	15.4	15 57.2	10 7.1	+ 3 1.6	+0.9728	0.5261	0.1471	+75	+19
40 H. Virginis	5.1	3.24	15.0	15 55.4	12 57.5	+ 5 46.8	+0.5284	0.5269	0.1438	+63	- 9
ϵ Libræ	4.7	3.70	11.6	19 29.4	7 19 21.8	+11 14.9	+0.7181	0.5373	0.1018	+71	+ 3
25 Libræ	6.0	3.70	11.5	19 20.8	19 54.0	+11 46.1	+0.5053	0.5375	0.1009	+56	- 9
147 B. Libræ	6.2	+3.83	-10.3	-20 27.2	8 4 14.8	- 4 8.9	+0.9420	0.5405	-0.0878	+70	+18
150 B. Libræ	6.1	3.82	10.1	19 53.5	4 47.8	- 3 36.9	+0.2720	0.5408	0.0869	+40	-22
11 H. Libræ	5.4	3.82	9.8	19 23.9	5 13.7	- 3 11.8	-0.3113	0.5409	0.0862	+ 8	-57
172 B. Libræ	5.9	3.88	9.7	20 45.1	7 55.3	- 0 35.4	+0.9600	0.5419	0.0818	+70	+20
41 Libræ	5.3	3.84	9.2	19 2.3	8 15.1	- 0 16.2	-0.9622	0.5420	0.0812	-32	-90
κ Libræ	5.0	+3.86	- 9.0	-19 25.2	9 42.3	+ 1 8.2	-0.6568	0.5425	-0.0788	-13	-89
λ Libræ	5.1	3.94	8.1	19 55.7	15 7.5	+ 6 22.9	-0.4961	0.5444	0.0696	- 4	-72
10 G. Scorp	5.9	3.98	7.9	20 45.1	17 10.4	+ 8 21.8	+0.2744	0.5450	0.0661	+38	-22
β Scorp	2.9	3.99	6.8	19 35.2	20 51.7	+11 55.9	-1.2437	0.5463	0.0596	-60	-85
56 B. Scorp	5.0	3.99	6.8	19 35.0	20 51.9	+11 56.1	-1.2482	0.5463	0.0596	-61	-84
ω ¹ Scorp	4.3	+4.02	- 7.0	-20 27.2	21 29.8	-11 27.2	-0.3245	0.5465	-0.0585	+ 4	-58
ω ² Scorp	4.6	4.03	7.0	20 39.2	21 46.4	-11 11.1	-0.1196	0.5466	0.0580	+14	-45
84 B. Scorp	6.3	4.07	6.3	20 54.3	9 1 6.2	- 7 57.9	-0.0253	0.5476	0.0521	+19	-39
51 G. Scorp	6.5	4.09	6.1	21 6.3	2 16.4	- 6 50.0	+0.1363	0.5480	0.0500	+28	-30
58 G. Scorp	6.2	4.06	5.6	20 1.4	3 17.8	- 5 50.7	-1.1078	0.5483	0.0481	-46	-90
<i>Ophiuchi</i>	4.5	+4.16	- 4.6	-21 17.7	9 21.6	+ 0 1.2	+0.0378	0.5501	-0.0370	-21	-36

OCCULTATIONS, 1919.

587

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y'</i>	<i>z'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
123 B. Scorpii	6.5	+4.16	-3.5	-20 15.1	9 13 18.2	+3 50.0	-1.2419	0.5512	-0.0297	-62	-85
116 B. Ophiuchi	6.3	4.29	-1.2	21 27.2	10 1 8.0	-8 43.8	-0.1378	0.5540	-0.0072	+9	-46
ξ Ophiuchi	4.4	4.33	+0.3	21 1.6	7 56.1	-2 9.4	-0.6100	0.5552	+0.0058	-17	-83
190 B. Ophiuchi	5.9	4.34	0.8	21 22.0	9 38.2	-0 30.7	-0.2240	0.5555	0.0092	+4	-52
52 Ophiuchi	6.4	4.39	1.8	21 59.4	14 28.9	+4 10.2	+0.5248	0.5562	0.0187	+50	-8
58 Ophiuchi	4.8	+4.39	+2.7	-21 38.7	18 12.2	+7 46.0	+0.2297	0.5566	+0.0259	+31	-25
16 G. Sagittarii	6.4	4.38	4.6	20 20.0	11 1 47.0	-8 54.6	-0.9484	0.5572	0.0406	-35	-90
30 G. Sagittarii	6.2	4.42	5.2	21 27.1	5 2.5	-5 45.7	+0.4135	0.5574	0.0469	+45	-14
39 G. Sagittarii	6.3	4.38	5.8	19 51.4	6 54.9	-3 57.1	-1.2311	0.5575	0.0505	-59	-87
μ Sagittarii	4.0	4.42	6.0	21 4.8	8 2.6	-2 51.7	+0.1576	0.5576	0.0527	+29	-29
14 Sagittarii	5.6	+4.44	+6.0	-21 44.0	8 15.8	-2 38.9	+0.8814	0.5576	+0.0531	+69	+14
15 Sagittarii	5.3	4.41	6.1	20 45.1	8 42.6	-2 13.1	-0.1636	0.5576	0.0540	+12	-48
16 Sagittarii	5.9	4.40	6.2	20 24.7	8 43.0	-2 12.7	-0.5333	0.5576	0.0540	-8	-75
21 Sagittarii	5.0	4.42	7.2	20 35.0	13 20.0	+2 15.0	-0.0756	0.5576	0.0628	+17	-42
115 B. Sagittarii	5.7	4.45	8.4	21 27.8	19 2.7	+7 46.1	+1.2676	0.5575	0.0735	+69	+57
121 B. Sagittarii	5.9	+4.44	+8.5	-21 7.0	19 30.2	+8 12.7	+0.9259	0.5575	+0.0744	+69	+17
128 B. Sagittarii	6.3	4.44	9.2	21 4.9	22 25.7	+11 2.2	+1.1128	0.5574	0.0799	+69	+33
29 Sagittarii	5.3	4.42	9.7	20 24.9	12 0 25.8	-11 1.7	+0.5536	0.5572	0.0836	+58	-7
36 Sagittarii	5.1	4.43	10.4	20 45.6	3 55.9	-7 38.8	+1.2297	0.5569	0.0900	+70	+47
171 B. Sagittarii	6.1	4.39	11.0	19 21.7	6 34.3	-5 5.7	-0.0389	0.5567	0.0948	+23	-40
173 B. Sagittarii	6.4	+4.38	+11.0	-19 13.1	6 35.9	-5 4.1	-0.1909	0.5567	+0.0948	+15	-49
187 B. Sagittarii	6.4	4.38	11.4	18 51.7	8 26.8	-3 16.9	-0.3977	0.5565	0.0981	+4	-63
190 B. Sagittarii	5.4	4.39	11.6	19 24.9	8 57.5	-2 47.3	+0.2506	0.5564	0.0990	+40	-24
195 B. Sagittarii	6.3	4.40	11.6	19 55.7	9 38.9	-2 7.3	+0.8737	0.5564	0.1002	+71	+13
<i>d</i> Sagittarii	5.0	4.37	12.4	19 5.7	13 15.3	+1 21.8	+0.3465	0.5560	0.1064	+46	-18
226 B. Sagittarii	6.4	+4.38	+12.8	-19 23.0	15 4.7	+3 7.6	+0.8540	0.5558	+0.1097	+71	+12
ρ Sagittarii	4.0	4.34	12.8	17 59.8	15 7.5	+3 10.3	-0.6328	0.5558	0.1098	-8	-85
45 Sagittarii	6.0	4.36	12.8	18 27.3	15 11.6	+3 14.2	-0.1317	0.5558	0.1099	+19	-46
266 B. Sagittarii	6.1	4.35	14.2	19 1.7	21 54.1	+9 43.2	+1.2583	0.5548	0.1212	+71	+50
267 B. Sagittarii	5.8	4.33	14.2	18 24.5	22 11.9	+10 0.4	+0.6276	0.5548	0.1217	+67	-3
54 Sagittarii	5.4	+4.28	+14.5	-16 28.6	23 54.9	+11 39.9	-1.2347	0.5545	+0.1246	-52	-90
<i>g</i> Sagittarii	5.1	4.23	15.9	15 42.2	13 7 53.8	-4 37.0	-1.0152	0.5532	0.1371	-29	-90
16 B. Capricorni	6.2	4.17	17.6	15 2.2	18 31.5	+5 39.5	-0.1828	0.5513	0.1527	+21	-49
β Capricorni	3.2	4.18	17.6	15 2.0	18 38.1	+5 46.0	-0.1693	0.5512	0.1529	+22	-48
27 G. Capricorni	6.2	4.15	18.4	15 19.4	23 20.3	+10 18.8	+0.8732	0.5504	0.1593	+75	+12
45 B. Capricorni	6.1	+4.12	+18.5	-13 59.7	14 0 48.8	+11 44.3	-0.3024	0.5501	+0.1612	+16	-56
84 B. Capricorni	6.0	4.06	19.4	12 50.4	8 34.9	-4 44.8	-0.2374	0.5487	0.1710	+20	-52
16 B. Aquarii	6.4	4.03	19.5	11 52.5	9 43.5	-3 38.4	-1.0636	0.5484	0.1724	-29	-90
ν Aquarii	4.5	3.98	20.4	11 41.7	17 31.2	+3 54.1	+0.1257	0.5471	0.1811	+42	-31
51 G. Aquarii	6.5	3.95	20.5	10 56.1	19 45.0	+6 3.4	-0.2695	0.5467	0.1835	+20	-54
17 Aquarii	6.3	+3.90	+20.8	-9 39.6	23 52.4	+10 2.8	-0.8494	0.5461	+0.1876	-12	-90
19 Aquarii	5.6	3.90	20.9	10 5.3	15 0 57.1	+11 5.6	-0.1947	0.5460	0.1886	+25	-49
ξ Aquarii	4.8	3.84	21.2	8 12.7	6 55.7	-7 7.5	-1.0243	0.5452	0.1940	-23	-90
c^1 Capricorni	5.3	3.82	21.7	9 26.9	10 22.8	-3 47.1	+0.9496	0.5448	0.1968	+81	+16
c^2 Capricorni	6.3	3.82	21.8	9 38.7	10 58.9	-3 12.1	+1.2733	0.5447	0.1973	+81	+45
30 Aquarii	5.6	+3.73	+21.9	-6 54.5	19 7.4	+4 40.6	+0.0336	0.5440	+0.2031	+39	-36
138 B. Aquarii	6.4	3.68	21.7	5 6.9	23 39.7	+9 4.2	-0.9136	0.5438	0.2059	-13	-90
44 Aquarii	5.7	3.67	22.0	5 47.2	16 1 44.9	+11 5.4	+0.2192	0.5437	0.2070	+50	-26
51 Aquarii	5.8	3.64	22.0	5 14.5	5 6.1	-9 40.0	+0.3473	0.5436	0.2087	+58	-19
187 B. Aquarii	6.3	3.60	21.7	3 19.2	8 33.2	-6 19.5	-0.9319	0.5436	0.2103	-15	-90
κ Aquarii	5.2	+3.57	+22.1	-4 38.4	11 87.9	-3 20.7	+1.0919	0.5437	+0.2115	+86	-86

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	s	d h m	h m					
207 B. Aquarii	6.3	+3.56	+22.1	- 3 58.2	16 13 5.2	1 56.2	+0.7018	0.5437	+0.2120	+87	0
6 G. Piscium	6.2	3.48	21.9	2 49.4	21 25.4	+ 6 7.9	+1.2860	0.5442	0.2142	+88	+45
3 Piscium	6.3	3.47	21.3	0 14.6	22 33.7	+ 7 14.0	-1.1460	0.5443	0.2144	-31	-90
22 B. Piscium	6.4	3.38	21.3	0 8.8	17 9 26.0	- 6 14.8	+1.0919	0.5458	0.2152	+90	+26
κ Piscium	4.9	3.36	20.9	+ 0 49.1	11 2.6	- 4 41.4	+0.4407	0.5461	0.2151	+65	-14
9 Piscium	6.4	+3.36	+21.0	+ 0 41.0	11 11.6	- 4 32.8	+0.6117	0.5461	+0.2151	+79	- 5
16 Piscium	5.7	3.32	20.6	1 39.5	15 30.8	- 0 22.0	+0.5334	0.5470	0.2147	+72	- 9
19 Piscium	5.4	3.28	20.1	3 2.6	20 12.7	+ 4 10.7	+0.1129	0.5481	0.2138	+44	-31
22 Piscium	5.8	3.25	20.2	2 29.1	22 49.1	+ 6 41.9	+1.2424	0.5488	0.2132	+90	+40
d Piscium	5.4	3.16	17.9	7 44.7	18 12 6.0	- 4 27.5	-1.3590	0.5529	0.2078	-66	-70
51 Piscium	5.6	+3.10	+18.0	+ 6 30.8	17 30.4	+ 0 46.0	+1.0177	0.5550	+0.2046	+90	+21
136 B. Piscium	6.5	3.08	16.8	8 55.1	21 30.7	+ 4 38.1	-0.6269	0.5566	0.2019	+ 4	-78
π Piscium	5.6	2.86	13.7	11 43.9	19 22 19.4	+ 4 35.2	+1.2390	0.5687	0.1776	+90	+46
19 Arietis	5.8	2.75	10.8	14 54.2	20 13 40.8	- 4 36.8	+0.5897	0.5772	0.1562	+79	+ 2
27 Arietis	6.4	2.71	8.9	17 20.9	21 7.9	+ 2 33.8	-0.7625	0.5814	0.1440	- 5	-73
36 Arietis	6.5	+2.65	+ 8.1	+17 25.4	21 2 40.5	+ 7 53.9	-0.0667	0.5844	+0.1342	+34	-32
40 Arietis	6.0	2.64	7.8	17 57.0	4 24.0	+ 9 33.5	-0.3678	0.5854	0.1311	+17	-49
π Arietis	5.2	2.62	8.0	17 7.8	4 43.2	+ 9 52.0	+0.5001	0.5856	0.1305	+71	- 1
45 Arietis	6.0	2.61	7.3	18 0.4	7 22.4	-11 34.9	-0.0436	0.5870	0.1255	+35	-30
ρ Arietis	5.6	2.61	7.3	17 42.2	7 37.3	-11 20.5	+0.2933	0.5871	0.1250	+56	-12
53 Arietis	6.0	+2.55	+ 6.8	+17 34.2	12 5.8	- 7 2.3	+0.9669	0.5895	+0.1163	+90	+29
54 Arietis	6.5	2.56	6.4	18 29.2	12 27.5	- 6 41.5	+0.0852	0.5896	0.1156	+43	-21
δ Arietis	4.5	2.57	6.0	19 25.4	13 46.1	- 5 25.8	-0.7082	0.5903	0.1129	- 2	-71
63 Arietis	5.2	2.54	5.0	20 27.3	18 14.0	- 1 8.3	-1.2627	0.5925	0.1037	-53	-70
65 Arietis	6.0	2.53	4.9	20 31.1	18 54.3	- 0 29.6	-1.2576	0.5928	0.1023	-52	-70
175 B. Arietis	6.4	+2.48	+ 5.4	+18 28.5	19 58.3	+ 0 31.9	+0.9069	0.5933	+0.1001	+90	+26
14 H ¹ . Tauri	6.5	2.47	4.0	20 39.2	22 0 42.2	+ 5 4.8	-0.8360	0.5954	0.0898	-11	-70
13 Tauri	5.6	2.43	4.2	19 26.6	2 1.8	+ 6 21.2	+0.4994	0.5960	0.0869	+72	+ 3
14 Tauri	6.2	2.43	4.0	19 24.7	2 36.6	+ 6 54.7	+0.5812	0.5963	0.0856	+80	+ 8
22 H ¹ . Tauri	6.1	2.45	3.6	20 40.5	2 52.1	+ 7 9.6	-0.6678	0.5964	0.0850	0	-67
A Tauri	4.5	+2.39	+ 2.1	+21 51.7	10 48.6	- 9 12.7	-1.2572	0.5994	+0.0669	-55	-69
39 Tauri	6.1	2.38	2.0	21 47.5	11 3.6	- 8 58.4	-1.1699	0.5995	0.0663	-40	-69
ω Tauri	4.8	2.30	1.8	20 22.8	15 44.7	- 4 28.5	+0.5328	0.6009	0.0552	+75	+ 8
51 Tauri	5.6	2.32	1.4	21 23.0	16 9.9	- 4 4.2	-0.4507	0.6010	0.0542	+12	-48
53 Tauri	5.3	2.30	1.5	20 56.9	16 34.9	- 3 40.3	+0.0087	0.6011	0.0532	+38	-20
56 Tauri	5.2	+2.32	+ 1.3	+21 34.8	16 38.6	- 3 36.8	-0.6225	0.6012	+0.0531	+ 2	-61
224 B. Tauri	6.1	2.28	1.4	20 37.9	17 44.0	- 2 33.9	+0.3862	0.6014	0.0504	+63	0
227 B. Tauri	5.9	2.28	1.3	20 47.7	18 11.0	- 2 8.0	+0.2446	0.6015	0.0494	+53	- 7
κ Tauri	4.1	2.30	0.8	22 6.6	18 52.4	- 1 28.3	-1.0432	0.6018	0.0477	-27	-68
67 Tauri	5.4	2.30	0.9	22 1.0	18 53.7	- 1 27.0	-0.9480	0.6018	0.0477	-19	-68
247 B. Tauri	5.8	+2.28	+ 0.9	+21 26.4	19 54.7	- 0 28.4	-0.3222	0.6020	+0.0452	+20	-38
129 H ¹ . Tauri	5.8	2.22	+ 0.5	20 31.4	23 54.4	+ 3 21.6	+0.7601	0.6029	0.0354	+90	+23
ι Tauri	4.7	2.14	- 1.1	21 28.5	23 9 30.0	-11 26.0	+0.0304	0.6041	0.0117	+40	-15
330 B. Tauri	6.3	2.13	1.1	21 9.9	9 59.7	-10 57.6	+0.3473	0.6042	0.0105	+60	+ 2
l Tauri	5.2	2.10	1.1	20 18.7	11 20.4	- 9 40.0	+1.2160	0.6044	0.0071	+89	+60
105 Tauri	6.0	+2.12	- 1.4	+21 35.9	11 22.0	- 9 38.5	-0.0761	0.6043	+0.0070	+33	-21
108 Tauri	6.2	2.10	1.9	22 11.6	14 16.2	- 6 51.4	-0.6634	0.6043	-0.0002	0	-61
n Tauri	5.1	2.09	2.2	22 0.8	15 44.8	- 5 26.3	-0.4863	0.6043	0.0039	+10	-46
o Tauri	4.8	2.05	2.5	21 52.1	18 58.8	- 2 20.2	-0.3663	0.6042	0.0120	+17	-38
372 B. Tauri	6.1	2.01	2.5	20 25.0	21 19.6	- 0 5.1	+1.0575	0.6040	0.0178	+90	+45
ζ Tauri	3.0	+2.00	- 2.9	+21 5.6	22 51.9	+ 1 23.6	+0.3473	0.6039	-0.0218	+60	+ 1

OCCULTATIONS, 1919.

589

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>T</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>s</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>"</i>	<i>"</i>
175 H. Tauri	6.5	+2.02	-3.4	+22 37.2	24 0 33.4	+3 0.9	-1.2284	0.6037	-0.0258	-50	-68
χ^1 Orionis	4.5	1.93	3.6	20 15.7	5 22.7	+7 38.6	+0.9914	0.6029	0.0377	+90	+38
141 Tauri	6.3	1.94	4.4	22 23.9	8 11.2	+10 20.3	-1.2755	0.6023	0.0445	-65	-68
χ^2 Orionis	4.7	1.90	4.0	20 8.4	9 5.2	+11 12.2	+0.9572	0.6021	0.0467	+90	+35
14 B. Geminorum	6.0	1.92	4.7	22 12.2	11 15.2	-10 43.1	-1.2264	0.6016	0.0519	-49	-68
68 Orionis	5.7	+1.87	-4.4	+19 48.5	12 15.4	-9 45.3	+1.1319	0.6013	-0.0543	+90	+48
NEW MOON.											
19 Sextantis	5.9	+1.61	-12.5	+5 0.7	28 20 1.5	-5 43.4	+1.0789	0.5423	-0.2045	+90	+25
155 B. Leonis	6.5	1.64	12.5	6 6.1	29 1 4.4	-0 50.1	-1.1035	0.5398	0.2062	-27	-84
237 B. Leonis	6.3	+1.72	-13.5	+1 27.1	15 20.0	-11 1.2	+0.8462	0.5334	-0.2087	+90	+9
55 Leonis	6.1	1.74	13.5	1 9.9	17 3.6	-9 20.8	+0.7897	0.5328	0.2087	+90	+6
p^3 Leonis	6.1	1.76	13.7	0 25.9	21 0.9	-5 30.7	+0.7450	0.5314	0.2087	+90	+3
p^5 Leonis	5.3	1.80	13.7	0 22.1	30 2 6.5	-0 34.5	-0.2482	0.5296	0.2083	+24	-52
388 B. Leonis	6.3	1.86	14.0	-1 15.5	9 15.3	+6 21.3	+0.0030	0.5275	0.2071	+38	-38
ϵ Leonis	5.1	+1.87	-14.3	-2 33.6	10 29.0	+7 32.8	+1.1437	0.5272	-0.2068	+88	+30
431 B. Leonis	6.2	1.90	14.1	1 59.5	14 35.8	+11 32.2	-0.3129	0.5262	0.2056	+21	-56
78 B. Virginis	6.5	2.08	14.4	5 16.4	31 8 58.2	+5 21.8	-0.4933	0.5231	0.1978	+10	-69
χ Virginis	4.8	+2.24	-14.6	-7 33.2	21 50.1	-6 9.2	-0.5145	0.5224	-0.1897	+8	-71

AUGUST.

ψ Virginis	5.0	+2.34	-14.6	-9 6.2	1 5 36.5	+1 23.4	-0.2794	0.5224	-0.1839	+20	-54
49 Virginis	5.2	2.43	14.5	10 18.7	12 34.1	+8 8.7	-0.2190	0.5228	0.1780	+22	-50
50 Virginis	6.2	2.43	14.3	9 54.1	13 31.6	+9 4.4	-0.8381	0.5229	0.1772	-12	-90
α Virginis (<i>Spica</i>)	1.2	+2.54	-14.0	-10 44.6	21 26.3	-7 15.0	-1.2917	0.5237	-0.1698	-53	-87
i Virginis	5.7	2.56	14.5	12 17.4	22 12.8	-6 29.9	+0.2751	0.5238	0.1690	+49	-23
550 B. Virginis	6.0	2.62	14.3	12 48.2	2 16.3	-2 33.6	+0.1610	0.5244	0.1649	+42	-29
621 B. Virginis	6.4	2.84	13.4	14 35.2	17 22.2	-11 54.9	-0.2423	0.5272	0.1481	+18	-52
214 G. Virginis	6.5	2.87	13.8	15 57.1	17 45.0	-11 32.9	+1.2074	0.5273	0.1476	+75	+40
40 H. Virginis	5.1	+2.91	-13.5	-15 55.4	20 34.6	-8 48.4	+0.7637	0.5279	-0.1442	+75	+5
ϵ Libræ	4.7	3.39	10.7	19 29.3	2 57.4	-3 21.9	+0.9385	0.5363	0.1022	+71	+18
25 Libræ	6.0	3.40	10.5	19 20.8	3 29.6	-2 50.6	+0.7256	0.5364	0.1014	+71	+4
28 Libræ	6.2	3.42	9.5	17 52.1	7 11.7	+0 44.5	-1.2740	0.5376	0.0957	-62	-81
147 B. Libræ	6.2	3.54	9.5	20 27.2	11 51.7	+5 15.6	+1.1554	0.5390	0.0883	+70	+37
150 B. Libræ	6.1	+3.53	-9.2	-19 53.5	12 24.7	+5 47.6	+0.4856	0.5392	-0.0874	+53	-10
11 H. Libræ	5.4	3.52	9.0	19 23.9	12 50.8	+6 12.9	-0.0976	0.5393	0.0867	+18	-43
172 B. Libræ	5.9	3.60	9.0	20 45.1	15 32.9	+8 50.0	+1.1703	0.5402	0.0823	+70	+39
41 Libræ	5.3	3.56	8.4	19 2.3	15 52.8	+9 9.1	-0.7507	0.5402	0.0818	-18	-90
κ Libræ	5.0	3.58	8.3	19 25.2	17 20.3	+10 33.8	-0.4468	0.5407	0.0794	-2	-67
λ Libræ	5.1	+3.67	-7.4	-19 55.7	22 46.8	-8 10.2	-0.2915	0.5424	-0.0702	+6	-56
47 Libræ	5.8	3.66	7.0	19 8.8	23 35.4	-7 23.1	-1.2112	0.5426	0.0689	-55	-90
10 G. Scorpïi	5.9	3.72	7.3	20 45.1	5 0 50.3	-6 10.6	+0.4765	0.5430	0.0667	+51	-11
β Scorpïi	2.9	3.73	6.2	19 35.2	4 32.6	-2 35.5	-1.0449	0.5441	0.0603	-40	-90
56 B. Scorpïi	5.0	3.73	6.2	19 35.0	4 32.8	-2 35.3	-1.0493	0.5441	0.0603	-41	-90
ω^1 Scorpïi	4.3	+3.76	-6.4	-20 27.2	5 10.9	-1 58.3	-0.1267	0.5443	-0.0593	+14	-45
ω^2 Scorpïi	4.6	3.78	6.4	20 39.2	5 27.6	-1 42.2	+0.0778	0.5444	0.0588	+25	-33
84 B. Scorpïi	6.3	3.82	5.8	20 54.3	8 48.4	+1 32.0	+0.1685	0.5453	0.0529	+30	-28
51 G. Scorpïi	6.5	3.84	5.7	21 6.3	9 59.0	+2 40.3	+0.3287	0.5457	0.0508	+39	-19
53 G. Scorpïi	6.2	3.83	5.1	20 1.4	11 0.7	+3 40.1	-0.9162	0.5460	0.0490	-32	-38
ψ Ophiuchi	4.6	+3.85	-4.6	-19 51.0	13 21.5	+5 56.3	-1.2160	0.5466	-0.0448	+58	-58

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'
		$\Delta\alpha$	$\Delta\delta$						
ω Ophiuchi	4.5	+3.94	-4.3	-21 17.7	d h m	h m			
123 B. Scorpii	6.5	3.95	3.1	20 15.1	5 17 6.3	+9 33.7	+0.2220	0.5477	-0.0380
68 B. Ophiuchi	5.9	4.02	1.9	20 16.9	21 4.2	-10 36.2	-1.0624	0.5487	0.0307
109 B. Ophiuchi	6.2	4.08	0.8	20 22.9	6 3 3.4	-4 48.9	-1.1795	0.5503	0.0196
116 B. Ophiuchi	6.3	4.12	1.0	21 27.2	8 18.7	+0 16.0	-1.1449	0.5514	0.0097
ξ Ophiuchi	4.4	+4.19	+0.5	-21 1.6	8 57.7	+0 53.7	+0.0258	0.5516	-0.0085
190 B. Ophiuchi	5.9	4.20	0.9	21 22.0	15 47.8	+7 30.0	-0.4558	0.5530	+0.0045
52 Ophiuchi	6.4	4.27	1.8	21 59.4	17 30.2	+9 9.1	-0.0726	0.5533	0.0078
58 Ophiuchi	4.8	4.29	2.8	21 38.6	22 22.2	-10 8.7	+0.6686	0.5542	0.0171
16 G. Sagittarii	6.4	4.31	4.8	20 20.0	7 2 6.3	-6 32.2	+0.3679	0.5547	0.0243
30 G. Sagittarii	6.2	+4.37	+5.3	-21 27.1	9 42.5	+0 48.6	-0.8211	0.5557	0.0389
39 G. Sagittarii	6.3	4.34	6.1	19 51.4	12 58.4	+3 57.9	+0.5338	0.5561	+0.0451
μ Sagittarii	4.0	4.38	6.1	21 4.8	14 51.1	+5 46.8	-1.1117	0.5562	0.0487
14 Sagittarii	5.6	4.40	6.0	21 44.0	15 58.8	+6 52.2	+0.2731	0.5563	0.0509
15 Sagittarii	5.3	4.38	6.3	20 45.1	16 12.0	+7 5.0	+0.9956	0.5564	0.0513
16 Sagittarii	5.9	+4.37	+6.4	-20 24.7	16 38.9	+7 30.9	-0.0488	0.5564	0.0522
21 Sagittarii	5.0	4.40	7.4	20 35.0	16 39.3	+7 31.3	-0.4179	0.5564	+0.0522
121 B. Sagittarii	5.9	4.45	8.6	21 7.0	21 16.5	+11 59.2	+0.0312	0.5568	0.0610
128 B. Sagittarii	6.3	4.47	9.3	21 4.9	8 3 26.7	-6 3.0	+1.0196	0.5570	0.0726
29 Sagittarii	5.3	4.46	9.9	20 24.9	6 22.1	-3 13.7	+1.2007	0.5571	0.0780
171 B. Sagittarii	6.1	+4.46	+11.4	-19 21.6	8 22.0	-1 17.7	+0.6389	0.5571	0.0817
173 B. Sagittarii	6.4	4.45	11.5	19 13.1	14 29.6	+4 37.4	+0.0364	0.5571	+0.0929
187 B. Sagittarii	6.4	4.45	11.9	18 51.6	14 31.2	+4 39.0	-0.1153	0.5571	0.0929
190 B. Sagittarii	5.4	4.47	11.9	19 24.9	16 21.7	+6 25.7	-0.3249	0.5571	0.0962
195 B. Sagittarii	6.3	4.48	12.0	19 55.7	16 52.3	+6 55.3	+0.3205	0.5570	0.0972
d Sagittarii	5.0	+4.47	+12.9	-19 5.7	17 33.6	+7 35.2	+0.9402	0.5570	0.0984
226 B. Sagittarii	6.4	4.48	13.3	19 23.0	21 9.0	+11 3.3	+0.4076	0.5569	+0.1047
p Sagittarii	4.0	4.44	13.5	17 59.8	22 57.9	-11 11.4	+0.9097	0.5568	0.1079
45 Sagittarii	6.0	4.46	13.4	18 27.3	23 0.7	-11 8.8	-0.5720	0.5568	0.1080
266 B. Sagittarii	6.1	4.49	14.7	19 1.7	23 4.8	-11 4.8	-0.0728	0.5568	0.1081
267 B. Sagittarii	5.8	+4.47	+14.8	-18 24.5	9 5 44.9	-4 38.3	+1.2982	0.5564	0.1195
54 Sagittarii	5.4	4.43	15.4	16 28.5	6 2.5	-4 21.2	+0.6694	0.5565	+0.1200
e Sagittarii	5.2	4.43	15.6	16 18.6	7 44.8	-2 42.4	-1.1885	0.5564	0.1229
g Sagittarii	5.1	4.42	17.0	15 42.1	8 34.3	-1 54.6	-1.2626	0.5562	0.1242
16 B. Capricorni	6.2	4.41	19.0	15 2.1	15 39.8	+4 56.7	-0.9858	0.5557	0.1356
δ Capricorni	3.2	+4.42	+19.1	-15 2.0	10 2 10.9	-8 53.3	-0.1797	0.5547	0.1515
27 G. Capricorni	6.2	4.41	19.7	15 19.4	2 17.4	-8 47.0	-0.1665	0.5547	+0.1517
45 B. Capricorni	6.1	4.39	20.2	13 59.7	6 56.1	-4 17.7	+0.8598	0.5542	0.1582
84 B. Capricorni	6.0	4.37	21.4	12 50.4	8 23.5	-2 53.2	-0.3120	0.5540	0.1602
16 B. Aquarii	6.4	4.34	21.6	11 52.5	16 3.0	+4 31.0	-0.2641	0.5532	0.1702
ν Aquarii	4.5	+4.33	+22.6	-11 41.6	17 10.5	+5 36.3	-1.0872	0.5531	0.1716
51 G. Aquarii	6.5	4.31	22.8	10 56.1	11 0 50.8	-10 58.8	+0.0770	0.5523	+0.1807
17 Aquarii	6.3	4.28	23.4	9 39.5	3 2.4	-8 51.5	-0.3202	0.5522	0.1831
19 Aquarii	5.6	4.28	23.4	10 5.3	7 5.4	-4 56.5	-0.9046	0.5517	0.1873
ξ Aquarii	4.8	4.25	24.1	8 12.7	8 8.9	-3 55.1	-0.2572	0.5517	0.1884
c^1 Capricorni	5.3	+4.25	+24.5	-9 26.9	14 0.9	+1 45.3	-1.0931	0.5512	0.1939
c^2 Capricorni	6.3	4.25	24.6	9 38.6	17 24.0	+5 1.7	+0.8577	0.5510	+0.1969
30 Aquarii	5.6	4.19	25.1	6 54.4	17 59.4	+5 36.0	+1.1774	0.5510	0.1974
138 B. Aquarii	6.4	4.15	25.2	5 6.8	12 1 58.2	-10 41.1	-0.0696	0.5506	0.2035
44 Aquarii	5.7	4.15	25.5	5 47.1	6 24.9	-6 23.1	-1.0183	0.5505	0.2063
51 Aquarii	5.8	+4.14	+25.6	-5 14.4	8 27.5	-4 24.6	+0.1007	0.5505	0.2075

OCCULTATIONS, 1919.

591

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S						AT CONJUNCTION IN R. A.						Limiting Parallels.	
	Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.	
			$\Delta\alpha$	$\Delta\delta$									
			s	$''$	$^{\circ}$	d h m	h m				$^{\circ}$	$^{\circ}$	
187 B.	Aquarii	6.3	+4.11	+25.5	- 3 19.2	12 15 7.2	+ 2 2.0	-1.0544	0.5506	+0.2110	-24	-90	
κ	Aquarii	5.2	4.10	25.8	4 38.3	18 8.0	+ 4 56.9	+0.9462	0.5507	0.2122	+86	+16	
207 B.	Aquarii	6.3	4.09	25.8	3 58.1	19 33.5	+ 6 19.5	+0.5566	0.5507	0.2127	+73	- 8	
6 G.	Piscium	6.2	4.05	25.9	2 49.3	13 3 43.2	- 9 46.9	+1.1203	0.5512	0.2151	+88	+29	
3	Piscium	6.3	4.04	25.6	0 14.5	4 50.0	- 8 42.2	-1.2938	0.5513	0.2153	-47	-90	
22 B.	Piscium	6.4	+3.98	+25.6	- 0 8.8	15 29.0	+ 1 35.6	+0.9073	0.5526	+0.2161	+90	+13	
κ	Piscium	4.9	3.98	25.4	+ 0 49.1	17 3.6	+ 3 7.1	+0.2584	0.5528	0.2161	+53	-24	
9	Piscium	6.4	3.98	25.4	0 41.1	17 12.4	+ 3 15.5	+0.4280	0.5529	0.2160	+64	-14	
16	Piscium	5.7	3.95	25.2	1 39.6	21 26.6	+ 7 21.3	+0.3435	0.5536	0.2156	+58	-19	
λ	Piscium	4.6	3.93	25.1	1 20.5	14 0 3.3	+ 9 52.7	+1.2313	0.5541	0.2151	+90	+40	
19	Piscium	5.4	+3.93	+24.8	+ 3 2.7	2 3.2	+11 48.6	-0.0810	0.5545	+0.2147	+33	-42	
22	Piscium	5.8	3.91	24.8	2 29.2	4 36.7	- 9 43.0	+1.0369	0.5550	0.2140	+90	+22	
51	Piscium	5.6	3.82	22.9	6 30.9	23 0.2	+ 8 3.1	+0.7923	0.5600	0.2052	+90	+ 8	
136 B.	Piscium	6.5	3.81	21.9	8 55.2	15 2 57.5	+11 52.3	-0.8482	0.5613	0.2024	-10	-82	
π	Piscium	5.6	3.66	18.5	11 44.0	16 3 33.8	+11 36.8	+0.9961	0.5706	0.1776	+90	+24	
19	Arietis	5.8	+3.59	+15.3	+14 54.3	18 54.3	+ 2 24.0	+0.3456	0.5772	+0.1559	+59	-12	
27	Arietis	6.4	3.56	13.2	17 21.0	17 2 23.1	+ 9 36.3	-1.0085	0.5804	0.1437	-22	-73	
36	Arietis	6.5	3.51	12.2	17 25.5	7 57.7	- 9 1.6	-0.3104	0.5827	0.1339	+20	-46	
40	Arietis	6.0	3.50	11.8	17 57.0	9 42.0	- 7 21.1	-0.6121	0.5834	0.1307	+ 4	-66	
π	Arietis	5.2	3.48	12.0	17 7.9	10 1.4	- 7 2.5	+0.2587	0.5835	0.1301	+53	-14	
45	Arietis	6.0	+3.47	+11.2	+18 0.4	12 42.0	- 4 27.9	-0.2860	0.5846	+0.1251	+22	-43	
ρ	Arietis	5.6	3.47	11.2	17 42.2	12 57.0	- 4 13.5	+0.0523	0.5847	0.1246	+41	-24	
53	Arietis	6.0	3.41	10.6	17 34.3	17 28.2	+ 0 7.5	+0.7308	0.5865	0.1159	+90	+14	
54	Arietis	6.5	3.42	10.2	18 29.3	17 50.2	+ 0 28.6	-0.1548	0.5866	0.1152	+29	-35	
δ	Arietis	4.5	3.44	9.6	19 25.4	19 9.6	+ 1 44.9	-0.9513	0.5871	0.1126	-19	-71	
175 B.	Arietis	6.4	+3.35	+ 8.7	+18 28.6	18 1 26.6	+ 7 47.5	+0.6755	0.5893	+0.0998	+90	+12	
14 H ¹ .	Tauri	6.5	3.34	7.0	20 39.3	6 14.6	-11 35.6	-1.0746	0.5909	0.0896	-29	-70	
13	Tauri	5.6	3.29	7.2	19 26.6	7 35.5	-10 17.8	+0.2701	0.5913	0.0867	+54	- 9	
14	Tauri	6.2	3.29	7.1	19 24.7	8 10.8	- 9 43.9	+0.3529	0.5915	0.0855	+60	- 4	
22 H ¹ .	Tauri	6.1	3.31	6.6	20 40.5	8 26.5	- 9 28.7	-0.9041	0.5916	0.0849	-16	-70	
43	Tauri	5.5	+3.17	+ 5.2	+19 23.8	18 20.2	+ 0 1.9	+1.1222	0.5941	+0.0629	+90	+47	
ω	Tauri	4.8	3.15	4.3	20 22.9	21 33.2	+ 3 7.3	+0.3160	0.5947	0.0555	+57	- 3	
51	Tauri	5.6	3.17	3.8	21 23.0	21 59.0	+ 3 32.2	-0.6752	0.5948	0.0545	- 1	-65	
53	Tauri	5.3	3.15	3.9	20 56.9	22 24.5	+ 3 56.7	-0.2117	0.5949	0.0536	+25	-32	
56	Tauri	5.2	3.17	3.7	21 34.8	22 28.2	+ 4 0.2	-0.8480	0.5949	0.0534	-12	-69	
224 B.	Tauri	6.1	+3.13	+ 3.8	+20 37.9	23 35.0	+ 5 4.4	+0.1702	0.5951	+0.0508	+48	-10	
227 B.	Tauri	5.9	3.13	3.6	20 47.7	19 0 2.5	+ 5 30.8	+0.0279	0.5951	0.0498	+39	-18	
κ	Tauri	4.1	3.15	3.0	22 6.6	0 44.9	+ 6 11.5	-1.2701	0.5953	0.0481	-60	-68	
67	Tauri	5.4	3.15	3.1	22 1.0	0 46.1	+ 6 12.7	-1.1740	0.5953	0.0481	-41	-68	
247 B.	Tauri	5.8	3.13	3.0	21 26.4	1 48.4	+ 7 12.5	-0.5420	0.5955	0.0456	+ 7	-53	
129 H ¹ .	Tauri	5.8	+3.05	+ 2.6	+20 31.4	5 53.3	+11 7.9	+0.5542	0.5960	+0.0361	+77	+12	
ι	Tauri	4.7	2.95	0.5	21 28.5	15 42.2	- 3 26.4	-0.1709	0.5966	0.0128	+28	-26	
330 B.	Tauri	6.3	2.93	0.5	21 9.9	16 12.6	- 2 57.2	+0.1499	0.5966	0.0116	+47	- 9	
l	Tauri	5.2	2.89	0.5	20 18.8	17 35.3	- 1 37.8	+1.0290	0.5966	0.0083	+90	+44	
105	Tauri	6.0	2.92	+ 0.1	21 35.9	17 36.9	- 1 36.2	-0.2760	0.5966	0.0082	+22	-32	
108	Tauri	6.2	+2.90	- 0.7	+22 11.6	20 35.4	+ 1 15.3	-0.8656	0.5965	+0.0011	-14	-68	
n	Tauri	5.1	2.88	0.9	22 0.8	22 6.2	+ 2 42.4	-0.6847	0.5965	-0.0025	- 2	-63	
σ	Tauri	4.8	2.83	1.4	21 52.1	1 25.1	+ 5 53.6	-0.5590	0.5962	0.0104	+ 6	-52	
372 B.	Tauri	6.1	2.77	1.4	20 25.0	3 49.5	+ 8 12.3	+0.8833	0.5960	0.0162	+90	+33	
ζ	Tauri	3.0	2.76	1.9	21 5.6	5 24.2	+ 9 43.4	+0.1678	0.5958	0.0199	+48	- 8	
χ^1	Orionis	4.5	+2.65	- 2.8	+20 15.7	12 5.1	- 7 51.4	+0.8290	0.5947	-0.0356	+90	+3	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S						AT CONJUNCTION IN R. A.						Limit- ing Par- allels.	
	Name.	Mag.	Red'ns from 1919.0.		Apparent Declina- tion.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y'</i>	<i>x'</i>	<i>y'</i>	N.	S.	
			$\Delta\alpha$	$\Delta\delta$									
			s	"	"	d	h	m	h	m		"	
64	Orionis	5.1	+2.61	-3.2	+19 41.5	20	15	42.7	-4 22.3	+1.2649	0.5939	-0.0440	+78 +66
χ^2	Orionis	4.7	2.61	3.4	20 8.4	15	53.5	-4 12.0	+0.8004	0.5939	0.0444	+90 +25	
68	Orionis	5.7	2.57	3.8	19 48.5	19	8.6	-1 4.5	+0.9823	0.5930	0.0518	+90 +37	
15	Geminorum	6.5	2.51	5.1	20 50.3	21	1 28.6	+5 0.8	-0.4409	0.5912	0.0661	+13 -48	
16	Geminorum	6.2	2.50	5.0	20 32.7	1	32.9	+5 5.0	-0.1456	0.5912	0.0662	+29 -29	
ν	Geminorum	4.1	+2.49	-5.0	+20 15.8	1	57.8	+5 28.9	+0.1137	0.5911	-0.0671	+44 -15	
162 B.	Geminorum	5.7	2.17	7.9	17 15.5	22	3 54.0	+6 26.4	+0.7451	0.5801	0.1198	+90 +14	
<i>f</i>	Geminorum	5.3	2.15	8.3	17 51.5	7	7.9	+9 33.3	-0.2676	0.5785	0.1256	+23 -42	
1	Cancrī	6.0	2.06	8.8	16 0.3	14	37.6	-7 13.4	+0.6473	0.5746	0.1384	+86 +7	
2 B.	Cancrī	6.0	2.06	9.0	16 44.1	15	16.5	-6 35.9	-0.1946	0.5743	0.1395	+27 -40	
3	Cancrī	5.7	+2.06	-9.2	+17 31.7	16	14.4	-5 40.1	-1.1469	0.5738	-0.1410	-35 -73	
5	Cancrī	5.9	2.05	9.1	16 40.6	16	33.5	-5 21.7	-0.3150	0.5736	0.1415	+20 -47	
30 B.	Cancrī	6.1	2.00	9.2	+14 52.0	20	41.0	-1 23.1	+0.9530	0.5713	0.1480	+90 +25	
NEW MOON.													
78 B.	Virginis	6.5	+1.90	-12.8	-5 16.3	27	17 20.7	-8 27.8	-0.2879	0.5271	-0.1975	+21 -54	
χ	Virginis	4.8	2.00	12.8	7 33.2	28	6 5.5	+3 54.0	-0.2875	0.5264	0.1896	+20 -54	
ψ	Virginis	5.0	2.08	12.7	9 6.2	13	47.6	+11 22.3	-0.0417	0.5264	0.1838	+33 -40	
49	Virginis	5.2	2.15	12.6	10 18.7	20	41.4	-5 56.3	+0.0278	0.5267	0.1780	+36 -36	
50	Virginis	6.2	2.16	12.4	9 54.1	21	38.4	-5 0.9	-0.5887	0.5267	0.1772	+2 -78	
α	Virginis (<i>Spica</i>)	1.2	+2.24	-12.1	-10 44.5	29	5 29.1	+2 35.6	-1.0322	0.5273	-0.1698	-26 -90	
ι	Virginis	5.7	2.26	12.5	12 17.4	6	15.3	+3 20.4	+0.5319	0.5274	0.1690	+66 -8	
550 B.	Virginis	6.0	2.30	12.3	12 48.2	10	16.8	+7 14.7	+0.4223	0.5278	0.1649	+58 -14	
621 B.	Virginis	6.4	2.49	11.5	14 35.2	30	1 16.6	-2 12.8	+0.0325	0.5299	0.1480	+33 -36	
40 H.	Virginis	5.1	2.54	11.6	15 55.4	4	28.0	+0 52.7	+1.0390	0.5304	0.1441	+75 +25	
ϵ	Libræ	4.7	+2.97	-9.2	-19 29.3	31	10 46.8	+6 15.5	+1.2257	0.5367	-0.1021	+71 +46	
25	Libræ	6.0	2.97	9.0	19 20.7	11	19.1	+6 46.7	+1.0128	0.5368	0.1013	+71 +24	
26	Libræ	6.3	2.95	8.4	17 28.1	11	56.8	+7 23.3	-1.1261	0.5369	0.1003	-43 -90	
28	Libræ	6.2	2.99	8.0	17 52.0	15	1.5	+10 22.2	-0.9872	0.5376	0.0956	-32 -90	
150 B.	Libræ	6.1	3.10	7.9	19 53.4	20	15.2	-8 34.1	+0.7729	0.5388	0.0873	+71 +7	
11 H.	Libræ	5.4	+3.10	-7.7	-19 23.8	20	41.3	-8 8.8	+0.1893	0.5389	-0.0866	+35 -27	
41	Libræ	5.3	+3.14	-7.1	-19 2.3	23	43.9	-5 12.0	-0.4648	0.5396	-0.0817	-2 -68	

SEPTEMBER.

κ	Libræ	5.0	+3.16	-7.1	-19 25.1	1 1 11.8	-3 46.9	-0.1610	0.5400	-0.0793	+15	-47
λ	Libræ	5.1	3.24	6.3	19 55.7	6 39.8	+1 30.6	-0.0069	0.5412	0.0702	+22	-38
47	Libræ	5.8	3.23	5.9	19 8.8	7 28.6	+2 17.8	-0.9279	0.5414	0.0689	-31	-90
10 G.	Scorpii	5.9	3.29	6.2	20 45.0	8 44.0	+3 30.8	+0.7616	0.5417	0.0668	+70	+8
β	Scorpii	2.9	3.30	5.2	19 35.2	12 27.6	+7 7.2	-0.7633	0.5425	0.0604	-21	-90
56 B.	Scorpii	5.0	+3.30	-5.2	-19 34.9	12 27.8	+7 7.4	-0.7678	0.5425	-0.0604	-21	-90
ω^1	Scorpii	4.3	3.34	5.4	20 27.1	13 6.0	+7 44.5	+0.1562	0.5427	0.0593	+30	-29
ω^2	Scorpii	4.6	3.35	5.5	20 39.2	13 22.9	+8 0.8	+0.3609	0.5427	0.0588	+42	-17
84 B.	Scorpii	6.3	3.39	5.0	20 54.2	16 45.0	+11 16.4	+0.4503	0.5434	0.0530	+48	-12
51 G.	Scorpii	6.5	3.41	4.8	21 6.3	17 56.1	-11 34.9	+0.6104	0.5437	0.0509	+59	-3
58 G.	Scorpii	6.2	+3.40	-4.2	-20 1.3	18 58.3	-10 34.6	-0.6375	0.5440	-0.0492	-15	-86
ψ	Ophiuchi	4.6	3.42	3.8	19 51.0	21 20.2	-8 17.3	-0.9392	0.5444	0.0450	-34	-90
ω	Ophiuchi	4.5	3.51	3.6	21 17.7	2 1 6.8	-4 38.1	+0.4998	0.5452	0.0383	+50	-9
123 B.	Scorpii	6.5	3.53	2.4	20 15.1	5 6.8	-0 46.0	-0.7900	0.5461	0.0311	-26	-90
68 B.	Ophiuchi	5.9	3.61	1.4	20 16.9	11 9.4	+5 4.8	-0.9117	0.5472	0.0202	-34	-90
109 B.	Ophiuchi	6.2	+3.68	-0.4	-20 22.9	16 28.0	+10 13.0	-0.8814	0.5482	-0.0104	-33	-90

OCCULTATIONS, 1919.

593

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declina- tion.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
116 B. Ophiuchi	6.3	+3.71	-0.6	-21 27.2	2 17 7.4	+10 51.1	+0.2922	0.5483	-0.0092	+33	-21
ξ Ophiuchi	4.4	3.80	+0.8	21 1.6	3 0 1.9	-6 28.0	-0.1969	0.5493	+0.0036	+5	-49
190 B. Ophiuchi	5.9	3.81	1.1	21 22.0	1 45.6	-4 47.7	+0.1860	0.5496	0.0068	+26	-27
52 Ophiuchi	6.4	3.89	2.0	21 59.4	6 40.9	-0 2.2	+0.9246	0.5503	0.0160	+69	+18
58 Ophiuchi	4.8	3.92	2.8	21 38.6	10 27.7	+3 37.1	+0.6190	0.5508	0.0231	+58	-2
16 G. Sagittarii	6.4	+3.96	+4.9	-20 20.0	18 9.4	+11 3.5	-0.5826	0.5516	+0.0374	-14	-80
30 G. Sagittarii	6.2	4.03	5.2	21 27.1	21 27.7	-9 44.9	+0.7727	0.5520	0.0436	+69	+7
39 G. Sagittarii	6.3	4.00	6.1	19 51.4	23 21.7	-7 54.7	-0.8805	0.5521	0.0471	-30	-90
μ Sagittarii	4.0	4.05	6.0	21 4.8	4 0 30.3	-6 48.4	+0.5074	0.5523	0.0493	+52	-9
14 Sagittarii	5.6	4.07	5.8	21 44.1	0 43.6	-6 35.6	+1.2319	0.5523	0.0497	+69	+50
15 Sagittarii	5.3	+4.04	+6.2	-20 45.1	1 10.9	-6 9.2	+0.1836	0.5523	+0.0505	+30	-27
16 Sagittarii	5.9	4.04	6.3	20 24.7	1 11.3	-6 8.8	-0.1867	0.5523	0.0505	+10	-49
21 Sagittarii	5.0	4.08	7.2	20 35.0	5 51.8	-1 37.6	+0.2576	0.5527	0.0592	+36	-23
121 B. Sagittarii	5.9	4.16	8.3	21 7.0	12 6.3	+4 24.4	+1.2401	0.5530	0.0706	+69	+50
29 Sagittarii	5.3	4.18	9.7	20 24.9	17 4.9	+9 13.0	+0.8507	0.5532	0.0796	+70	+12
171 B. Sagittarii	6.1	+4.20	+11.2	-19 21.7	23 16.4	-8 48.0	+0.2367	0.5534	+0.0906	+38	-24
173 B. Sagittarii	6.4	4.20	11.3	19 13.1	23 18.0	-8 46.4	+0.0846	0.5534	0.0907	+29	-33
187 B. Sagittarii	6.4	4.21	11.7	18 51.6	5 1 9.6	-6 58.5	-0.1286	0.5534	0.0940	+17	-45
190 B. Sagittarii	5.4	4.22	11.7	19 24.9	1 40.6	-6 28.5	+0.5175	0.5535	0.0949	+56	-8
195 B. Sagittarii	6.3	4.24	11.7	19 55.7	2 22.2	-5 48.3	+1.1375	0.5535	0.0961	+71	+35
d Sagittarii	5.0	+4.24	+12.7	-19 5.7	5 59.7	-2 18.1	+0.5973	0.5535	+0.1024	+63	-4
226 B. Sagittarii	6.4	4.27	13.0	19 23.0	7 49.6	-0 31.8	+1.0972	0.5536	0.1055	+71	+31
p Sagittarii	4.0	4.23	13.4	17 59.8	7 52.4	-0 29.0	-0.3875	0.5536	0.1056	+5	-62
45 Sagittarii	6.0	4.25	13.2	18 27.3	7 56.6	-0 25.2	+0.1126	0.5536	0.1057	+32	-31
267 B. Sagittarii	5.8	4.29	14.6	18 24.5	14 57.7	+6 22.0	+0.8432	0.5536	0.1175	+72	+11
54 Sagittarii	5.4	+4.25	+15.5	-16 28.5	16 40.8	+8 1.5	-1.0206	0.5536	+0.1203	-32	-90
e Sagittarii	5.2	4.25	15.7	16 18.6	17 30.6	+8 49.7	-1.0963	0.5536	0.1217	-38	-90
g Sagittarii	5.1	4.28	17.1	15 42.1	6 0 38.8	-8 16.4	-0.8324	0.5535	0.1331	-18	-90
16 B. Capricorni	6.2	4.32	19.2	15 2.1	11 12.3	+1 55.9	-0.0477	0.5534	0.1490	+27	-40
β Capricorni	3.2	4.32	19.2	15 2.0	11 18.9	+2 2.4	-0.0347	0.5533	0.1491	+28	-39
27 G. Capricorni	6.2	+4.34	+19.8	-15 19.4	15 58.2	+6 32.3	+0.9806	0.5533	+0.1557	+75	+20
45 B. Capricorni	6.1	4.32	20.5	13 59.7	17 25.6	+7 56.8	-0.1933	0.5533	0.1578	+21	-49
84 B. Capricorni	6.0	4.34	21.9	12 50.4	7 1 4.9	-8 39.1	-0.1627	0.5532	0.1679	+23	-48
16 B. Aquarii	6.4	4.32	22.2	11 52.4	2 12.4	-7 33.8	-0.9867	0.5532	0.1693	-24	-90
ν Aquarii	4.5	4.35	23.3	11 41.6	9 51.2	-0 10.3	+0.1568	0.5532	0.1785	+42	-28
51 G. Aquarii	6.5	+4.33	+23.7	-10 56.1	12 2.2	+1 56.3	-0.2445	0.5532	+0.1810	+20	-52
17 Aquarii	6.3	4.32	24.4	9 39.5	16 3.9	+5 49.9	-0.8366	0.5533	0.1854	-13	-90
19 Aquarii	5.6	4.33	24.3	10 5.2	17 7.0	+6 51.0	-0.1941	0.5534	0.1865	+24	-49
ξ Aquarii	4.8	4.32	25.3	8 12.7	22 56.3	-11 31.3	-1.0407	0.5535	0.1922	-25	-90
c ¹ Capricorni	5.3	4.34	25.6	9 26.9	8 2 17.5	-8 16.9	+0.8922	0.5538	0.1953	+81	+13
c ² Capricorni	6.3	+4.35	+25.6	-9 38.6	2 52.6	-7 42.9	+1.2089	0.5538	+0.1958	+81	+38
30 Aquarii	5.6	4.33	26.6	6 54.4	10 45.9	-0 5.4	-0.0523	0.5543	0.2022	+33	-40
138 B. Aquarii	6.4	4.31	27.1	5 6.8	15 9.1	+4 9.0	-1.0061	0.5546	0.2053	-20	-90
44 Aquarii	5.7	4.32	27.2	5 47.1	17 10.0	+6 5.8	+0.1002	0.5548	0.2066	+41	-32
51 Aquarii	5.8	4.32	27.4	5 14.4	20 24.0	+9 13.4	+0.2111	0.5552	0.2085	+49	-26
187 B. Aquarii	6.3	+4.31	+27.7	-3 19.1	23 43.4	-11 33.9	-1.0634	0.5556	+0.2102	-25	-90
κ Aquarii	5.2	4.32	27.7	4 38.3	9 2 41.2	-8 42.1	+0.9139	0.5560	0.2116	+86	+14
207 B. Aquarii	6.3	4.32	27.9	3 58.1	4 5.1	-7 21.0	+0.5237	0.5562	0.2122	+71	-9
6 G. Piscium	6.2	4.32	28.1	2 49.3	12 5.5	+0 23.2	+1.0609	0.5575	0.2149	+88	+24
3 Piscium	6.3	4.31	28.3	0 14.5	13 11.0	+1 26.5	-1.3342	0.5577	0.2151	-55	-83
22 B. Piscium	6.4	+4.31	+28.3	-0 8.7	23 36.1	+11 30.5	+0.8193	0.5598	+0.2164	+90	+90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS

SEPTEMBER.

THE STAR'S						AT CONJUNCTION IN R. A.					
Name.		Mag	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Υ	x'	y'	
			$\Delta\alpha$	$\Delta\delta$							
			s	$''$	$''$	d h m	h m				
κ	Piscium	4.9	+4.31	+28.2	+0 49.2	10 1 8.5	-11 0.3	+0.1731	0.5602	+0.216	
9	Piscium	6.4	4.31	28.2	0 41.1	1 17.1	-10 52.0	+0.3406	0.5602	0.216	
16	Piscium	5.7	4.30	28.2	1 39.6	5 25.3	-6 52.2	+0.2465	0.5612	0.216	
λ	Piscium	4.6	4.30	28.0	1 20.5	7 58.2	-4 24.6	+1.1184	0.5619	0.215	
19	Piscium	5.4	4.31	28.0	3 2.7	9 55.1	-2 31.7	-0.1844	0.5625	0.215	
22	Piscium	5.8	+4.31	+27.9	+2 29.3	12 24.8	-0 7.1	+0.9152	0.5631	+0.214	
51	Piscium	5.6	4.30	26.5	6 30.9	11 6 19.3	-6 50.2	+0.6325	0.5688	0.206	
136 B.	Piscium	6.5	4.31	25.8	8 55.2	10 10.2	-3 7.4	-0.9964	0.5702	0.203	
π	Piscium	5.6	4.28	22.3	11 44.0	12 10 7.1	-4 2.3	+0.7836	0.5794	0.178	
12 H ¹ .	Arietis	6.3	4.25	20.3	13 5.5	20 46.0	+6 12.9	+1.2465	0.5835	0.163	
19	Arietis	5.8	+4.28	+19.1	+14 54.4	13 1 5.0	+10 22.2	+0.1207	0.5852	+0.156	
27	Arietis	6.4	4.28	17.0	17 21.1	8 23.8	-6 35.6	-1.2277	0.5878	0.144	
36	Arietis	6.5	4.25	15.9	17 25.6	13 51.5	-1 20.4	-0.5419	0.5897	0.134	
40	Arietis	6.0	4.25	15.4	17 57.1	15 33.8	+0 18.0	-0.8424	0.5902	0.131	
π	Arietis	5.2	4.23	15.6	17 8.0	15 52.7	+0 36.2	+0.0202	0.5903	0.130	
124 B.	Arietis	6.4	+4.19	+15.5	+16 9.5	17 27.8	+2 7.7	+1.2023	0.5908	+0.127	
45	Arietis	6.0	4.23	14.8	18 0.5	18 30.4	+3 7.7	-0.5218	0.5912	0.125	
ρ	Arietis	5.6	4.23	14.7	17 42.3	18 45.1	+3 22.0	-0.1866	0.5912	0.125	
53	Arietis	6.0	4.18	13.9	17 34.3	23 11.5	+7 38.1	+0.4830	0.5925	0.116	
54	Arietis	6.5	4.20	13.5	18 29.3	23 33.0	+7 58.8	-0.3954	0.5926	0.115	
δ	Arietis	4.5	+4.22	+13.0	+19 25.5	14 0 51.2	+9 13.9	-1.1864	0.5930	+0.112	
175 B.	Arietis	6.4	4.14	11.8	18 28.6	7 2.3	-8 49.3	+0.4242	0.5945	0.100	
13	Tauri	5.6	4.11	10.2	19 26.7	13 6.3	-2 59.5	+0.0192	0.5957	0.086	
14	Tauri	6.2	4.10	10.0	19 24.8	13 41.2	-2 26.1	+0.1013	0.5958	0.085	
22 H ¹ .	Tauri	6.1	4.13	9.6	20 40.6	13 56.8	-2 11.0	-1.1479	0.5959	0.085	
43	Tauri	5.5	+4.00	+7.6	+19 23.9	23 44.4	+7 13.5	+0.8648	0.5971	+0.063	
ω	Tauri	4.8	3.98	6.5	20 22.9	15 2 56.0	+10 17.5	+0.0622	0.5973	0.055	
51	Tauri	5.6	4.01	6.1	21 23.0	3 21.6	+10 42.1	-0.9248	0.5973	0.054	
53	Tauri	5.3	3.99	6.1	20 56.9	3 46.9	+11 6.4	-0.4633	0.5974	0.053	
56	Tauri	5.2	4.01	5.9	21 34.8	3 50.6	+11 9.9	-1.0970	0.5974	0.053	
224 B.	Tauri	6.1	+3.97	+6.0	+20 38.0	4 57.0	-11 46.3	-0.0831	0.5974	+0.050	
227 B.	Tauri	5.9	3.97	5.8	20 47.8	5 24.3	-11 20.0	-0.2249	0.5975	0.049	
247 B.	Tauri	5.8	3.97	5.2	21 26.5	7 9.6	-9 38.9	-0.7927	0.5975	0.045	
282 B.	Tauri	6.4	3.88	5.0	19 43.0	10 13.4	-6 42.3	+1.0778	0.5975	0.038	
129 H ¹ .	Tauri	5.8	3.89	4.5	20 31.5	11 13.4	-5 44.7	+0.2998	0.5975	0.036	
ϵ	Tauri	4.7	+3.80	+1.9	+21 28.5	21 1.1	+3 39.9	-0.4218	0.5968	+0.013	
330 B.	Tauri	6.3	3.78	1.9	21 9.9	21 31.5	+4 9.0	-0.1015	0.5967	0.011	
ζ	Tauri	5.2	3.74	1.8	20 18.8	22 54.2	+5 28.5	+0.7771	0.5965	0.008	
105	Tauri	6.0	3.77	1.4	21 35.9	22 55.8	+5 30.1	-0.5264	0.5965	0.008	
108	Tauri	6.2	3.75	0.5	22 11.6	16 1 54.6	+8 21.7	-1.1148	0.5961	+0.001	
n	Tauri	5.1	+3.72	+0.2	+22 0.8	3 25.6	+9 49.2	-0.9337	0.5958	-0.002	
351 B.	Tauri	6.2	3.67	+0.9	20 3.1	3 26.6	+9 50.2	+1.0584	0.5958	0.002	
σ	Tauri	4.8	3.67	-0.5	21 52.1	6 45.1	-10 59.1	-0.8072	0.5952	0.009	
372 B.	Tauri	6.1	3.60	0.5	20 25.1	9 10.0	-8 39.9	+0.6367	0.5946	0.015	
τ	Tauri	3.0	3.60	1.2	21 5.6	10 45.2	-7 8.4	-0.0783	0.5942	0.019	
χ^1	B. D. +19°1110	6.0	+3.48	-2.0	+19 50.8	16 40.5	-1 26.9	+1.0370	0.5926	-0.032	
57	Orionis	4.5	3.47	2.4	20 15.7	17 28.6	-0 40.6	+0.5879	0.5923	0.034	
64	Orionis	5.8	3.47	2.2	19 44.1	17 42.2	-0 27.6	+1.1175	0.5923	0.035	
χ^2	Orionis	5.1	3.42	2.9	19 41.5	21 7.9	+2 50.2	+1.0275	0.5911	0.043	
	Orionis	4.7	3.43	3.1	20 8.4	21 18.8	+3 0.6	+0.5621	0.5911	0.043	
68	Orionis	5.7	+3.37	-3.6	+19 48.5	17 0 35.7	+6 10.0	+0.7472	0.5899	-0.050	

OCCULTATIONS, 1919.

595

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	$''$	$^{\circ}$ $'$ $''$	d h m	h m				$^{\circ}$	$''$
15 Geminorum	6.5	+3.30	-5.3	+20 50.3	17 6 59.7	-11 40.7	-0.6751	0.5874	-0.0646	-1	-66
16 Geminorum	6.2	3.30	5.2	20 32.7	7 4.1	-11 36.4	-0.3787	0.5874	0.0648	+16	-43
ν Geminorum	4.1	3.28	5.2	20 15.8	7 29.2	-11 12.3	-0.1181	0.5872	0.0657	+31	-28
110 B. Geminorum	6.2	3.04	6.9	17 52.2	21 21.8	+2 9.0	+1.2287	0.5809	0.0941	+90	+56
162 B. Geminorum	5.7	2.86	8.8	17 15.4	18 9 48.4	-9 51.8	+0.5467	0.5746	0.1172	+75	+4
f Geminorum	5.3	+2.82	-9.4	+17 51.5	13 5.7	-6 41.5	-0.4681	0.5728	-0.1228	+11	-55
1 Cancr	6.0	2.69	9.9	16 0.3	20 43.5	+0 39.9	+0.4644	0.5688	0.1353	+69	-2
2 B. Cancr	6.0	2.70	10.2	16 44.1	21 23.2	+1 18.0	-0.3825	0.5684	0.1364	+16	-51
5 Cancr	5.9	2.68	10.3	16 40.6	22 41.6	+2 33.8	-0.5018	0.5677	0.1383	+9	-59
30 B. Cancr	6.1	2.60	10.3	14 52.0	19 2 53.8	+6 37.2	+0.7823	0.5654	0.1446	+90	+14
29 Cancr	5.9	+2.50	-11.1	+14 28.6	10 46.5	-9 46.4	+0.0064	0.5611	-0.1556	+38	-30
84 B. Cancr	6.4	2.47	11.2	13 31.9	13 6.0	-7 31.7	+0.6264	0.5599	0.1586	+82	+3
A^1 Cancr	5.5	2.42	11.4	12 58.1	17 23.8	-3 22.8	+0.5216	0.5577	0.1638	+72	-3
A^2 Cancr	5.7	2.39	11.5	12 24.3	19 6.4	-1 43.6	+0.8294	0.5568	0.1659	+90	+14
60 Cancr	5.7	2.34	11.7	11 56.0	23 14.3	+2 16.0	+0.6288	0.5547	0.1705	+82	+2
α Cancr	4.3	+2.34	-11.9	+12 10.1	20 0 24.9	+3 24.2	+0.1807	0.5541	-0.1718	+48	-23
κ Cancr	5.1	2.28	11.9	10 59.5	4 43.5	+7 34.2	+0.6646	0.5520	0.1763	+86	+3
209 B. Cancr	6.5	2.28	12.2	11 53.5	5 39.7	+8 28.5	-0.4447	0.5515	0.1771	+13	-60
222 B. Cancr	6.3	2.25	12.4	11 50.3	9 26.8	-11 51.8	-1.0664	0.5497	0.1807	-26	-79
ω Leonis	5.5	2.19	12.3	9 24.4	14 27.9	-7 0.6	+0.5707	0.5474	0.1850	+77	-3
h Leonis	5.2	+2.18	-12.5	+10 4.2	16 7.4	-5 24.4	-0.4354	0.5466	-0.1863	+14	-61
π Leonis	4.9	2.07	12.9	8 25.8	21 5 42.7	+7 44.8	-1.3052	0.5410	0.1954	-51	-82
14 Sextantis	6.3	2.04	12.6	6 0.2	8 55.8	+10 52.0	+0.6312	0.5399	0.1970	+81	-1
19 Sextantis	5.9	2.01	12.6	+5 0.7	11 52.6	-10 16.7	+1.1005	0.5388	0.1984	+90	+29
NEW MOON.											
550 B. Virginis	6.0	+2.11	-10.7	-12 48.1	25 17 55.6	-7 18.9	+0.5886	0.5302	-0.1639	+70	-5
86 Virginis	5.6	2.14	10.2	12 1.4	23 36.5	-1 48.3	-1.1809	0.5310	0.1578	-41	-90
621 B. Virginis	6.4	2.23	9.8	14 35.1	26 8 52.5	+7 10.9	+0.2225	0.5324	0.1472	+43	-25
40 H. Virginis	5.1	2.27	9.8	15 55.4	12 3.3	+10 15.8	+1.2345	0.5330	0.1433	+75	+45
25 Libræ	6.0	+2.59	-7.3	-19 20.7	27 18 50.3	-7 54.4	+1.2460	0.5384	-0.1005	+71	+50
26 Libræ	6.3	2.56	6.8	17 28.1	19 27.9	-7 18.0	-0.8953	0.5386	0.0996	-25	-90
28 Libræ	6.2	2.60	6.5	17 52.0	22 32.6	-4 19.1	-0.7535	0.5391	0.0949	-17	-90
150 B. Libræ	6.1	2.69	6.3	19 53.4	28 3 46.5	+0 44.8	+1.0140	0.5400	0.0866	+71	+25
11 H. Libræ	5.4	2.69	6.1	19 23.8	4 12.6	+1 10.1	+0.4297	0.5401	0.0859	+50	-13
41 Libræ	5.3	+2.72	-5.6	-19 2.2	7 15.4	+4 7.1	-0.2233	0.5406	-0.0810	+10	-51
κ Libræ	5.0	2.74	5.6	19 25.1	8 43.4	+5 32.3	+0.0823	0.5409	0.0786	+28	-32
λ Libræ	5.1	2.80	4.9	19 55.6	14 12.2	+10 50.6	+0.2405	0.5418	0.0696	+36	-24
47 Libræ	5.8	2.80	4.5	19 8.8	15 1.1	+11 38.0	-0.6822	0.5419	0.0682	-15	-90
10 G. Scorp	5.9	2.84	4.8	20 45.0	16 16.7	-11 8.8	+1.0123	0.5421	0.0661	+70	+25
β Scorp	2.9	+2.86	-3.9	-19 35.1	20 1.1	-7 31.6	-0.5145	0.5427	-0.0598	-7	-73
56 B. Scorp	5.0	2.86	3.9	19 34.9	20 1.3	-7 31.4	-0.5189	0.5427	0.0598	-7	-73
ω^1 Scorp	4.3	2.88	4.1	20 27.1	20 39.7	-6 54.2	+0.4079	0.5428	0.0587	+45	-14
ω^2 Scorp	4.6	2.90	4.2	20 39.1	20 56.6	-6 37.9	+0.6133	0.5428	0.0582	+61	-2
ν Scorp	3.9	2.88	3.4	19 15.1	23 9.8	-4 28.9	-1.0638	0.5431	0.0544	-42	-90
84 B. Scorp	6.3	+2.93	-3.7	-20 54.2	29 0 19.7	-3 21.2	+0.7048	0.5433	-0.0524	+68	+3
51 G. Scorp	6.5	2.95	3.6	21 6.3	1 31.1	-2 12.2	+0.8661	0.5435	0.0504	+69	+14
58 G. Scorp	6.2	2.94	3.1	20 1.3	2 33.6	-1 11.6	-0.3852	0.5436	0.0486	-1	-62
ψ Ophiuchi	4.6	2.96	2.7	19 51.0	4 56.2	+1 6.4	-0.6869	0.5439	0.0444	-18	-90
ω Ophiuchi	4.5	3.04	2.5	21 17.7	8 44.3	+4 47.1	+0.7585	0.5444	0.0378	+88	+7
123 B. Scorp	6.5	+3.06	-1.4	-20 15.1	12 46.0	+8 41.1	-0.5348	0.5449	-0.0306	-11	-75

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>
		$\Delta\alpha$	$\Delta\delta$						
131 B. Scorpii	5.5	+3.06	- 1.2	-19 46.2	29 13 24.0	+ 9 17.8	-1.0873	0.5450	-0.0295
68 B. Ophiuchi	5.9	3.12	- 0.5	20 16.9	18 51.6	- 9 25.2	-0.6557	0.5456	0.0198
109 B. Ophiuchi	6.2	3.18	+ 0.4	20 22.9	30 0 13.2	- 4 14.1	-0.6246	0.5461	0.0102
116 B. Ophiuchi	6.3	3.22	0.1	21 27.2	0 53.0	- 3 35.6	+0.5546	0.5461	-0.0090
ξ Ophiuchi	4.4	3.30	1.4	21 1.6	7 52.1	+ 3 9.9	+0.0637	0.5467	+0.0037
190 B. Ophiuchi	5.9	+3.31	+ 1.7	-21 22.0	9 37.1	+ 4 51.4	+0.4487	0.5467	+0.0068
52 Ophiuchi	6.4	3.38	2.4	21 59.4	14 36.1	+ 9 40.7	+1.1916	0.5471	0.0156
58 Ophiuchi	4.8	+3.41	+ 3.2	-21 38.6	18 26.1	-10 36.8	+0.8840	0.5472	+0.0228

OCTOBER.

16 G. Sagittarii	6.4	+3.46	+ 5.1	-20 20.0	1 2 14.6	- 3 3.5	-0.3265	0.5476	+0.0368
30 G. Sagittarii	6.2	3.53	5.3	21 27.1	5 36.1	+ 0 11.3	+1.0369	0.5476	0.0430
39 G. Sagittarii	6.3	3.51	6.2	19 51.4	7 32.0	+ 2 3.4	-0.6281	0.5477	0.0464
μ Sagittarii	4.0	3.55	6.0	21 4.8	8 41.7	+ 3 10.8	+0.7689	0.5477	0.0488
15 Sagittarii	5.3	+3.55	+ 6.3	-20 45.1	9 23.0	+ 3 50.8	+0.4427	0.5477	+0.0497
16 Sagittarii	5.9	3.54	6.4	20 24.7	9 23.4	+ 3 51.1	+0.0697	0.5477	0.0498
21 Sagittarii	5.0	3.60	7.2	20 35.0	14 8.7	+ 8 27.1	+0.5154	0.5477	0.0582
29 Sagittarii	5.3	3.70	9.4	20 24.9	2 1 34.3	- 4 29.7	+1.1073	0.5477	0.0782
171 B. Sagittarii	6.1	3.74	10.8	19 21.7	7 53.0	+ 1 36.5	+0.4846	0.5476	0.0890
173 B. Sagittarii	6.4	+3.74	+10.9	-19 13.1	7 54.6	+ 1 38.1	+0.3313	0.5476	+0.0890
187 B. Sagittarii	6.4	3.75	11.4	18 51.7	9 48.5	+ 3 28.2	+0.1152	0.5476	0.0922
190 B. Sagittarii	5.4	3.76	11.3	19 24.9	10 20.0	+ 3 58.7	+0.7659	0.5476	0.0931
<i>d</i> Sagittarii	5.0	3.80	12.2	19 5.7	14 44.4	+ 8 14.4	+0.8430	0.5475	0.1004
ρ Sagittarii	4.0	3.78	12.9	17 59.8	16 39.4	+10 5.7	-0.1512	0.5475	0.1036
45 Sagittarii	6.0	+3.80	+12.7	-18 27.3	16 43.6	+10 9.7	+0.3528	0.5475	+0.1037
267 B. Sagittarii	5.8	3.86	14.1	18 24.5	23 53.4	- 6 54.5	+1.0827	0.5474	0.1152
54 Sagittarii	5.4	3.83	15.0	16 28.6	3 1 38.6	- 5 12.6	-0.7974	0.5473	0.1180
<i>e</i> Sagittarii	5.2	3.84	15.2	16 18.6	2 29.4	- 4 22.6	-0.8744	0.5473	0.1193
<i>g</i> Sagittarii	5.1	3.88	16.6	15 42.2	9 46.3	+ 2 39.1	-0.6162	0.5472	0.1304
16 B. Capricorni	6.2	+3.96	+18.5	-15 2.2	20 32.5	-10 55.8	+0.1615	0.5472	+0.1460
β Capricorni	3.2	3.96	18.6	15 2.0	20 39.2	-10 49.3	+0.1745	0.5472	0.1462
27 G. Capricorni	6.2	3.99	19.1	15 19.4	4 1 23.8	- 6 14.1	+1.1905	0.5473	0.1527
45 B. Capricorni	6.1	3.98	19.9	13 59.7	2 53.0	- 4 47.8	+0.0063	0.5473	0.1546
84 B. Capricorni	6.0	4.03	21.2	12 50.4	10 40.6	+ 2 44.6	+0.0257	0.5476	0.1647
16 B. Aquarii	6.4	+4.01	+21.8	-11 52.5	11 49.2	+ 3 50.9	-0.8053	0.5477	+0.1661
ν Aquarii	4.5	4.07	22.8	11 41.6	19 35.6	+11 22.0	+0.3327	0.5481	0.1752
51 G. Aquarii	6.5	4.06	23.2	10 56.1	21 48.6	-10 29.3	-0.0746	0.5483	0.1777
17 Aquarii	6.3	4.07	24.0	9 39.5	5 1 53.8	- 6 32.2	-0.6766	0.5487	0.1820
19 Aquarii	5.6	4.09	24.0	10 5.2	2 57.7	- 5 30.3	-0.0328	0.5488	0.1831
ξ Aquarii	4.8	+4.11	+25.2	- 8 12.7	8 51.6	+ 0 12.0	-0.8937	0.5494	+0.1889
<i>c'</i> Capricorni	5.3	4.14	25.2	9 26.9	12 15.1	+ 3 28.7	+1.0404	0.5499	0.1920
30 Aquarii	5.6	4.17	26.6	6 54.4	20 48.4	+11 45.1	+0.0754	0.5513	0.1991
138 B. Aquarii	6.4	4.18	27.3	5 6.8	6 1 13.6	- 7 58.4	-0.8895	0.5521	0.2023
44 Aquarii	5.7	4.20	27.3	5 47.1	3 15.3	- 6 0.8	+0.2147	0.5526	0.2036
51 Aquarii	5.8	+4.21	+27.6	- 5 14.4	6 30.3	- 2 52.2	+0.3187	0.5533	+0.2056
187 B. Aquarii	6.3	4.21	28.2	3 19.1	9 50.6	+ 0 21.4	-0.9640	0.5541	0.2075
κ Aquarii	5.2	4.24	28.0	4 38.3	12 48.9	+ 3 13.8	+1.0076	0.5548	0.2090
207 B. Aquarii	6.3	4.24	28.3	3 58.1	14 13.0	+ 4 35.0	+0.6141	0.5552	0.2096
6 G. Piscium	6.2	4.28	28.7	2 49.3	22 13.5	-11 40.6	+1.1318	0.5575	0.2127
3 Piscium	6.3	+4.29	+29.2	- 0 14.5	23 18.9	-10 37.4	-1.2624	0.5578	+0.2129

OCCULTATIONS, 1919.

597

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y'</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
B. Piscium	6.4	+4.34	+29.2	- 0 8.7	7 9 41.5	- 0 36.0	+0.8622	0.5614	+0.2147	+90	+11
Piscium	4.9	4.35	29.3	+ 0 49.2	11 13.4	+ 0 52.6	+0.2146	0.5620	0.2148	+50	-25
Piscium	6.4	4.35	29.3	0 41.1	11 21.9	+ 1 0.9	+0.3810	0.5620	0.2147	+60	-17
Piscium	5.7	4.37	29.4	1 39.6	15 28.2	+ 4 58.7	+0.2775	0.5636	0.2147	+53	-22
Piscium	4.6	4.38	29.2	1 20.5	17 59.7	+ 7 25.0	+1.1392	0.5646	0.2144	+90	+30
Piscium	5.4	+4.40	+29.4	+ 3 2.7	19 55.5	+ 9 16.8	-0.1619	0.5654	+0.2141	+28	-46
Piscium	5.8	4.41	29.2	2 29.3	22 23.6	+11 39.7	+0.9259	0.5664	0.2137	+90	+15
Piscium	5.6	4.51	28.3	6 31.0	8 16 2.1	+ 4 40.7	+0.6019	0.5745	0.2060	+78	- 3
B. Piscium	6.5	4.55	28.0	8 55.3	19 48.6	+ 8 19.1	-1.0211	0.5764	0.2031	-22	-82
Piscium	5.6	4.66	24.8	11 44.1	9 19 11.7	+ 6 50.2	+0.6901	0.5882	0.1793	+90	+ 4
H ¹ . Arietis	6.3	+4.70	+22.8	+13 5.6	10 5 32.8	- 7 12.4	+1.1259	0.5932	+0.1643	+90	+36
Arietis	5.8	4.76	21.7	14 54.4	9 44.1	- 3 10.8	+0.0077	0.5951	0.1575	+38	-30
Arietis	6.5	4.81	18.5	17 25.6	22 7.0	+ 8 42.9	-0.6660	0.6003	0.1352	0	-71
Arietis	6.0	4.82	18.0	17 57.1	23 46.1	+10 18.1	-0.9647	0.6009	0.1319	-20	-73
Arietis	5.2	4.79	18.1	17 8.0	11 0 4.4	+10 35.7	-0.1153	0.6010	0.1313	+31	-34
B. Arietis	6.4	+4.76	+17.9	+16 9.5	1 36.5	-11 55.9	+1.0468	0.6016	+0.1283	+90	+34
Arietis	6.0	4.81	17.3	18 0.5	2 37.1	-10 57.7	-0.6531	0.6019	0.1263	0	-69
Arietis	5.6	4.82	17.2	17 42.3	2 51.4	-10 43.9	-0.3233	0.6020	0.1258	+19	-46
Arietis	6.0	4.79	16.2	17 34.4	7 9.3	- 6 36.3	+0.3299	0.6033	0.1169	+58	- 9
Arietis	6.5	4.82	16.0	18 29.4	7 30.1	- 6 16.4	-0.5358	0.6034	0.1162	+ 7	-59
B. Arietis	6.4	+4.79	+14.0	+18 28.7	14 45.0	+ 0 41.0	+0.2616	0.6053	+0.1005	+53	-11
Tauri	5.6	4.79	12.2	19 26.7	20 37.5	+ 6 19.3	-0.1446	0.6064	0.0872	+29	-31
Tauri	6.2	4.79	12.0	19 24.8	21 11.3	+ 6 51.7	-0.0645	0.6065	0.0859	+33	-27
Tauri	5.5	4.73	9.3	19 23.9	12 6 55.8	- 7 47.6	+0.6770	0.6075	0.0630	+90	+16
Tauri	4.8	4.73	8.1	20 23.0	10 1.5	- 4 49.5	-0.1169	0.6075	0.0555	+30	-28
Tauri	5.6	+4.77	+ 7.8	+21 23.1	10 26.3	- 4 25.7	-1.0899	0.6075	+0.0545	-32	-69
Tauri	5.3	4.75	7.7	20 57.0	10 50.9	- 4 2.0	-0.6356	0.6075	0.0535	+ 1	-62
Tauri	5.2	4.77	7.6	21 34.9	10 54.5	- 3 58.6	-1.2600	0.6075	0.0534	-57	-69
B. Tauri	6.1	4.72	7.5	20 38.0	11 58.9	- 2 56.8	-0.2620	0.6075	0.0508	+22	-35
B. Tauri	5.9	4.73	7.4	20 47.8	12 25.4	- 2 31.4	-0.4021	0.6075	0.0497	+14	-44
B. Tauri	5.8	+4.74	+ 6.6	+21 26.5	14 7.6	- 0 53.4	-0.9634	0.6074	+0.0456	-21	-69
B. Tauri	6.4	4.65	6.3	19 43.1	17 6.1	+ 1 57.9	+0.8778	0.6072	0.0383	+90	+30
H ¹ . Tauri	5.8	4.67	5.8	20 31.5	18 4.3	+ 2 53.7	+0.1101	0.6071	0.0359	+44	-13
Tauri	4.7	4.61	2.7	21 28.6	13 3 35.8	-11 57.9	-0.6091	0.6057	0.0126	+ 2	-57
B. Tauri	6.3	4.59	2.7	21 10.0	4 5.4	-11 29.5	-0.2934	0.6055	0.0114	+20	-34
B. Tauri	6.3	+4.53	+ 3.0	+19 41.8	4 33.8	-11 2.3	+1.1806	0.6054	+0.0102	+90	+57
Tauri	5.2	4.54	2.5	20 18.8	5 26.0	-10 12.2	+0.5727	0.6052	0.0081	+78	+15
Tauri	6.0	4.58	2.2	21 36.0	5 27.6	-10 10.7	-0.7137	0.6052	0.0080	- 4	-68
Tauri	6.5	4.52	2.6	19 45.4	5 50.2	- 9 48.9	+1.1327	0.6051	+0.0071	+90	+52
Tauri	5.1	4.55	0.7	22 0.8	9 50.4	- 5 58.5	-1.1188	0.6040	-0.0027	-35	-68
B. Tauri	6.2	+4.48	+ 1.4	+20 3.1	9 51.4	- 5 57.5	+0.8481	0.6040	-0.0027	+90	+31
B. Tauri	6.5	4.47	+ 1.3	19 44.0	10 31.1	- 5 19.4	+1.1641	0.6038	0.0043	+90	+56
Tauri	4.8	4.50	- 0.1	21 52.1	13 5.1	- 2 51.5	-0.9960	0.6030	0.0105	-24	-69
B. Tauri	6.1	4.43	0.3	20 25.1	15 26.6	- 0 35.8	+0.4290	0.6023	0.0162	+65	+ 6
Tauri	3.0	4.43	1.0	21 5.6	16 59.5	+ 0 53.4	-0.2782	0.6017	0.0199	+21	-34
B. D. +19°1110	6.0	+4.32	- 2.2	+19 50.8	22 47.1	+ 6 27.1	+0.8222	0.5993	-0.0335	+90	+28
Orionis	4.5	4.31	2.5	20 15.7	23 34.2	+ 7 12.4	+0.3778	0.5990	0.0354	+62	+ 1
Orionis	5.8	4.30	2.3	19 44.1	23 47.5	+ 7 25.2	+0.9016	0.5989	0.0359	+90	+32
Orionis	5.1	4.25	3.2	19 41.5	14 3 9.1	+10 38.8	+0.8119	0.5974	0.0438	+90	+26
Orionis	4.7	4.26	3.4	20 8.4	3 19.8	+10 49.0	+0.3513	0.5973	0.0440	+59	0
Orionis	5.7	+4.21	- 4.2	+19 48.5	6 33.0	-10 5.3	+0.5339	0.5957	-0.0513	+74	+

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	r'	y'
		$\Delta\alpha$	$\Delta\delta$						
71 Orionis	5.1	+4.17	-4.4	+19 11.0	14 7 41.3	-8 59.7	+1.1065	0.5952	-0.0531
15 Geminorum	6.5	4.15	6.1	20 50.3	12 50.4	-4 2.6	-0.8762	0.5924	0.0651
16 Geminorum	6.2	4.14	6.0	20 32.7	12 54.7	-3 58.5	-0.5825	0.5924	0.0651
r Geminorum	4.1	4.12	6.0	20 15.8	13 19.5	-3 34.6	-0.3244	0.5921	0.0661
74 B. Geminorum	6.2	3.96	7.1	18 16.8	20 49.6	+3 38.2	-1.1356	0.5873	0.0821
110 B. Geminorum	6.2	+3.86	-8.3	+17 52.2	15 3 0.8	+9 35.4	+1.0123	0.5840	-0.0941
162 B. Geminorum	5.7	3.66	10.6	17 15.4	15 20.9	-2 31.9	+0.3380	0.5761	0.1171
f Geminorum	5.3	3.62	11.4	17 51.4	18 37.0	+0 37.1	-0.6710	0.5740	0.1221
1 Cancri	6.0	3.47	12.1	16 0.3	2 13.0	+7 56.7	+0.2608	0.5690	0.1341
2 B. Cancri	6.0	3.48	12.5	16 44.1	2 52.6	+8 34.9	-0.5832	0.5686	0.1351
5 Cancri	5.9	-3.46	-12.6	+16 40.6	4 10.9	+9 50.5	-0.7016	0.5677	-0.1371
30 B. Cancri	6.1	3.36	12.7	14 52.0	8 22.7	-10 6.6	+0.5815	0.5650	0.1431
29 Cancri	5.9	3.24	13.7	14 28.6	16 15.7	-2 30.0	-0.1878	0.5600	0.1541
84 B. Cancri	6.4	3.19	13.7	13 31.9	18 35.5	-0 14.9	-0.4333	0.5585	0.1571
11 Cancri	5.5	3.13	14.0	12 58.1	22 54.1	+3 54.9	+0.3321	0.5558	0.1621
42 Cancri	5.7	-3.09	-14.0	+12 24.2	17 0 37.1	+5 34.5	+0.6413	0.5548	-0.1641
60 Cancri	5.7	3.03	14.3	11 55.9	4 46.2	+9 35.2	-0.4446	0.5525	0.1681
a Cancri	4.3	3.02	14.6	12 10.1	5 57.2	-10 43.9	-0.0026	0.5517	0.1701
1 Cancri	5.1	2.95	14.6	10 59.5	10 17.4	-9 4.5	-0.4860	0.5493	0.1741
209 B. Cancri	6.5	2.95	15.0	11 53.4	11 14.0	-8 9.8	-0.6237	0.5488	0.1751
222 B. Cancri	6.3	-2.91	-15.3	-11 50.2	15 2.7	-4 28.5	-1.2427	0.5467	-0.1781
1 Leonis	5.5	2.82	15.0	9 24.4	20 6.3	-0 25.2	-0.4027	0.5441	0.1821
3 Leonis	5.8	2.81	14.7	8 32.3	20 7.8	-0 26.7	-1.3129	0.5441	0.1821
5 Leonis	5.2	2.81	15.3	10 4.2	21 46.7	+2 2.4	-0.6038	0.5433	0.1831
10 B. Sextantis	6.0	2.70	14.9	7 4.7	18 4 39.5	+8 42.1	-1.2762	0.5401	0.1881
14 Sextantis	6.3	-2.59	-15.2	-6 0.2	14 45.5	-5 31.0	-0.4874	0.5359	-0.1941
19 Sextantis	5.9	2.56	15.0	5 0.7	17 44.3	-2 37.7	-0.9627	0.5348	0.1951
155 B. Leonis	6.5	2.50	15.6	6 6.1	22 55.6	-2 24.0	-1.2182	0.5330	0.1971
237 B. Leonis	6.3	2.38	14.8	1 27.0	13 31.3	-7 27.0	-0.8482	0.5290	0.2001
30 Leonis	6.1	2.38	14.7	1 9.9	15 17.0	-5 44.5	-0.8019	0.5287	0.2001
1 Leonis	6.1	-2.34	-14.6	-0 23.9	19 18.7	-1 50.0	-0.7815	0.5279	-0.2011
1 Leonis	5.3	2.30	14.6	-0 22.0	20 0 29.3	-3 11.3	-0.1900	0.5270	0.2011
388 B. Leonis	6.1	2.28	14.3	-1 15.5	7 44.0	-10 13.1	-0.1089	0.5260	0.2001
1 Leonis	5.1	2.26	14.0	2 33.6	8 58.6	-11 25.5	-1.2675	0.5260	0.2001
45 B. Leonis	6.2	2.25	14.1	1 59.5	13 7.9	-8 32.6	-0.1766	0.5256	0.1991
8 B. Virgois	6.3	-2.17	-13.1	-3 12.3	21 7 36.5	-9 23.1	-0.2475	0.5252	-0.1921
NEW MOON.					NEW MOON.				
150 B. Librae	6.1	-2.41	-13 13.4	25 10 38.2	-9 24.1	-1.1212	0.5418	-0.0851	
151 B. Librae	5.4	2.48	-13 13.5	11 4.3	-9 49.4	-0.5363	0.5418	0.0851	
1 Librae	5.3	-2.38	-13 13.5	14 7.0	-11 13.7	-0 1147	0.5424	-0.0801	
1 Librae	5.3	2.38	-13 13.5	15 34.8	-9 48.5	-0.1930	0.5426	0.0771	
1 Librae	5.3	2.38	-13 13.5	21 3.5	-4 30.4	-0 3571	0.5434	0.0681	
1 Librae	5.3	2.38	-13 13.5	21 52.5	-3 43.0	-0 5686	0.5436	0.0671	
1 Librae	5.3	2.38	-13 13.5	22 5.0	-2 29.9	-1.1325	0.5438	0.0651	
1 B. Scorpis	5.7	2.38	-13 13.5	25 10 38.2	-9 24.1	-1.1212	0.5418	-0.0851	
1 B. Scorpis	5.7	2.38	-13 13.5	11 4.3	-9 49.4	-0.5363	0.5418	0.0851	
1 B. Scorpis	5.7	2.38	-13 13.5	14 7.0	-11 13.7	-0 1147	0.5424	-0.0801	
1 B. Scorpis	5.7	2.38	-13 13.5	15 34.8	-9 48.5	-0.1930	0.5426	0.0771	
1 B. Scorpis	5.7	2.38	-13 13.5	21 3.5	-4 30.4	-0 3571	0.5434	0.0681	
1 B. Scorpis	5.7	2.38	-13 13.5	21 52.5	-3 43.0	-0 5686	0.5436	0.0671	
1 B. Scorpis	5.7	2.38	-13 13.5	22 5.0	-2 29.9	-1.1325	0.5438	0.0651	
1 B. Scorpis	5.7	2.38	-13 13.5	25 10 38.2	-9 24.1	-1.1212	0.5418	-0.0851	
1 B. Scorpis	5.7	2.38	-13 13.5	11 4.3	-9 49.4	-0.5363	0.5418	0.0851	
1 B. Scorpis	5.7	2.38	-13 13.5	14 7.0	-11 13.7	-0 1147	0.5424	-0.0801	
1 B. Scorpis	5.7	2.38	-13 13.5	15 34.8	-9 48.5	-0.1930	0.5426	0.0771	
1 B. Scorpis	5.7	2.38	-13 13.5	21 3.5	-4 30.4	-0 3571	0.5434	0.0681	
1 B. Scorpis	5.7	2.38	-13 13.5	21 52.5	-3 43.0	-0 5686	0.5436	0.0671	
1 B. Scorpis	5.7	2.38	-13 13.5	22 5.0	-2 29.9	-1.1325	0.5438	0.0651	
1 B. Scorpis	5.7	2.38	-13 13.5	25 10 38.2	-9 24.1	-1.1212	0.5418	-0.0851	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
51 G. Scorpii	6.5	+2.65	-2.3	-21 6.2	26 8 22.5	+6 26.9	+0.9948	0.5449	-0.0496	+70	+24
58 G. Scorpii	6.2	2.64	2.0	20 1.3	9 25.0	+7 27.3	-0.2589	0.5450	0.0478	+6	-53
ψ Ophiuchi	4.6	2.65	1.6	19 51.0	11 47.8	+9 45.5	-0.5594	0.5452	0.0437	-10	-77
ω Ophiuchi	4.5	2.71	1.3	21 17.7	15 36.2	-10 33.4	+0.8932	0.5456	0.0370	+69	+16
123 B. Scorpii	6.5	2.72	0.4	20 15.1	19 38.3	-6 39.1	-0.4009	0.5459	0.0299	-3	-63
131 B. Scorpii	5.5	+2.71	-0.2	-19 46.2	20 16.4	-6 2.3	-0.9545	0.5460	-0.0288	-36	-90
68 B. Ophiuchi	5.9	2.76	+0.4	20 16.9	27 1 44.8	-0 44.4	-0.5179	0.5463	0.0191	-11	-73
109 B. Ophiuchi	6.2	2.81	1.2	20 22.9	7 7.5	+4 27.9	-0.4832	0.5465	0.0095	-10	-70
116 B. Ophiuchi	6.3	2.84	1.0	21 27.2	7 47.5	+5 6.6	+0.7010	0.5465	-0.0083	+66	+3
ξ Ophiuchi	4.4	2.90	2.1	21 1.6	14 48.6	+11 54.0	+0.2125	0.5466	+0.0043	+28	-25
190 B. Ophiuchi	5.9	+2.91	+2.5	-21 22.0	16 34.0	-10 24.0	+0.6002	0.5466	+0.0074	+56	-3
58 Ophiuchi	4.8	2.98	3.8	21 38.6	28 1 26.6	-1 48.7	+1.0427	0.5465	0.0232	+69	+28
16 G. Sagittarii	6.4	3.02	5.5	20 20.0	9 19.2	+5 48.6	-0.1710	0.5461	0.0372	+10	-48
30 G. Sagittarii	6.2	3.08	5.7	21 27.1	12 42.7	+9 5.5	+1.2021	0.5459	0.0432	+69	+45
39 G. Sagittarii	6.3	3.05	6.5	19 51.4	14 39.8	+10 58.8	-0.4726	0.5458	0.0466	-5	-69
μ Sagittarii	4.0	+3.10	+6.3	-21 4.8	15 50.3	-11 53.0	+0.9338	0.5457	+0.0487	+69	+19
15 Sagittarii	5.3	3.09	6.6	20 45.1	16 32.0	-11 12.6	+0.6056	0.5456	0.0499	+60	-3
16 Sagittarii	5.9	3.08	6.6	20 24.7	16 32.4	-11 12.2	+0.2303	0.5456	0.0499	+34	-24
21 Sagittarii	5.0	3.13	7.4	20 35.0	21 21.2	-6 32.8	+0.6806	0.5452	0.0582	+67	+2
95 B. Sagittarii	5.7	3.11	8.2	18 46.7	23 41.4	-4 17.1	-1.1695	0.5451	0.0622	-51	-90
29 Sagittarii	5.3	+3.22	+9.3	-20 24.9	29 8 56.5	+4 40.2	+1.2804	0.5442	+0.0778	+70	+62
171 B. Sagittarii	6.1	3.26	10.6	19 21.7	15 21.4	+10 52.6	+0.6537	0.5435	0.0884	+67	+1
173 B. Sagittarii	6.4	3.26	10.7	19 13.1	15 23.1	+10 54.3	+0.4991	0.5435	0.0884	+55	-9
187 B. Sagittarii	6.4	3.26	11.1	18 51.7	17 19.0	-11 13.6	+0.2812	0.5433	0.0916	+41	-21
190 B. Sagittarii	5.4	3.28	11.0	19 24.9	17 51.1	-10 42.5	+0.9378	0.5432	0.0924	+71	+19
d Sagittarii	5.0	+3.31	+11.8	-19 5.7	22 20.3	-6 21.9	+1.0161	0.5428	+0.0995	+71	+24
ρ Sagittarii	4.0	3.30	12.5	17 59.8	30 0 17.6	-4 28.4	+0.0126	0.5426	0.1026	+27	-37
45 Sagittarii	6.0	3.32	12.3	18 27.4	0 21.9	-4 24.2	+0.5214	0.5425	0.1027	+58	-8
267 B. Sagittarii	5.8	3.38	13.5	18 24.5	7 40.5	+2 40.4	+1.2587	0.5418	0.1139	+72	+51
54 Sagittarii	5.4	3.36	14.4	16 28.6	9 27.9	+4 24.4	-0.6409	0.5416	0.1166	-7	-85
e Sagittarii	5.2	+3.36	+14.6	-16 18.6	10 19.9	+5 14.7	-0.7190	0.5415	+0.1179	-12	-90
g Sagittarii	5.1	3.41	15.8	15 42.2	17 46.8	-11 32.7	-0.4595	0.5408	0.1287	+4	-67
16 B. Capricorni	6.2	3.49	17.6	15 2.2	31 4 49.0	-0 51.5	+0.3240	0.5401	0.1438	+49	-19
β Capricorni	3.2	3.49	17.7	15 2.0	4 55.8	-0 44.9	+0.3371	0.5401	0.1439	+50	-19
45 B. Capricorni	6.1	3.53	18.9	13 59.7	11 19.4	+5 26.6	+0.1646	0.5398	0.1521	+41	-28
84 B. Capricorni	6.0	+3.59	+20.2	-12 50.4	19 19.8	-10 48.3	+0.1806	0.5397	+0.1618	+43	-27
16 B. Aquarii	6.4	+3.58	+20.7	-11 52.5	20 30.4	-9 40.0	-0.6613	0.5396	+0.1631	-3	-86

NOVEMBER.

ν Aquarii	4.5	+3.65	+21.6	-11 41.7	1 4 30.0	-1 55.6	+0.4865	0.5398	+0.1720	+63	-11
51 G. Aquarii	6.5	3.65	22.1	10 56.1	6 46.8	+0 16.8	+0.0727	0.5400	0.1743	+38	-33
17 Aquarii	6.3	3.67	23.0	9 39.5	10 59.1	+4 21.1	-0.5398	0.5402	0.1786	+5	-73
19 Aquarii	5.6	3.69	22.9	10 5.3	12 4.8	+5 24.9	+0.1114	0.5403	0.1796	+40	-31
ξ Aquarii	4.8	3.73	24.2	8 12.7	18 8.9	+11 17.3	-0.7647	0.5409	0.1853	-7	-90
c^1 Capricorni	5.3	+3.77	+24.0	-9 26.9	21 38.3	-9 19.9	+1.1908	0.5413	+0.1883	+81	+37
30 Aquarii	5.6	3.82	25.5	6 54.4	2 6 26.3	-0 48.9	+0.2063	0.5428	0.1952	+48	-26
138 B. Aquarii	6.4	3.84	26.4	5 6.8	10 58.9	+3 34.9	-0.7742	0.5437	0.1983	-7	-90
44 Aquarii	5.7	3.87	26.3	5 47.1	13 3.9	+5 35.9	+0.3410	0.5442	0.1986	+56	-19
51 Aquarii	5.8	3.90	26.6	5 14.4	16 24.3	+8 49.8	+0.4427	0.5450	0.2016	+64	-13
187 B. Aquarii	6.3	+3.92	+27.4	-3 19.1	19 49.9	-11 51.2	-0.8579	0.5460	+0.2035	-11	-

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S						AT CONJUNCTION IN R. A.							Limit- ing Par- allels.	
	Name.	Mag.	Red'ns from 1919.0.		Apparent Declina- tion.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>		
			$\Delta\alpha$	$\Delta\delta$										
			<i>s</i>	<i>"</i>	<i>°</i>	<i>d</i>	<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>	<i>°</i>	<i>'</i>		
κ	Aquarii	5.2	+3.95	+27.0	-4 38.3	2	22	52.8	-8 54.2	+1.1324	0.5468	+0.2050	+85 +30	
207 B.	Aquarii	6.3	3.97	27.4	3 58.1	3	0	19.1	-7 30.7	+0.7329	0.5473	0.2056	+86 +3	
6 G.	Piscium	6.2	4.04	27.9	2 49.3		8	31.4	+0 25.4	+1.2460	0.5501	0.2087	+87 +44	
3	Piscium	6.3	4.05	28.7	0 14.5		9	38.4	+1 30.3	-1.1729	0.5505	0.2090	-34 -90	
22 B.	Piscium	6.4	4.15	28.8	0 8.7		20	14.5	+11 45.2	+0.9585	0.5549	0.2110	+90 +17	
κ	Piscium	4.9	+4.17	+28.9	+0 49.2		21	48.2	-10 44.2	+0.3034	0.5556	+0.2111	+55 -21	
9	Piscium	6.4	4.17	28.9	0 41.1		21	56.9	-10 35.9	+0.4710	0.5557	0.2111	+67 -12	
16	Piscium	5.7	4.20	29.1	1 39.6	4	2	7.8	-6 33.5	+0.3613	0.5577	0.2112	+59 -17	
λ	Piscium	4.6	4.22	28.8	1 20.5		4	42.0	-4 4.5	+1.2257	0.5590	0.2111	+90 +40	
19	Piscium	5.4	4.26	29.2	3 2.7		6	39.8	-2 10.7	-0.0871	0.5600	0.2108	+32 -42	
22	Piscium	5.8	+4.28	+29.0	+2 29.3		9	10.2	+0 14.5	+1.0043	0.5613	+0.2105	+90 +21	
51	Piscium	5.6	4.48	28.6	6 31.0	5	3	1.2	-6 31.9	+0.6524	0.5716	0.2037	+84 0	
136 B.	Piscium	6.5	4.54	28.6	8 55.3		6	49.3	-2 52.0	-0.9797	0.5740	0.2013	-19 -81	
π	Piscium	5.6	4.81	25.7	11 44.1	6	6	13.1	-4 20.2	+0.7004	0.5895	0.1784	+90 +6	
12 H.	Arietis	6.3	4.92	23.7	13 5.6		16	29.3	+5 32.3	+1.1192	0.5963	0.1639	+90 +37	
19	Arietis	5.8	+5.00	+22.9	+14 54.4		20	37.9	+9 31.2	+0.0016	0.5989	+0.1573	+37 -30	
36	Arietis	6.5	5.15	19.9	17 25.6	7	8	49.6	-2 46.2	-0.6812	0.6061	0.1353	-1 -71	
40	Arietis	6.0	5.17	19.5	17 57.2		10	26.8	-1 13.0	-0.9788	0.6069	0.1321	-21 -72	
π	Arietis	5.2	5.14	19.4	17 8.0		10	44.9	-0 55.6	-0.1373	0.6071	0.1315	+29 -35	
124 B.	Arietis	6.4	5.12	18.9	16 9.5		12	15.2	+0 31.0	+1.0124	0.6079	0.1285	+90 +32	
45	Arietis	6.0	+5.19	+18.7	+18 0.6		13	14.6	+1 28.1	-0.6728	0.6083	+0.1265	-1 -70	
ρ	Arietis	5.6	5.20	18.5	17 42.4		13	28.5	+1 41.4	-0.3463	0.6085	0.1260	+18 -47	
53	Arietis	6.0	5.19	17.4	17 34.4		17	41.1	+5 43.6	+0.2958	0.6105	0.1172	+55 -10	
54	Arietis	6.5	5.22	17.3	18 29.4		18	1.5	+6 3.3	-0.5614	0.6106	0.1164	+5 -61	
175 B.	Arietis	6.4	5.25	15.2	18 28.7	8	1	6.3	-11 9.5	+0.2199	0.6135	0.1008	+50 -12	
13	Tauri	5.6	+5.29	+13.4	+19 26.7		6	49.8	-5 40.3	-0.1873	0.6154	+0.0875	+26 -34	
14	Tauri	6.2	5.29	13.1	19 24.8		7	22.6	-5 8.9	-0.1087	0.6156	0.0862	+31 -29	
43	Tauri	5.5	5.29	10.0	19 23.9		16	50.6	+3 55.4	+0.6136	0.6176	0.0631	+83 +13	
ω	Tauri	4.8	5.31	8.9	20 23.0		19	50.8	+6 48.0	-0.1718	0.6179	0.0556	+27 -30	
51	Tauri	5.6	5.36	8.7	21 23.1		20	14.8	+7 10.9	-1.1312	0.6180	0.0546	-36 -69	
53	Tauri	5.3	+5.34	+8.6	+20 57.0		20	38.7	+7 33.9	-0.6836	0.6180	+0.0536	-2 -66	
224 B.	Tauri	6.1	5.32	8.3	20 38.0		21	44.5	+8 36.9	-0.3164	0.6181	0.0508	+19 -38	
227 B.	Tauri	5.9	5.33	8.1	20 47.8		22	10.2	+9 1.4	-0.4549	0.6181	0.0497	+11 -47	
247 B.	Tauri	5.8	5.35	7.4	21 26.5		23	49.2	+10 36.3	-1.0092	0.6182	0.0455	-25 -69	
282 B.	Tauri	6.4	5.27	6.8	19 43.1	9	2	42.0	-10 38.2	+0.8020	0.6182	0.0382	+90 +26	
129 H.	Tauri	5.8	+5.30	+6.3	+20 31.5		3	38.3	-9 44.3	+0.0452	0.6182	+0.0358	+40 -16	
ι	Tauri	4.7	5.30	2.9	21 28.6		12	50.9	-0 54.9	-0.6697	0.6172	0.0121	-1 -62	
330 B.	Tauri	6.3	5.28	2.8	21 10.0		13	19.5	-0 27.5	-0.3593	0.6171	0.0109	+17 -37	
333 B.	Tauri	6.3	5.21	3.0	19 41.8		13	46.8	-0 1.3	+1.0905	0.6170	0.0097	+90 +49	
l	Tauri	5.2	5.23	2.5	20 18.8		14	37.2	+0 46.9	+0.4919	0.6168	0.0075	+71 +11	
105	Tauri	6.0	+5.29	+2.3	+21 36.0		14	38.8	+0 48.4	-0.7738	0.6168	+0.0075	-8 -68	
107	Tauri	6.5	5.21	2.5	19 45.4		15	0.6	+1 9.4	+1.0424	0.6167	+0.0065	+90 +45	
n	Tauri	5.1	5.28	0.7	22 0.8		18	52.6	+4 51.6	-1.1750	0.6158	-0.0034	-42 -68	
351 B.	Tauri	6.2	5.20	1.2	20 3.1		18	53.5	+4 52.5	+0.7595	0.6158	0.0034	+90 +27	
353 B.	Tauri	6.5	5.18	+1.0	19 44.0		19	31.8	+5 29.2	+1.0698	0.6156	0.0051	+90 +48	
o	Tauri	4.8	+5.24	-0.3	+21 52.1		22	0.4	+7 51.5	-1.0562	0.6149	-0.0113	-29 -68	
372 B.	Tauri	6.1	5.17	0.7	20 25.1	10	0	17.0	+10 2.5	+0.3436	0.6141	0.0171	+59 +2	
ξ	Tauri	3.0	5.18	1.4	21 5.6		1	46.6	+11 28.4	-0.3527	0.6135	0.0209	+17 -38	
β	B. D. +19°1110	6.0	5.08	2.9	19 50.8		7	21.9	-7 10.2	+0.7258	0.6112	0.0347	+90 +22	
χ^1	Orionis	4.5	5.08	3.3	20 15.7		8	7.3	-6 26.7	+0.2885	0.6108	0.0366	+55 -3	
57	Orionis	5.8	+5.07	-3.2	+19 44.0		8	20.1	-6 14.3	+0.8033	0.6107	-0.0371	+90 +28	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S						AT CONJUNCTION IN R. A.						Limiting Parallels.	
	Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>	
			$\Delta\alpha$	$\Delta\delta$									
			<i>s</i>	<i>"</i>	<i>° ' "</i>	<i>d h m</i>	<i>h m</i>				<i>° ' "</i>	<i>° ' "</i>	
64	Orionis	5.1	+5.04	-4.2	+19 41.5	10 11 34.6	-3 7.8	+0.7132	0.6091	-0.0450	+90	+20	
χ^2	Orionis	4.7	5.05	4.4	20 8.4	11 44.8	-2 58.1	+0.2604	0.6090	0.0454	+53	-5	
68	Orionis	5.7	5.00	5.3	-19 48.5	14 51.2	+0 0.7	+0.4382	0.6074	0.0528	+66	+4	
71	Orionis	5.1	4.96	5.6	19 11.0	15 57.1	+1 3.9	+1.0005	0.6068	0.0553	+90	+38	
15	Geminorum	6.5	4.97	7.5	20 50.3	20 55.4	+5 50.2	-0.9510	0.6039	0.0668	-20	-69	
16	Geminorum	6.2	+4.96	-7.4	+20 32.6	20 59.5	+5 54.1	-0.6623	0.6038	-0.0670	-1	-65	
ν	Geminorum	4.1	4.94	7.4	20 15.8	21 23.4	+6 17.1	-0.4087	0.6036	0.0679	+14	-46	
74 B.	Geminorum	6.2	4.79	9.0	18 16.8	11 4 37.9	-10 45.7	+1.0239	0.5989	0.0838	+90	+37	
110 B.	Geminorum	6.2	4.70	10.4	17 52.1	10 36.7	-5 1.1	+0.9008	0.5946	0.0963	+90	+27	
162 B.	Geminorum	5.7	4.52	13.3	17 15.4	22 33.0	+6 27.8	+0.2344	0.5856	0.1190	+51	-14	
<i>f</i>	Geminorum	5.3	+4.48	-14.2	+17 51.4	12 1 43.2	+9 30.9	-0.7601	0.5831	-0.1246	-6	-72	
1	Cancr	6.0	4.32	15.2	16 0.2	9 5.9	-7 22.8	+0.1568	0.5774	0.1367	+46	-20	
2 B.	Cancr	6.0	4.34	15.6	16 44.0	9 44.3	-6 45.8	-0.6752	0.5768	0.1377	-1	-72	
5	Cancr	5.9	4.32	15.8	16 40.5	11 0.4	-5 32.5	-0.7922	0.5758	0.1396	-8	-73	
30 B.	Cancr	6.1	4.21	16.0	14 51.9	15 5.5	-1 36.2	+0.4726	0.5726	0.1456	+68	-4	
29	Cancr	5.9	+4.09	-17.2	+14 28.5	22 46.6	+5 48.4	-0.2867	0.5667	-0.1561	+21	-47	
84 B.	Cancr	6.4	4.04	17.4	13 31.8	13 1 3.1	+8 0.2	+0.3267	0.5649	0.1589	+57	-13	
<i>A</i> ¹	Cancr	5.5	3.97	17.8	12 58.0	5 15.8	-11 55.9	+0.2270	0.5618	0.1639	+51	-19	
<i>A</i> ²	Cancr	5.7	3.93	17.8	12 24.2	6 56.7	-10 18.6	+0.5330	0.5606	0.1658	+72	-4	
60	Cancr	5.7	3.87	18.2	11 55.9	11 0.6	-6 23.0	+0.3391	0.5576	0.1701	+58	-14	
α	Cancr	4.3	+3.86	-18.5	+12 10.0	12 10.2	-5 15.7	-0.1031	0.5568	-0.1713	+31	-38	
κ	Cancr	5.1	3.78	18.6	10 59.4	16 25.5	-1 9.0	+0.3811	0.5538	0.1754	+61	-13	
209 B.	Cancr	6.5	3.78	19.1	11 53.4	17 21.1	-0 15.2	-0.7172	0.5532	0.1762	-3	-78	
222 B.	Cancr	6.3	3.73	19.4	11 50.1	21 6.0	+3 22.2	-1.3301	0.5507	0.1795	-61	-75	
ω	Leonis	5.5	3.63	19.1	9 24.3	14 2 4.9	+8 11.1	+0.3011	0.5475	0.1834	+55	-18	
3	Leonis	5.8	+3.61	-18.8	+8 32.2	2 6.4	+8 12.6	+1.2034	0.5475	-0.1834	+90	+41	
<i>h</i>	Leonis	5.2	3.61	19.5	10 4.1	3 43.8	+9 46.8	-0.6964	0.5465	0.1846	-1	-80	
10 B.	Sextantis	6.0	3.49	19.1	7 4.7	10 31.3	-7 38.9	+1.1709	0.5425	0.1890	+90	+36	
25 B.	Sextantis	6.3	3.44	19.1	6 20.1	14 9.7	-4 7.4	+1.2624	0.5405	0.1911	+90	+46	
14	Sextantis	6.3	3.36	19.4	6 0.1	20 31.3	+2 2.2	+0.3919	0.5372	0.1941	+61	-15	
19	Sextantis	5.9	+3.32	-19.2	+5 0.6	23 28.8	+4 54.2	+0.8660	0.5358	-0.1953	+90	+12	
155 B.	Leonis	6.5	3.25	19.9	6 6.0	15 4 38.1	+9 53.9	-1.3015	0.5335	0.1970	-50	-84	
237 B.	Leonis	6.3	3.09	18.8	1 27.0	19 10.7	-0 0.1	+0.7632	0.5282	0.1998	+90	+5	
55	Leonis	6.1	3.08	18.7	1 9.8	20 56.2	+1 42.2	+0.7181	0.5277	0.1999	+90	+2	
<i>p</i> ³	Leonis	6.1	3.03	18.5	0 25.8	16 0 57.8	+5 36.5	+0.7003	0.5266	0.2000	+89	+1	
<i>p</i> ⁵	Leonis	5.3	+2.98	-18.6	+0 22.0	6 8.7	+10 38.0	-0.2662	0.5254	-0.1998	+23	-53	
388 B.	Leonis	6.3	2.92	18.0	-1 15.5	13 24.3	-6 19.3	+0.0363	0.5240	0.1990	+39	-35	
ϵ	Leonis	5.1	2.91	17.6	2 33.7	14 39.0	-5 6.8	+1.1947	0.5239	0.1987	+87	+36	
431 B.	Leonis	6.2	2.87	17.7	1 59.6	18 49.2	-1 4.0	-0.2456	0.5233	0.1978	+24	-51	
78 B.	Virginis	6.5	2.75	16.2	5 16.4	17 13 23.5	-7 2.5	-0.3053	0.5224	0.1912	+20	-55	
χ	Virginis	4.8	+2.68	-15.1	-7 33.3	18 2 20.4	+5 31.6	-0.2464	0.5231	-0.1840	+22	-52	
ψ	Virginis	5.0	2.66	14.3	9 6.2	10 8.6	-10 54.0	+0.0356	0.5239	0.1786	+36	-35	
49	Virginis	5.2	2.64	13.6	10 18.7	17 7.0	-4 8.0	+0.1353	0.5249	0.1732	+42	-30	
50	Virginis	6.2	2.63	13.6	9 54.1	18 4.6	-3 12.1	-0.4814	0.5251	0.1724	+8	-68	
α	Virginis(<i>Spica</i>)	1.2	2.60	12.8	10 44.5	19 1 59.5	+4 28.7	-0.8950	0.5266	0.1655	-17	-90	
<i>i</i>	Virginis	5.7	+2.61	-12.4	-12 17.4	2 46.1	+5 14.0	+0.6819	0.5267	-0.1647	+77	+1	
550 B.	Virginis	6.0	2.61	12.0	12 48.2	6 49.3	+9 9.9	+0.5875	0.5276	0.1609	+70	-5	
86	Virginis	5.6	2.58	11.6	12 1.4	12 33.4	-9 16.3	-1.1781	0.5289	0.1551	-41	-90	
621 B.	Virginis	6.4	2.59	10.3	14 35.1	21 53.7	-0 12.9	+0.2513	0.5312	0.1448	+45	-23	
40 H.	Virginis	5.1	+2.60	-9.8	-15 55.4	20 1 5.8	+2 53.3	+1.2738	0.5320	-0.1410	+74	+51	

NEW MOON.

NEW MOON.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.				
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y'</i>	<i>x'</i>	<i>y'</i>
		$\Delta\alpha$	$\Delta\delta$						
		<i>s</i>	<i>"</i>	<i>°</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>			
58 Ophiuchi	4.8	+2.82	+4.3	-21 38.6	24 7 38.0	+6 10.3	+1.0589	0.5483	+0.0234
16 G. Sagittarii	6.4	2.83	5.8	20 20.0	15 30.1	-10 13.0	-0.1562	0.5477	0.0374
30 G. Sagittarii	6.2	2.87	6.2	21 27.1	18 53.5	-6 56.2	+1.2205	0.5475	0.0434
39 G. Sagittarii	6.3	2.84	6.7	19 51.4	20 50.6	-5 2.9	-0.4581	0.5472	0.0468
μ Sagittarii	4.0	2.88	6.7	21 4.8	22 1.1	-3 54.7	+0.9520	0.5472	0.0489
15 Sagittarii	5.3	+2.87	+6.9	-20 45.1	22 42.8	-3 14.3	+0.6231	0.5470	+0.0501
16 Sagittarii	5.9	2.87	6.9	20 24.7	22 43.2	-3 13.9	+0.2467	0.5470	0.0501
<i>Y</i> Sagittarii (<i>var.</i>)	5.4	2.85	7.7	18 53.7	25 1 40.6	-0 22.3	-1.2762	0.5467	0.0552
21 Sagittarii	5.0	2.89	7.6	20 35.0	3 32.1	+1 25.6	+0.6988	0.5465	0.0584
95 B. Sagittarii	5.7	2.87	8.3	18 46.7	5 52.4	+3 41.4	-1.1571	0.5462	0.0624
171 B. Sagittarii	6.1	+2.96	+10.5	-19 21.7	21 35.0	-5 6.4	+0.6733	0.5437	+0.0884
173 B. Sagittarii	6.4	2.96	10.6	19 13.1	21 36.7	-5 4.7	+0.5179	0.5437	0.0884
187 B. Sagittarii	6.4	2.96	10.9	18 51.7	23 33.0	-3 12.1	+0.2991	0.5434	0.0915
190 B. Sagittarii	5.4	2.98	10.9	19 24.9	26 0 5.3	-2 40.8	+0.9588	0.5433	0.0924
<i>d</i> Sagittarii	5.0	3.00	11.6	19 5.7	4 36.0	+1 41.4	+1.0380	0.5425	0.0995
<i>p</i> Sagittarii	4.0	+2.98	+12.2	-17 59.8	6 34.0	+3 35.6	+0.0290	0.5421	+0.1025
45 Sagittarii	6.0	3.00	12.0	18 27.4	6 38.3	+3 39.7	+0.5406	0.5421	0.1026
267 B. Sagittarii	5.8	3.04	13.1	18 24.5	14 0.2	+10 47.6	+1.2825	0.5407	0.1136
54 Sagittarii	5.4	3.02	13.8	16 28.6	15 48.6	-11 27.4	-0.6293	0.5404	0.1163
<i>e</i> Sagittarii	5.2	3.02	14.0	16 18.7	16 41.0	-10 36.7	-0.7081	0.5403	0.1175
<i>g</i> Sagittarii	5.1	+3.05	+15.1	-15 42.2	27 0 12.5	-3 19.5	-0.4480	0.5389	+0.1281
16 B. Capricorni	6.2	3.12	16.8	15 2.2	11 23.3	+7 30.3	+0.3407	0.5370	0.1428
β Capricorni	3.2	3.12	16.8	15 2.0	11 30.3	+7 37.1	+0.3539	0.5370	0.1430
45 B. Capricorni	6.1	3.16	17.9	13 59.7	18 0.0	-10 5.3	+0.1791	0.5361	0.1509
84 B. Capricorni	6.0	3.21	19.0	12 50.4	28 2 9.2	-2 11.4	+0.1943	0.5350	0.1602
16 B. Aquarii	6.4	+3.20	+19.6	-11 52.5	3 21.1	-1 1.7	-0.6569	0.5349	+0.1615
<i>v</i> Aquarii	4.5	3.26	20.3	11 41.7	11 30.9	+6 52.9	+0.5024	0.5342	0.1700
51 G. Aquarii	6.5	3.27	20.8	10 56.1	13 50.8	+9 8.4	+0.0834	0.5341	0.1723
17 Aquarii	6.3	3.29	21.6	9 39.6	18 9.1	-10 41.3	-0.5375	0.5340	0.1763
19 Aquarii	5.6	3.31	21.4	10 5.3	19 16.5	-9 35.9	+0.1216	0.5339	0.1773
ξ Aquarii	4.8	+3.35	+22.7	-8 12.7	29 1 30.0	-3 34.0	-0.7673	0.5339	+0.1827
<i>c</i> ¹ Capricorni	5.3	3.38	22.5	9 26.9	5 5.1	-0 5.5	+1.2144	0.5340	0.1855
30 Aquarii	5.6	3.45	24.0	6 54.5	14 8.5	+8 41.0	+0.2146	0.5346	0.1920
138 B. Aquarii	6.4	3.48	24.8	5 6.8	18 49.4	-10 46.8	-0.7814	0.5352	0.1950
44 Aquarii	5.7	3.50	24.7	5 47.1	20 58.4	-8 41.8	+0.3502	0.5355	0.1962
51 Aquarii	5.8	+3.54	+25.0	-5 14.4	30 0 25.2	-5 21.6	+0.4530	0.5360	+0.1981
187 B. Aquarii	6.3	3.56	25.8	3 19.1	3 57.6	-1 55.8	-0.8686	0.5367	0.1998
κ Aquarii	5.2	3.60	25.4	4 38.3	7 6.6	+1 7.4	+1.1525	0.5374	0.2012
207 B. Aquarii	6.3	3.62	25.8	3 58.1	8 35.8	+2 33.7	+0.7464	0.5377	0.2019
6 G. Piscium	6.2	3.70	26.2	2 49.3	17 5.2	+10 47.0	+1.2666	0.5400	0.2047
3 Piscium	6.3	+3.72	+27.2	-0 14.5	18 14.5	+11 54.2	-1.1919	0.5404	+0.2050

DECEMBER.

22 B. Piscium	6.4	+3.85	+27.2	-0 8.7	1 5 13.4	-1 27.9	+0.9727	0.5444	+0.2069
κ Piscium	4.9	+3.87	+27.4	+0 49.2	6 50.5	+0 6.0	+0.3066	0.5450	+0.2070
9 Piscium	6.4	3.87	27.4	0 41.1	6 59.5	+0 14.6	+0.4770	0.5451	0.2070
16 Piscium	5.7	3.92	27.7	1 39.6	11 19.5	+4 26.3	+0.3646	0.5470	0.2070
λ Piscium	4.6	3.94	27.3	1 20.5	13 59.2	+7 0.7	+1.2428	0.5483	0.2069
19 Piscium	5.4	3.98	27.9	3 2.7	16 1.2	+8 58.7	-0.0917	0.5492	0.2067
22 Piscium	5.8	+4.02	+27.6	+2 29.3	18 37.1	+11 29.5	+1.0170	0.5505	+0.2082

OCCULTATIONS, 1919.

603

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Magn.	Red'ns from 1919.0.		Apparent Declina- tion.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
51 Piscium	5.6	+4.28	+27.7	+ 6 31.0	2 13 5.5	+ 5 20.5	+0.6569	0.5613	+0.1999	+84	0
136 B. Piscium	6.5	4.36	27.9	8 55.3	17 1.2	+ 9 8.0	-0.9993	0.5639	0.1976	-21	-82
π Piscium	5.6	4.74	25.3	11 44.1	3 17 6.2	+ 8 21.2	+0.7024	0.5813	0.1759	+90	+ 6
12 H ¹ . Arietis	6.3	4.91	23.5	13 5.6	4 3 36.7	- 5 32.0	+1.1243	0.5894	0.1621	+90	+37
19 Arietis	5.8	5.03	22.9	14 54.4	7 50.2	- 1 28.2	-0.0032	0.5926	0.1557	+37	-30
36 Arietis	6.5	+5.25	+20.2	+17 25.6	20 13.6	+10 26.1	-0.6881	0.6017	+0.1344	- 2	-72
40 Arietis	6.0	5.29	19.9	17 57.2	21 52.1	-11 59.4	-0.9868	0.6028	0.1313	-21	-73
π Arietis	5.2	5.26	19.7	17 8.0	22 10.3	-11 42.0	-0.1409	0.6030	0.1308	+29	-35
124 B. Arietis	6.4	5.25	19.0	16 9.5	23 41.6	-10 14.2	+1.0146	0.6040	0.1278	+90	+32
45 Arietis	6.0	5.32	19.1	18 0.6	5 0 41.7	- 9 16.6	-0.6783	0.6047	0.1258	- 1	-70
ρ Arietis	5.6	+5.33	+18.8	+17 42.4	0 55.8	- 9 3.0	-0.3503	0.6048	+0.1254	+18	-47
53 Arietis	6.0	5.35	17.7	17 34.4	5 10.8	- 4 58.4	+0.2951	0.6076	0.1169	+55	-10
54 Arietis	6.5	5.39	17.7	18 29.4	5 31.3	- 4 38.7	-0.5649	0.6078	0.1161	+ 5	-61
175 B. Arietis	6.4	5.46	15.5	18 28.7	12 38.7	+ 2 11.2	+0.2200	0.6120	0.1007	+50	-12
13 Tauri	5.6	5.55	13.6	19 26.7	18 23.0	+ 7 41.3	-0.1864	0.6150	0.0876	+26	-34
14 Tauri	6.2	+5.56	+13.4	+19 24.8	18 55.9	+ 8 12.7	-0.1076	0.6153	+0.0864	+31	-29
43 Tauri	5.5	5.63	10.1	19 23.9	6 4 22.7	- 6 44.2	+0.6156	0.6191	0.0635	+83	+13
ω Tauri	4.8	5.68	9.1	20 23.0	7 21.9	- 3 52.6	-0.1672	0.6200	0.0560	+27	-29
51 Tauri	5.6	5.73	9.0	21 23.1	7 45.8	- 3 29.7	-1.1235	0.6201	0.0550	-35	-69
53 Tauri	5.3	5.71	8.8	20 57.0	8 9.5	- 3 7.1	-0.6772	0.6202	0.0540	- 2	-66
224 B. Tauri	6.1	+5.70	+ 8.5	+20 38.0	9 14.9	- 2 4.4	-0.3107	0.6205	+0.0513	+19	-38
227 B. Tauri	5.9	5.71	8.3	20 47.8	9 40.4	- 1 40.0	-0.4485	0.6206	0.0502	+12	-47
247 B. Tauri	5.8	5.75	7.7	21 26.5	11 18.6	- 0 5.9	-1.0000	0.6210	0.0460	-24	-69
282 B. Tauri	6.4	5.68	6.6	19 43.1	14 9.8	+ 2 37.9	+0.8046	0.6216	0.0387	+90	+26
129 H ¹ . Tauri	5.8	5.72	6.3	20 31.5	15 5.5	+ 3 31.3	+0.0513	0.6217	0.0363	+40	-15
ι Tauri	4.7	+5.79	+ 2.8	+21 28.6	7 0 11.0	-11 46.5	-0.6560	0.6224	+0.0125	- 1	-61
330 B. Tauri	6.3	5.77	2.7	21 10.0	0 39.1	-11 19.6	-0.3475	0.6224	0.0113	+17	-37
333 B. Tauri	6.3	5.70	2.5	19 41.8	1 6.0	-10 53.8	+1.0924	0.6224	0.0101	+90	+49
l Tauri	5.2	5.73	2.2	20 18.8	1 55.7	-10 6.3	+0.4980	0.6223	0.0079	+71	+11
105 Tauri	6.0	5.79	2.2	21 36.0	1 57.2	-10 4.9	-0.7584	0.6223	0.0078	- 7	-69
107 Tauri	6.5	+5.71	+ 2.1	+19 45.4	2 18.7	- 9 44.3	+1.0447	0.6223	+0.0069	+90	+46
n Tauri	5.1	5.81	0.5	22 0.8	6 6.7	- 6 6.0	-1.1543	0.6220	-0.0031	-39	-68
351 B. Tauri	6.2	5.72	0.6	20 3.1	6 7.6	- 6 5.1	+0.7644	0.6220	0.0031	+90	+27
353 B. Tauri	6.5	5.71	+ 0.4	19 44.0	6 45.2	- 5 29.2	+1.0724	0.6219	0.0048	+90	+48
o Tauri	4.8	5.80	- 0.6	21 52.1	9 11.0	- 3 9.7	-1.0347	0.6216	0.0111	-27	-69
372 B. Tauri	6.1	+5.73	- 1.4	+20 25.0	11 24.8	- 1 1.5	+0.3534	0.6212	-0.0169	+60	+ 2
ζ Tauri	3.0	5.76	2.0	21 5.6	12 52.5	+ 0 22.5	-0.3358	0.6209	0.0208	+18	-37
B. D. +19°1110	6.0	5.69	3.9	19 50.8	18 20.2	+ 5 36.3	+0.7336	0.6193	0.0348	+90	+22
χ^1 Orionis	4.5	5.69	4.3	20 15.7	19 4.6	+ 6 18.8	+0.3012	0.6191	0.0367	+56	- 2
57 Orionis	5.8	5.68	4.3	19 44.0	19 17.1	+ 6 30.9	+0.8105	0.6190	0.0372	+90	+27
64 Orionis	5.1	+5.66	- 5.4	+19 41.5	22 26.8	+ 9 32.5	+0.7222	0.6178	-0.0452	+90	+21
χ^2 Orionis	4.7	5.68	5.5	20 8.4	22 36.8	+ 9 42.1	+0.2746	0.6177	0.0457	+54	- 4
68 Orionis	5.7	5.65	6.6	19 48.5	8 1 38.3	-11 23.9	+0.4513	0.6165	0.0532	+67	+ 5
71 Orionis	5.1	5.62	7.1	19 11.0	2 42.4	-10 22.6	+1.0071	0.6160	0.0558	+90	+39
15 Geminorum	6.5	5.66	8.8	20 50.3	7 32.4	- 5 44.6	-0.9181	0.6136	0.0675	-18	-70
16 Geminorum	6.2	+5.64	- 8.8	+20 32.6	7 36.4	- 5 40.8	-0.6331	0.6136	-0.0677	+ 1	-63
ν Geminorum	4.1	5.63	8.9	20 15.7	7 59.6	- 5 18.5	-0.3826	0.6134	0.0686	+15	-44
74 B. Geminorum	6.2	5.50	11.0	18 16.8	15 1.2	+ 1 25.6	+1.0333	0.6093	0.0849	+90	+38
110 B. Geminorum	6.2	5.44	12.8	17 52.1	20 48.5	+ 6 58.9	+0.9137	0.6055	0.0976	+90	+28
162 B. Geminorum	5.7	5.30	16.1	17 15.3	9 8 20.6	- 5 56.5	+0.2616	0.5971	0.1210	+53	-15
f Geminorum	5.3	+5.28	-17.0	+17 51.3	11 24.1	- 3 0.2	-0.7156	0.5947	-0.1267	- 3	-

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S						AT CONJUNCTION IN R. A.						Limit- ing Par- allels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declina- tion.	Greenwich Mean Time.	Hour Angle, H	Y'	x'	y'	N.	S.		
		$\Delta\alpha$	$\Delta\delta$										
		α	δ	α	d h m	h m				α	δ		
1	Cancr	6.0	+5.14	-18.5	+16 0.1	9 18 31.0	+ 3 50.2	+0.1895	0.5890	-0.1390	+49-18		
2 B.	Cancr	6.0	5.16	18.8	16 44.0	19 8.1	+ 4 25.9	-0.6285	0.5885	0.1401	+ 1-69		
5	Cancr	5.9	5.14	19.1	16 40.5	20 21.4	+ 5 36.4	-0.7430	0.5875	0.1421	- 5-74		
30 B.	Cancr	6.1	5.04	19.6	14 51.9	10 0 17.6	+ 9 23.8	+0.5025	0.5842	0.1483	+70- 2		
29	Cancr	5.9	4.94	21.2	14 28.4	7 41.9	- 7 28.3	-0.2410	0.5781	0.1588	+24-44		
84 B.	Cancr	6.4	+4.89	-21.4	+13 31.7	9 53.4	- 5 21.6	+0.3630	0.5763	-0.1617	+59-12		
A ¹	Cancr	5.5	4.82	22.0	12 58.0	13 57.0	- 1 26.8	+0.2667	0.5730	0.1668	+53-17		
A ²	Cancr	5.7	4.79	22.2	12 24.1	15 34.2	+ 0 6.9	+0.5682	0.5716	0.1687	+76- 1		
60	Cancr	5.7	4.73	22.7	11 55.8	19 29.4	+ 3 53.7	+0.3792	0.5685	0.1731	+60-12		
α	Cancr	4.3	4.72	22.9	12 9.9	20 36.6	+ 4 58.6	-0.0552	0.5676	0.1743	+34-36		
κ	Cancr	5.1	+4.65	-23.2	+10 59.3	11 0 42.8	+ 8 56.1	+0.4225	0.5644	-0.1784	+64-10		
209 B.	Cancr	6.5	4.65	23.7	11 53.3	1 36.5	+ 9 47.9	-0.6574	0.5637	0.1793	+ 1-76		
222 B.	Cancr	6.3	4.61	24.1	11 50.1	5 13.6	-10 42.4	-1.2590	0.5609	0.1825	-46-79		
ω	Leonis	5.5	4.51	24.0	9 24.2	10 2.3	- 6 3.7	+0.3475	0.5573	0.1864	+58-15		
3	Leonis	5.8	4.49	23.8	8 32.2	10 3.8	- 6 2.1	+1.2353	0.5573	0.1864	+90+44		
h	Leonis	5.2	+4.49	-24.4	+10 4.0	11 38.0	- 4 31.2	-0.6336	0.5562	-0.1876	+ 2-76		
10 B.	Sextantis	6.0	4.37	24.2	7 4.6	18 12.2	+ 1 49.8	+1.2068	0.5515	0.1919	+90+40		
25 B.	Sextantis	6.3	4.32	24.3	6 20.0	21 43.8	+ 5 14.5	+1.2984	0.5492	0.1939	+88+52		
14	Sextantis	6.3	4.24	24.7	6 0.0	12 3 53.9	+11 12.4	+0.4432	0.5453	0.1968	+65-12		
19	Sextantis	5.9	4.19	24.6	5 0.5	6 46.2	-10 0.9	+0.9114	0.5436	0.1979	+90+15		
155 B.	Leonis	6.5	+4.13	-25.3	+ 6 5.9	11 47.0	- 5 9.7	-1.2246	0.5408	-0.1995	-40-84		
237 B.	Leonis	6.3	3.96	24.3	1 26.9	13 1 58.0	+ 8 34.7	+0.8161	0.5339	0.2018	+90+ 8		
55	Leonis	6.1	3.95	24.2	1 9.7	3 41.2	+10 14.7	+0.7720	0.5332	0.2019	+90+ 6		
p ¹	Leonis	6.1	3.90	24.0	0 25.7	7 37.6	- 9 56.1	+0.7553	0.5316	0.2018	+90+ 4		
p ⁵	Leonis	5.3	3.84	24.0	0 21.9	12 42.4	- 5 0.7	-0.1999	0.5298	0.2014	+26-49		
388 B.	Leonis	6.3	+3.77	-23.4	- 1 15.6	19 50.2	+ 1 54.2	+0.1000	0.5276	-0.2003	+43-32		
e	Leonis	5.1	3.77	23.0	2 33.8	21 3.8	+ 3 5.6	+1.2474	0.5273	0.2000	+88+42		
431 B.	Leonis	6.2	3.72	23.0	1 59.7	14 1 10.2	+ 7 4.5	-0.1792	0.5263	0.1990	+27-47		
78 B.	Virginis	6.5	3.57	21.2	5 16.5	19 31.5	+ 0 52.9	-0.2397	0.5235	0.1917	+23-51		
x	Virginis	4.8	3.48	19.8	7 33.3	15 8 23.0	-10 38.3	-0.1834	0.5231	0.1842	+25-48		
ψ	Virginis	5.0	+3.44	-18.7	- 9 6.3	16 9.4	- 3 5.7	+0.0954	0.5233	-0.1787	+40-32		
49	Virginis	5.2	3.40	17.7	10 18.8	23 6.8	+ 3 39.3	+0.1929	0.5240	0.1731	+45-26		
50	Virginis	6.2	3.39	17.8	9 54.2	16 0 4.3	+ 4 35.0	-0.4218	0.5241	0.1723	+11-63		
α	Virginis (<i>Spica</i>)	1.2	3.34	16.8	10 44.6	7 59.0	-11 44.4	-0.8371	0.5251	0.1654	-14-90		
i	Virginis	5.7	3.36	16.2	12 17.5	8 45.6	-10 59.2	+0.7351	0.5252	0.1646	+78+ 4		
550 B.	Virginis	6.0	+3.34	-15.6	-12 48.2	12 49.0	- 7 3.0	+0.6396	0.5259	-0.1607	+74- 2		
86	Virginis	5.6	3.29	15.2	12 1.5	18 33.5	- 1 28.9	-1.1244	0.5270	0.1549	-36-90		
621 B.	Virginis	6.4	3.28	13.4	14 35.2	17 3 55.2	+ 7 36.0	+0.2980	0.5290	0.1446	+48-21		
26	Librae	6.3	3.15	7.9	17 28.1	18 14 45.0	+ 6 38.4	-0.7797	0.5382	0.0985	-18-90		
28	Librae	6.2	3.15	7.4	17 52.0	17 50.3	- 3 39.0	-0.6347	0.5391	0.0939	-10-85		
150 B.	Librae	6.1	+3.17	- 6.2	-19 53.4	23 5.1	+ 1 26.0	+1.1417	0.5405	-0.0858	+71+37		
11 H.	Librae	5.4	3.16	6.2	19 23.8	23 31.3	+ 1 51.4	+0.5563	0.5406	0.0852	+59- 6		
41	Librae	5.3	3.15	5.8	19 2.2	19 2 34.5	+ 4 48.7	-0.0962	0.5414	0.0803	+18-43		
κ	Librae	5.0	3.14	5.5	19 25.1	4 2.7	+ 6 14.2	+0.2112	0.5418	0.0780	+35-25		
λ	Librae	5.1	3.13	4.5	19 55.6	9 31.8	+11 32.8	+0.3734	0.5431	0.0691	+44-16		
47	Librae	5.8	+3.11	- 4.5	-19 8.8	10 20.8	-11 39.8	-0.5514	0.5433	-0.0678	- 8-76		
10 G.	Scorpii	5.9	3.15	4.0	20 45.0	11 36.4	-10 26.6	+1.1482	0.5436	0.0657	+70+38		
β	Scorpii	2.9	3.10	3.6	19 35.1	15 20.9	- 6 49.3	-0.3806	0.5444	0.0594	0-62		
56 B.	Scorpii	5.0	3.10	3.6	19 34.9	15 21.1	- 6 49.1	-0.3851	0.5444	0.0594	0-62		
ω	Scorpii	4.3	3.12	3.4	20 27.1	15 59.6	- 6 11.9	+0.5445	0.5446	0.0584	+55- 6		
-	Scorpii	4.6	+3.13	- 3.3	-20 39.1	16 16.4	- 5 55.5	+0.7507	0.5446	-0.0579	+70+ 8		

OCCULTATIONS, 1919.

605

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1919.0.		Apparent Declination.	Greenwich Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
<i>r</i> Scorpii	3.9	+3.08	- 3.1	-19 15.1	19 18 29.6	- 3 46.6	-0.9301	0.5451	-0.0542	-32	-90
84 B. Scorpii	6.3	3.12	2.7	20 54.2	19 39.5	- 2 39.0	+0.8440	0.5454	0.0522	+70	+13
51 G. Scorpii	6.5	3.12	2.5	21 6.2	20 50.9	- 1 29.9	+1.0061	0.5456	0.0501	+69	+25
58 G. Scorpii	6.2	3.09	- 2.4	20 1.3	21 53.3	- 0 29.4	-0.2483	0.5458	-0.0483	+ 7	-52
NEW MOON.											
<i>g</i> Sagittarii	5.1	+2.95	+14.5	-15 42.2	24 5 54.5	+ 4 10.0	-0.5400	0.5418	+0.1279	- 1	-74
16 B. Capricorni	6.2	2.98	16.1	15 2.2	17 2.2	- 9 3.4	+0.2386	0.5395	0.1426	+44	-24
β Capricorni	3.2	2.98	16.1	15 2.0	17 9.1	- 8 56.7	+0.2517	0.5395	0.1427	+44	-23
27 G. Capricorni	6.2	3.00	16.5	15 19.4	22 4.8	- 4 10.3	+1.2850	0.5385	0.1488	+75	+53
45 B. Capricorni	6.1	+2.99	+17.0	-13 59.8	23 37.6	- 2 40.3	+0.0708	0.5382	+0.1506	+35	-33
84 B. Capricorni	6.0	3.02	18.0	12 50.4	25 7 46.0	+ 5 12.7	+0.0790	0.5367	0.1599	+36	-33
16 B. Aquarii	6.4	3.00	18.4	11 52.5	8 57.8	+ 6 22.4	-0.7758	0.5365	0.1612	-10	-90
<i>v</i> Aquarii	4.5	3.04	19.2	11 41.7	17 7.9	- 9 42.7	+0.3806	0.5352	0.1695	+56	-16
51 G. Aquarii	6.5	3.04	19.5	10 56.1	19 28.1	- 7 26.8	-0.0420	0.5348	0.1717	+31	-39
17 Aquarii	6.3	+3.05	+20.2	- 9 39.6	23 47.2	- 3 15.6	-0.6692	0.5343	+0.1757	- 3	-86
19 Aquarii	5.6	3.07	20.0	10 5.3	26 0 54.9	- 2 10.1	-0.0077	0.5342	0.1766	+33	-37
ξ Aquarii	4.8	3.09	21.2	8 12.7	7 10.3	+ 3 53.7	-0.9063	0.5335	0.1818	-17	-90
<i>c</i> Capricorni	5.3	3.12	21.1	9 26.9	10 46.9	+ 7 23.7	+1.0847	0.5332	0.1846	+81	+27
30 Aquarii	5.6	3.17	22.3	6 54.5	19 55.1	- 7 45.0	+0.0732	0.5328	0.1908	+40	-33
138 B. Aquarii	6.4	+3.19	+23.0	- 5 6.8	27 0 39.3	- 3 9.5	-0.9337	0.5328	+0.1936	-17	-90
44 Aquarii	5.7	3.22	23.0	5 47.1	2 49.9	- 1 2.8	+0.2062	0.5329	0.1947	+48	-26
51 Aquarii	5.8	3.25	23.2	5 14.5	6 19.5	+ 2 20.2	+0.3084	0.5331	0.1965	+55	-20
187 B. Aquarii	6.3	3.26	24.0	3 19.2	9 55.2	+ 5 49.2	-1.0274	0.5333	0.1981	-23	-90
κ Aquarii	5.2	3.30	23.5	4 38.4	13 7.3	+ 8 55.6	+1.0123	0.5335	0.1994	+86	+21
207 B. Aquarii	6.3	+3.32	+23.9	- 3 58.1	14 38.1	+10 23.5	+0.6018	0.5337	+0.1999	+77	- 4
6 G. Piscium	6.2	3.40	24.3	2 49.4	23 17.4	- 5 13.2	+1.1261	0.5350	0.2025	+88	+30
22 B. Piscium	6.4	3.54	25.3	- 0 8.8	28 11 42.7	+ 6 48.8	+0.8280	0.5378	0.2042	+90	+ 9
κ Piscium	4.9	3.56	25.4	0 49.1	13 22.4	+ 8 25.4	+0.1529	0.5383	0.2042	+46	-29
9 Piscium	6.4	3.56	25.4	0 41.1	13 31.6	+ 8 34.2	+0.3256	0.5383	0.2042	+56	-19
16 Piscium	5.7	+3.60	+25.8	+ 1 39.6	17 58.7	-11 7.0	+0.2117	0.5397	+0.2041	+49	-25
λ Piscium	4.6	3.63	25.4	1 20.5	20 43.1	- 8 27.9	+1.1029	0.5406	0.2039	+90	+28
19 Piscium	5.4	3.67	26.0	3 2.7	22 48.7	- 6 26.3	-0.2510	0.5413	0.2036	+23	-51
22 Piscium	5.8	3.70	25.7	2 29.2	29 1 29.2	- 3 50.9	+0.8747	0.5423	0.2032	+90	+12
51 Piscium	5.6	3.99	25.9	6 30.9	20 35.0	- 9 22.3	+0.5150	0.5511	0.1965	+70	- 8
136 B. Piscium	6.5	+4.07	+26.3	+ 8 55.2	30 0 39.2	- 5 26.3	-1.1680	0.5533	+0.1942	-35	-82
δ Piscium	4.6	4.11	25.3	7 9.1	4 5.0	- 2 7.2	+1.3145	0.5553	0.1921	+84	+56
π Piscium	5.6	4.51	24.0	11 44.1	31 1 40.8	- 5 16.3	+0.5799	0.5692	0.1730	+77	- 1
12 H ¹ . Arietis	6.3	4.71	22.4	13 5.6	12 36.7	+ 5 16.0	+1.0191	0.5771	0.1595	+90	+29
19 Arietis	5.8	+4.84	+22.0	+14 54.4	17 0.4	+ 9 30.0	-0.1243	0.5803	+0.1534	+30	-37

OCCULTATIONS VISIBLE AT WASHINGTON.

Date.	THE STAR'S		IMMERISION.				EMERISION.				Duration of Occultation.
			Washington.		Angle from—		Washington.		Angle from—		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
Jan. 7	19 Piscium	5.4	h m	h m	°	°	h m	h m	°	°	h m
10	27 Arietis	6.4	1 39	6 33	88	54	2 44	7 38	214	171	1 5
11	14 H ¹ . Tauri	6.5	6 22	11 0	32	338	7 5	11 42	219	263	0 21
11	22 H ¹ . Tauri	6.1	8 52	13 29	47	352	9 35	14 12	219	256	0 43
15	f Geminorum	5.3	5 26	9 48	138	185	6 34	10 56	253	283	1 8
19	p ² Leonis	6.1	7 0	11 6	147	195	8 3	12 9	266	308	1 3
Feb. 8	51 Tauri	5.6	4 36	7 24	84	69	5 59	8 46	266	219	1 23
8	56 Tauri	5.2	5 32	8 20	45	5	6 32	9 19	309	257	1 0
8	247 B. Tauri	5.8	9 40	12 27	75	19	10 34	13 21	291	238	0 54
9	106 Tauri	6.2	3 6	5 50	13	64	3 30	6 14	337	24	0 24
9	n Tauri	5.1	4 50	7 34	81	96	6 18	8 57	282	248	1 23
9	o Tauri	4.8	9 34	12 17	69	11	10 28	13 10	310	254	0 54
10	15 Geminorum	6.5	10 8	12 47	71	14	11 1	13 40	320	263	0 53
10	16 Geminorum	6.2	10 20	12 59	133	77	11 17	13 55	257	261	0 56
12	29 Cancrī	† 5.9	15 8	17 39	64	14	15 44	18 14	334	287	0 35
14	14 Sextantis	6.3	14 29	16 52	93	42	15 27	17 49	318	266	0 57
15	237 B. Leonis	6.3	13 24	15 43	115	76	14 38	16 56	308	256	1 14
15	55 Leonis	6.1	15 39	17 57	77	27	16 23	18 46	331	280	0 49
21	147 B. Libræ	† 6.2	10 14	12 10	78	139	11 11	13 7	319	4	0 57
Mar. 6	54 Arietis	6.5	9 5	10 10	95	42	9 57	11 2	255	206	0 52
8	i Tauri	4.7	6 6	7 3	137	100	7 4	8 1	229	178	0 58
8	105 Tauri	6.0	8 34	9 31	88	31	9 40	10 37	286	229	1 6
11	2 B. Cancrī	6.0	7 47	8 32	75	78	8 54	9 39	331	303	1 7
12	α Cancrī	4.3	13 16	13 57	66	13	13 57	14 37	343	290	0 41
20	i Libræ	4.7	10 23	10 32	91	139	11 29	11 38	309	350	1 6
24	128 B. Sagittarii	6.3	13 59	13 52	96	143	15 10	15 3	260	300	1 11
Apr. 8	A ¹ Cancrī	5.5	13 20	12 14	105	52	14 19	13 14	300	248	0 59
9	ω Leonis	5.5	10 32	9 23	127	102	11 53	10 44	294	251	1 21
11	p ³ Leonis	6.1	11 18	10 1	104	98	12 39	11 22	321	293	1 21
21	226 B. Sagittarii	6.4	16 7	14 10	70	107	17 28	15 31	270	294	1 21
May 4	162 B. Geminorum†	5.7	13 48	11 0	109	57	14 39	11 51	284	236	0 51
8	237 B. Leonis	6.3	14 3	10 59	52	8	14 33	11 29	2	316	0 30
14	147 B. Libræ	6.2	11 52	8 25	152	193	12 47	9 20	246	278	0 55
14	172 B. Libræ	5.9	16 59	13 31	99	80	18 27	14 59	274	240	1 28
17	14 Sagittarii	5.6	17 8	13 29	89	102	18 41	15 1	255	248	1 32
18	195 B. Sagittarii	6.3	19 38	15 54	102	94	20 52	17 8	220	197	1 14
26	19 Arietis	5.8	20 0	15 44	66	118	20 52	16 37	254	308	0 53
June 2	60 Cancrī	5.7	13 38	8 56	70	17	14 21	9 39	336	284	0 43
15	267 B. Sagittarii	† 5.8	14 25	8 52	48	97	15 20	9 47	298	343	0 55
16	27 G. Capricorni	6.2	15 53	10 16	87	134	17 4	11 26	244	284	1 10
23	π Arietis	5.2	21 12	15 6	57	110	22 6	16 1	265	320	0 54
29	84 B. Cancrī	† 6.4	15 6	8 38	83	32	15 51	9 22	315	267	0 45
July 12	226 B. Sagittarii	6.4	15 38	8 18	76	117	16 56	9 36	267	297	1 18
18	51 Piscium	5.6	18 11	10 28	90	141	19 3	11 19	224	276	0 51
21	175 B. Arietis	6.4	21 2	13 6	116	168	21 42	13 46	212	266	0 40
23	ζ Tauri	3.0	0 9	16 5	55	110	1 0	16 56	295	352	0 51
Aug. 7	14 Sagittarii	5.6	20 39	11 37	142	111	21 12	12 9	190	154	0 32

NOTE.—The angles of position are counted from the north point and vertex of the Moon's limb toward the east.
† Immersion below the horizon of Washington. ‡ Emerison below the horizon of Washington.

OCCULTATIONS VISIBLE AT WASHINGTON.

Date.	THE STAR'S		IMMERSION.				EMERSION.				Duration of Occul-tation.
			Washington.		Angle from—		Washington.		Angle from—		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Ver-tex.	Sidereal Time.	Mean Time.	North Point.	Ver-tex.	
Aug. 11	c ¹ Capricorni	5.3	h m 20 44	h m 11 25	° 80	° 94	h m 22 2	h m 12 43	° 222	° 216	h m 1 18
12	κ Aquarii	5.2	21 30	12 8	107	124	22 24	13 2	191	193	0 54
12	207 B. Aquarii	6.3	23 48	14 25	64	44	1 3	15 40	234	199	1 15
13	22 B. Piscium	6.4	17 55	8 30	64	116	18 56	9 30	249	298	1 0
13	16 Piscium	5.7	2 17	16 50	57	16	3 26	17 59	250	202	1 9
17	53 Arietis	6.0	20 18	10 36	66	116	21 9	11 27	262	315	0 51
18	ω Tauri	4.8	0 49	15 2	50	106	1 52	16 6	283	335	1 3
31	25 Libræ	6.0	17 6	6 30	127	101	18 22	7 46	251	213	1 16
Sept. 5	267 B. Sagittarii	5.8	20 43	9 46	91	75	21 58	11 1	226	195	1 15
8	51 Aquarii †	5.8	3 29	16 19	40	350	4 20	17 10	273	221	0 51
16	χ ¹ Orionis	† 4.5	22 20	10 40	81	127	23 10	11 30	273	324	0 50
16	χ ² Orionis	4.7	2 29	14 48	137	193	3 18	15 37	221	274	0 49
18	1 Cancri	6.0	1 34	13 46	110	162	2 31	14 42	266	320	0 56
Oct. 1	21 Sagittarii †	† 5.0	22 31	9 52	57	13	23 34	10 54	274	223	1 3
2	d Sagittarii	5.0	23 17	10 34	146	102	23 35	10 52	176	130	0 18
5	c ¹ Capricorni	5.3	18 27	5 33	98	138	19 33	6 38	215	245	1 6
6	κ Aquarii	5.2	19 1	6 3	91	135	20 6	7 7	217	252	1 5
6	207 B. Aquarii	6.3	21 18	8 19	36	57	22 30	9 31	264	266	1 12
8	51 Piscium	5.6	23 6	10 0	64	91	0 23	11 16	238	240	1 16
13	372 B. Tauri †	† 6.1	22 15	8 48	36	84	22 48	9 21	314	5	0 33
16	84 B. Cancri †	† 6.4	1 17	11 38	101	150	2 11	12 32	280	331	0 54
16	Δ ¹ Cancri	5.5	6 4	16 24	107	154	7 25	17 46	293	323	1 21
17	ω Leonis †	† 5.5	2 48	13 5	114	165	3 44	14 2	276	329	0 57
Nov. 2	44 Aquarii	5.7	23 9	8 24	346	330	23 32	8 47	313	292	0 23
2	51 Aquarii	5.8	2 52	12 7	82	34	3 50	13 4	230	179	0 58
7	124 B. Arietis	6.4	20 35	5 31	136	187	20 59	5 55	190	243	0 24
7	53 Arietis	6.0	3 19	12 13	68	60	4 35	13 30	264	224	1 16
8	43 Tauri	5.5	1 49	10 40	130	180	2 34	11 24	205	246	0 45
9	1 Tauri	5.2	23 1	7 49	66	120	23 53	8 41	278	334	0 52
10	68 Orionis	5.7	23 19	8 3	65	115	0 7	8 50	292	346	0 48
11	162 B. Geminorum	5.7	8 54	17 32	54	16	9 36	18 14	346	300	0 42
14	14 Sextantis	6.3	5 6	13 33	123	175	6 12	14 38	279	328	1 6
27	16 B. Capricorni	6.2	23 35	7.12	19	340	0 24	8 1	293	248	0 49
27	β Capricorni	3.2	23 40	7.17	26	345	0 34	8 11	287	241	0 54
28	ν Aquarii	4.5	23 14	6 47	49	20	0 29	8 1	256	215	1 15
29	30 Aquarii	5.6	2 38	10 6	33	345	3 30	10 58	278	228	0 52
Dec. 2	51 Piscium	5.6	0 2	7 18	89	99	1 12	8 29	213	197	1 10
7	χ ¹ Orionis	4.5	6 56	13 52	86	51	8 8	15 4	292	241	1 12
7	64 Orionis	5.1	11 15	18 11	122	67	12 5	19 0	259	207	0 50
9	1 Cancri	6.0	5 17	12 5	77	126	6 24	13 13	313	350	1 8
-10	Δ ² Cancri	5.7	2 2	8 47	139	190	2 45	9 30	244	297	0 43
10	60 Cancri	5.7	6 20	13 4	116	161	7 38	14 22	287	316	1 18
13	388 B. Leonis	6.3	6 17	12 50	55	106	6 51	13 24	353	42	0 34
18	11 H. Libræ †	† 5.4	10 16	16 29	106	156	11 23	17 35	289	334	1 6
28	9 Piscium	6.4	3 41	9 15	64	15	4 44	10 18	250	198	1 3
28	κ Piscium	4.9	3 46	9 20	27	338	4 36	10 9	287	236	0 49

NOTE.—The angles of position are counted from the north point and vertex of the Moon's limb toward the east.
† Immersion below the horizon of Washington. ‡ Emergence below the horizon of Washington.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE SUN.
FOR GREENWICH MEAN NOON.

Date.	<i>P</i>	<i>B</i> ₀	<i>L</i> ₀	Date.	<i>P</i>	<i>B</i> ₀	<i>L</i> ₀
Jan. 1	+ 2.23	-3.10	247.64	July 5	- 1.10	+3.37	325.87
6	- 0.20	3.67	181.79	10	+ 1.17	3.89	250.70
11	2.62	4.21	115.94	15	3.42	4.38	193.53
16	5.00	4.72	50.10	20	5.64	4.85	127.37
21	7.31	5.19	344.27	25	7.79	5.28	61.22
26	- 9.54	-5.62	278.44	30	+ 9.87	+5.08	355.09
31	11.68	6.00	212.60	Aug. 4	11.87	6.03	288.96
Feb. 5	13.70	6.34	146.77	9	13.78	6.35	222.85
10	15.60	6.62	80.94	14	15.58	6.62	156.75
15	17.37	6.86	15.10	19	17.26	6.85	90.66
20	-19.00	-7.04	309.26	24	+18.83	+7.02	24.59
25	20.48	7.16	243.40	29	20.27	7.15	318.53
Mar. 2	21.80	7.23	177.54	Sept. 3	21.57	7.23	252.48
7	22.97	7.25	111.67	8	22.73	7.25	186.45
12	23.97	7.21	45.78	13	23.74	7.23	120.43
17	-24.81	-7.11	339.88	18	+24.60	+7.14	54.42
22	25.48	6.96	273.96	23	25.30	7.01	348.42
27	25.97	6.76	208.02	28	25.84	6.88	282.43
Apr. 1	26.28	6.51	142.07	Oct. 3	26.21	6.59	216.46
6	26.42	6.21	76.10	8	26.40	6.31	150.49
11	-26.37	-5.87	10.10	13	+26.40	+5.97	84.53
16	26.14	5.48	304.08	18	26.22	5.60	18.57
21	25.73	5.06	238.04	23	25.85	5.17	312.63
26	25.13	4.60	171.99	28	25.29	4.71	246.69
May 1	24.34	4.11	105.92	Nov. 2	24.53	4.22	180.76
6	-23.38	-3.59	39.82	7	+23.57	+3.68	114.84
11	22.24	3.05	333.71	12	22.41	3.12	48.91
16	20.93	2.48	267.59	17	21.07	2.54	343.00
21	19.46	1.90	201.44	22	19.53	1.93	277.10
26	17.83	1.31	135.29	27	17.82	1.31	211.20
31	-16.06	-0.71	69.13	Dec. 2	+15.95	+0.68	145.30
June 5	14.16	-0.11	2.96	7	13.93	+0.04	79.41
10	12.16	+0.49	296.78	12	11.78	-0.60	13.53
15	10.06	1.09	230.60	17	9.52	1.24	307.65
20	7.88	1.68	164.42	22	7.18	1.87	241.79
25	- 5.65	+2.26	98.23	27	+ 4.78	-2.48	175.93
30	- 3.38	+2.83	32.05	32	+ 2.35	-3.07	110.07

In the above table, *P* is the position-angle of the axis of rotation measured eastward from the north point of the disk, while *L*₀ and *B*₀ are the heliographic longitudes and latitudes, respectively, of the center of the disk. The longitudes are reckoned from the Solar Meridian which passed through the ascending node of the Sun's equator on the ecliptic, on January 1, 1854, Greenwich Mean Noon.

MEAN EQUATOR, ORBIT, AND MEAN LONGITUDE.

FOR GREENWICH MEAN NOON.

Date.	Mean Equator.			Orbit.		Mean Longitude. C	Mean Solar Days.	Motion in Mean Longitude.
	i	Δ	Ω'	Γ'	Ω			
1. 0	23 58.3	68 27.0	3 35.4	27 21.6	251 44.0	261 27.9	0.1	1 19.06
10	23 59.1	67 56.0	3 34.6	28 28.4	251 12.2	33 13.7	0.2	2 38.12
20	23 59.9	67 25.0	3 33.8	29 35.2	250 40.4	164 59.6	0.3	3 57.18
30	24 0.7	66 53.9	3 33.0	30 42.1	250 8.7	296 45.4	0.4	5 16.23
b. 9	24 1.4	66 22.9	3 32.2	31 48.9	249 36.9	68 31.2	0.5	6 35.29
							0.6	7 54.35
19	24 2.2	65 52.0	3 31.3	32 55.8	249 5.1	200 17.1	0.7	9 13.41
11	24 3.0	65 21.0	3 30.5	34 2.6	248 33.3	332 2.9	0.8	10 32.47
21	24 3.8	64 50.0	3 29.6	35 9.4	248 1.6	103 48.8	0.9	11 51.53
31	24 4.6	64 19.0	3 28.7	36 16.3	247 29.8	235 34.6	1.0	13 10.58
	24 5.3	63 48.1	3 27.8	37 23.1	246 58.0	7 20.4	2.0	26 21.17
							3.0	39 31.75
10	24 6.1	63 17.2	3 26.8	38 30.0	246 26.2	139 6.3	4.0	52 42.33
20	24 6.8	62 46.3	3 25.9	39 36.8	245 54.5	270 52.1	5.0	65 52.92
30	24 7.6	62 15.4	3 24.9	40 43.7	245 22.7	42 38.0	6.0	79 3.50
10	24 8.3	61 44.5	3 24.0	41 50.5	244 50.9	174 23.8	7.0	92 14.09
20	24 9.1	61 13.7	3 23.0	42 57.3	244 19.2	306 9.6	8.0	105 24.67
							9.0	118 35.25
30	24 9.8	60 42.8	3 22.0	44 4.2	243 47.4	77 55.5	10.0	131 45.84
ne 9	24 10.5	60 12.0	3 20.9	45 11.0	243 15.6	209 41.3		
19	24 11.3	59 41.2	3 19.9	46 17.9	242 43.8	341 27.1	Hours.	
29	24 12.0	59 10.4	3 18.8	47 24.7	242 12.1	113 13.0	1	0 32.94
ly 9	24 12.7	58 39.6	3 17.8	48 31.6	241 40.3	244 58.8	2	1 5.88
							3	1 38.82
19	24 13.5	58 8.9	3 16.7	49 38.4	241 8.5	16 44.7	4	2 11.76
29	24 14.2	57 38.1	3 15.6	50 45.2	240 36.7	148 30.5	5	2 44.70
ig. 8	24 14.9	57 7.4	3 14.5	51 52.1	240 5.0	280 16.3	6	3 17.65
18	24 15.6	56 36.6	3 13.3	52 58.9	239 33.2	52 2.2	7	3 50.59
28	24 16.3	56 5.9	3 12.2	54 5.8	239 1.4	183 48.0	8	4 23.53
							9	4 56.47
pt. 7	24 17.0	55 35.2	3 11.0	55 12.6	238 29.7	315 33.8	10	5 29.41
17	24 17.7	55 4.5	3 9.8	56 19.5	237 57.9	87 19.7	11	6 2.35
27	24 18.4	54 33.8	3 8.6	57 26.3	237 26.1	219 5.5	12	6 35.29
t. 7	24 19.1	54 3.2	3 7.4	58 33.1	236 54.3	350 51.4	13	7 8.23
17	24 19.8	53 32.5	3 6.2	59 40.0	236 22.6	122 37.2	14	7 41.17
							15	8 14.11
27	24 20.5	53 1.9	3 5.0	60 46.8	235 50.8	254 23.0	16	8 47.06
iv. 6	24 21.2	52 31.2	3 3.7	61 53.7	235 19.0	26 8.9	17	9 20.00
16	24 21.8	52 0.6	3 2.5	63 0.5	234 47.3	157 54.7	18	9 52.94
26	24 22.5	51 30.0	3 1.2	64 7.3	234 15.5	289 40.6	19	10 25.88
ic. 6	24 23.1	50 59.5	2 59.9	65 14.2	233 43.7	61 26.4	20	10 58.82
							21	11 31.76
16	24 23.8	50 28.9	2 58.6	66 21.0	233 11.9	193 12.2	22	12 4.70
26	24 24.4	49 58.3	2 57.3	67 27.9	232 40.2	324 58.1	23	12 37.64
36	24 25.1	49 27.8	2 56.0	68 34.7	232 8.4	96 43.9		

Daily motion of Γ' +0'.384Daily motion of Ω -3'.171

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR GREENWICH MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
	°	°	°	°	°	°	°
Jan. 1	-4.91	-2.70	0.00	+0.03	270.69	+0.71	358.69
2	5.11	4.02	0.00	0.03	282.87	0.73	353.20
3	5.03	5.15	0.00	0.03	295.06	0.75	348.10
4	4.70	6.02	0.00	0.03	307.25	0.78	343.65
5	4.15	6.55	0.00	0.03	319.43	0.80	340.06
6	-3.44	-6.71	0.00	+0.03	331.60	+0.82	337.49
7	2.60	6.47	0.00	0.03	343.77	0.85	336.10
8	1.68	5.84	0.00	0.03	355.94	0.88	336.01
9	-0.71	4.85	0.00	0.03	8.10	0.91	337.32
10	+0.28	3.57	0.00	0.03	20.24	0.94	340.07
11	+1.26	-2.06	0.00	+0.03	32.39	+0.97	344.17
12	2.20	-0.43	0.00	0.03	44.52	1.00	349.37
13	3.08	+1.22	0.00	0.03	56.66	1.04	355.27
14	3.84	2.79	+0.01	0.03	68.78	1.07	1.37
15	4.44	4.16	0.01	0.03	80.91	1.10	7.18
16	+4.82	+5.28	+0.01	+0.03	93.04	+1.12	12.35
17	4.94	6.09	0.01	0.03	105.16	1.15	16.68
18	4.77	6.56	+0.01	0.03	117.29	1.17	20.04
19	4.29	6.69	0.00	0.03	129.43	1.19	22.41
20	3.52	6.51	0.00	0.03	141.57	1.21	23.78
21	+2.50	+6.04	0.00	+0.03	153.71	+1.22	24.15
22	+1.28	5.31	0.00	0.03	165.86	1.23	23.51
23	-0.05	4.36	0.00	0.03	178.02	1.24	21.88
24	1.41	3.22	0.00	0.03	190.18	1.25	19.25
25	2.72	1.95	0.00	0.03	202.35	1.26	15.69
26	-3.87	+0.56	0.00	+0.03	214.52	+1.27	11.28
27	4.80	-0.87	0.00	0.03	226.70	1.27	6.21
28	5.41	2.28	0.00	0.02	238.89	1.28	0.74
29	5.66	3.62	-0.01	0.02	251.08	1.29	355.16
30	5.54	4.80	0.01	0.02	263.27	1.30	349.82
31	-5.04	-5.73	-0.01	+0.02	275.46	+1.31	345.02
Feb. 1	4.24	6.34	0.01	0.02	287.65	1.32	341.04
2	3.20	6.57	0.01	0.02	299.85	1.33	338.07
3	2.03	6.39	0.01	0.02	312.03	1.34	336.31
4	-0.83	5.82	0.01	0.02	324.22	1.36	335.89
5	+0.32	-4.87	-0.01	+0.02	336.40	+1.37	336.89
6	1.36	3.63	0.00	0.02	348.57	1.39	339.34
7	2.25	2.18	0.00	0.02	0.73	1.40	343.13
8	2.99	-0.60	0.00	0.02	12.89	1.42	348.03
9	3.59	+0.99	0.00	0.02	25.05	1.44	353.63
10	+4.05	+2.51	0.00	+0.02	37.19	+1.46	359.63
11	4.38	3.87	0.00	0.02	49.33	1.48	5.44
12	4.56	5.00	0.00	0.02	61.47	1.50	10.74
13	4.58	5.84	0.00	0.03	73.61	1.51	15.31
14	4.41	6.37	0.00	0.03	85.74	1.53	19.00
15	+4.02	+6.57	0.00	+0.03	97.88	+1.54	21.72
16	+3.38	+6.45	0.00	+0.03	110.02	+1.55	23.45

MOON, 1919.

611

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR GREENWICH MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
	"	"	"	"	"	"	"
Feb. 16	+3.38	+6.45	0.00	+0.03	110.02	+1.55	23.45
17	2.52	6.03	0.00	0.03	122.16	1.55	24.17
18	1.44	5.34	0.00	0.03	134.30	1.55	23.86
19	+0.20	4.43	-0.01	0.03	146.46	1.55	22.55
20	-1.16	3.33	0.01	0.02	158.61	1.55	20.24
21	-2.56	+2.10	-0.01	+0.02	170.77	+1.55	17.00
22	3.89	+0.76	0.01	0.02	182.94	1.54	12.90
23	5.08	-0.62	0.01	0.02	195.11	1.54	8.11
24	6.01	2.01	0.01	-0.02	207.29	1.53	2.84
25	6.60	3.32	0.01	0.02	219.48	1.52	357.34
26	-6.77	-4.51	-0.01	+0.02	231.67	+1.52	351.93
27	6.49	5.49	0.01	0.02	243.87	1.51	346.89
28	5.76	6.18	0.01	0.02	256.07	1.51	342.52
Mar. 1	4.61	6.50	0.01	0.02	268.28	1.50	339.07
2	3.16	6.41	0.01	0.02	280.48	1.50	336.78
3	-1.54	-5.90	-0.01	+0.02	292.69	+1.50	335.85
4	+0.10	4.98	0.01	0.02	304.89	1.49	336.41
5	1.62	3.74	0.01	0.02	317.09	1.49	338.51
6	2.93	2.26	0.01	0.02	329.28	1.49	342.07
7	3.98	-0.67	0.01	0.02	341.47	1.49	346.82
8	+4.74	+0.93	-0.01	+0.02	353.65	+1.50	352.39
9	5.23	2.46	0.01	0.02	5.83	1.50	358.31
10	5.48	3.81	0.01	0.02	18.00	1.50	4.14
11	5.53	4.94	0.01	0.02	30.16	1.51	9.52
12	5.37	5.80	0.01	0.02	42.32	1.51	14.22
13	+5.04	+6.34	-0.01	+0.02	54.48	+1.51	18.10
14	4.54	6.57	0.01	0.02	66.63	1.51	21.07
15	3.86	6.48	0.01	0.02	78.78	1.51	23.08
16	3.00	6.09	0.01	0.02	90.93	1.50	24.09
17	1.97	5.43	0.01	0.02	103.08	1.49	24.09
18	+0.78	+4.53	-0.01	+0.02	115.24	+1.48	23.07
19	-0.53	3.44	0.01	0.02	127.40	1.47	21.05
20	1.93	2.21	0.01	0.02	139.56	1.45	18.07
21	3.34	+0.89	0.01	0.02	151.72	1.44	14.24
22	4.70	-0.49	0.01	0.02	163.90	1.42	9.69
23	-5.90	-1.86	-0.02	+0.02	176.08	+1.40	4.62
24	6.86	3.17	0.02	0.02	188.26	1.38	359.28
25	7.49	4.36	0.02	0.02	200.45	1.36	353.93
26	7.70	5.37	0.02	0.02	212.65	1.35	348.83
27	7.43	6.12	0.02	0.02	224.86	1.33	344.24
28	-6.67	-6.54	-0.02	+0.02	237.07	+1.31	340.42
29	5.43	6.56	0.02	0.02	249.28	1.29	337.60
30	3.82	6.16	0.02	0.02	261.50	1.27	336.04
31	-1.94	5.33	0.02	0.02	273.72	1.26	335.95
Apr. 1	+0.01	4.12	0.01	0.02	285.95	1.24	337.48
2	+1.88	-2.62	-0.01	+0.02	298.17	+1.22	340.61
3	+3.53	-0.96	-0.01	+0.02	310.39	+1.21	345.15

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR GREENWICH MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
	°	°	°	°	°	°	°
Apr. 1	+0.01	-4.12	-0.01	+0.02	285.95	+1.24	337.48
2	1.88	2.62	0.01	0.02	298.17	1.22	340.61
3	3.53	-0.96	0.01	0.02	310.39	1.21	345.15
4	4.86	+0.73	0.01	0.02	322.60	1.19	350.70
5	5.84	2.34	0.01	0.02	334.80	1.18	356.74
6	+6.45	+3.77	-0.01	+0.02	347.00	+1.17	2.75
7	6.71	4.96	0.01	0.02	359.20	1.16	8.34
8	6.66	5.85	0.01	0.02	11.39	1.15	13.24
9	6.34	6.43	0.01	0.02	23.57	1.14	17.31
10	5.78	6.68	0.01	0.02	35.75	1.12	20.48
11	+5.02	+6.62	-0.01	+0.02	47.92	+1.11	22.71
12	4.10	6.26	0.01	0.02	60.10	1.10	23.96
13	3.02	5.61	0.01	0.02	72.27	1.08	24.22
14	1.81	4.73	0.01	0.02	84.44	1.06	23.47
15	+0.50	3.65	0.01	0.02	96.61	1.04	21.71
16	-0.87	+2.41	-0.01	+0.02	108.78	+1.02	18.97
17	2.28	+1.07	0.01	0.02	120.95	0.99	15.34
18	3.67	-0.32	0.01	0.02	133.13	0.97	10.97
19	4.98	1.71	0.01	0.02	145.31	0.94	6.04
20	6.14	3.03	0.02	0.02	157.50	0.92	0.80
21	-7.08	-4.25	-0.02	+0.02	169.69	+0.89	355.51
22	7.72	5.29	0.02	0.02	181.88	0.86	350.42
23	7.97	6.09	0.02	0.02	194.09	0.83	345.75
24	7.80	6.60	0.02	0.02	206.30	0.80	341.74
25	7.15	6.74	0.02	0.02	218.52	0.78	338.58
26	-6.03	-6.48	-0.02	+0.02	230.74	+0.75	336.51
27	4.51	5.80	0.02	0.02	242.97	0.72	335.76
28	2.67	4.71	0.01	0.02	255.21	0.70	336.55
29	-0.67	3.27	0.01	0.02	267.44	0.67	338.98
30	+1.34	-1.60	0.01	0.02	279.68	0.64	343.02
May 1	+3.21	+0.18	-0.01	+0.02	291.92	+0.62	348.35
2	4.80	1.92	0.01	0.02	304.16	0.60	354.46
3	6.02	3.49	0.01	0.02	316.38	0.58	0.75
4	6.84	4.80	0.01	0.02	328.61	0.55	6.70
5	7.25	5.80	0.01	0.02	340.83	0.53	11.97
6	+7.27	+6.46	-0.01	+0.02	353.04	+0.51	16.37
7	6.93	6.78	0.01	0.02	5.25	0.49	19.82
8	6.29	6.77	0.01	0.02	17.45	0.47	22.30
9	5.40	6.45	0.01	0.02	29.65	0.45	23.79
10	4.32	5.85	0.01	0.02	41.84	0.43	24.29
11	+3.09	+4.99	-0.01	+0.02	54.03	+0.40	23.79
12	1.76	3.93	0.01	0.02	66.22	0.38	22.28
13	+0.38	2.70	0.01	0.02	78.40	0.35	19.78
14	-1.02	+1.36	0.01	0.02	90.59	0.32	16.35
15	2.39	-0.05	0.01	0.02	102.77	0.30	12.12
16	-3.68	-1.46	-0.01	+0.02	114.96	+0.27	7.29
17	-4.87	-2.82	-0.01	+0.01	127.14	+0.24	2.88

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR GREENWICH MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
day	17	-4.87	-2.82	-0.01	+0.01	127.14	+0.24	2.09
	18	5.88	4.07	0.01	0.01	139.34	0.21	356.79
	19	6.69	5.15	0.01	0.01	151.54	0.18	351.66
	20	7.22	6.00	0.01	0.01	163.74	0.15	346.92
	21	7.44	6.58	0.01	0.01	175.94	0.12	342.78
	22	-7.31	-6.82	-0.01	+0.01	188.16	+0.09	339.43
	23	6.78	6.68	0.01	0.01	200.38	0.06	337.05
	24	5.87	6.15	0.01	0.01	212.61	+0.03	335.84
	25	4.59	5.22	0.01	0.01	224.84	0.00	336.00
	26	3.01	3.92	0.01	0.01	237.08	-0.03	337.70
	27	-1.22	-2.34	-0.01	+0.01	249.33	-0.06	341.01
	28	+0.66	-0.59	-0.01	0.01	261.58	0.08	345.80
	29	2.49	+1.20	0.00	0.01	273.82	0.11	351.68
	30	4.14	2.89	0.00	0.01	286.07	0.14	358.08
	31	5.50	4.36	0.00	0.01	298.32	0.17	4.39
une	1	+6.48	+5.52	0.00	+0.01	310.56	-0.19	10.13
	2	7.04	6.32	0.00	0.01	322.80	0.22	15.00
	3	7.18	6.75	0.00	0.01	335.04	0.24	18.88
	4	6.90	6.83	0.00	0.01	347.26	0.27	21.71
	5	6.28	6.57	0.00	0.01	359.48	0.29	23.51
	6	+5.35	+6.03	0.00	+0.01	11.70	-0.31	24.29
	7	4.21	5.22	0.00	0.01	23.91	0.34	24.05
	8	2.90	4.20	0.00	0.01	36.12	0.36	22.79
	9	1.52	3.01	0.00	0.01	48.32	0.38	20.54
	10	+0.12	1.69	0.00	0.01	60.52	0.41	17.35
	11	-1.24	+0.29	0.00	+0.01	72.71	-0.44	13.30
	12	2.52	-1.13	0.00	0.01	84.90	0.46	8.58
	13	3.66	2.51	-0.01	0.01	97.10	0.49	3.40
	14	4.62	3.79	0.01	0.01	109.29	0.52	358.06
	15	5.39	4.91	0.01	0.01	121.48	0.54	352.81
	16	-5.93	-5.82	-0.01	+0.01	133.68	-0.57	347.94
	17	6.24	6.44	0.01	0.01	145.88	0.59	343.64
	18	6.28	6.75	0.01	0.01	158.09	0.62	340.12
	19	6.06	6.70	0.01	0.01	170.30	0.64	337.52
	20	5.57	6.27	-0.01	0.01	182.52	0.67	336.01
	21	-4.80	-5.47	0.00	+0.01	194.74	-0.69	335.76
	22	3.78	4.32	0.00	0.01	206.98	0.72	336.92
	23	2.52	2.88	0.00	0.01	219.21	0.74	339.59
	24	-1.09	-1.23	0.00	0.01	231.46	0.77	343.73
	25	+0.46	+0.51	0.00	0.01	243.71	0.79	349.12
	26	+2.03	+2.22	0.00	+0.01	255.96	-0.82	355.32
	27	3.50	3.76	0.00	0.01	268.22	0.84	1.74
	28	4.77	5.04	+0.01	0.01	280.47	0.86	7.82
	29	5.74	5.99	0.01	0.01	292.72	0.89	13.17
	30	6.34	6.55	0.01	0.01	304.97	0.91	17.55
uly	1	+6.53	+6.74	+0.01	+0.01	317.22	-0.93	20.85
	2	+6.31	+6.58	+0.01	+0.01	329.46	-0.95	23.98

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR GREENWICH MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		c
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
July 1	+6.53	+6.74	+0.01	+0.01	317.22	-0.93	20.85
2	6.31	6.58	0.01	0.01	329.46	0.95	23.06
3	5.71	6.10	0.01	0.01	341.69	0.97	24.18
4	4.80	5.36	+0.01	0.01	353.92	0.99	24.25
5	3.64	4.38	0.00	0.01	6.14	1.01	23.29
6	+2.31	+3.24	0.00	+0.01	18.36	-1.03	21.31
7	+0.92	1.96	0.00	0.01	30.57	1.05	18.38
8	-0.47	+0.59	0.00	0.01	42.78	1.07	14.56
9	1.76	-0.80	0.00	0.01	54.98	1.09	10.01
10	2.91	2.18	0.00	0.01	67.18	1.11	4.92
11	-3.86	-3.48	0.00	+0.01	79.37	-1.13	359.55
12	4.56	4.62	0.00	0.01	91.56	1.14	354.20
13	5.01	5.57	0.00	0.01	103.76	1.16	349.13
14	5.20	6.24	0.00	0.01	115.95	1.18	344.00
15	5.15	6.60	0.00	0.01	128.15	1.19	340.83
16	-4.88	-6.60	0.00	+0.01	140.34	-1.21	337.98
17	4.43	6.23	0.00	0.01	152.55	1.22	336.22
18	3.81	5.50	0.00	0.01	164.76	1.24	335.68
19	3.05	4.44	0.00	0.01	176.97	1.25	336.49
20	2.16	3.10	+0.01	0.01	189.19	1.26	338.73
21	-1.16	-1.56	+0.01	+0.01	201.42	-1.28	342.37
22	-0.07	+0.10	0.01	0.01	213.66	1.29	347.27
23	+1.09	1.75	0.01	0.01	225.90	1.31	353.10
24	2.27	3.29	0.01	0.01	238.14	1.32	359.26
25	3.39	4.61	0.01	0.01	250.39	1.34	5.54
26	+4.37	+5.63	+0.01	+0.01	262.64	-1.36	11.18
27	5.13	6.30	0.01	0.01	274.90	1.37	15.96
28	5.59	6.59	0.01	0.01	287.15	1.38	19.73
29	5.69	6.52	0.01	0.01	299.40	1.40	22.39
30	5.43	6.12	0.01	0.01	311.64	1.41	23.93
31	+4.81	+5.42	+0.01	+0.01	323.88	-1.42	24.37
Aug. 1	3.88	4.50	0.01	0.01	336.11	1.44	23.74
2	2.70	3.38	0.01	0.01	348.34	1.45	22.06
3	+1.37	2.14	0.01	0.01	6.56	1.46	19.41
4	-0.02	+0.81	0.01	0.01	12.78	1.47	15.86
5	-1.39	-0.57	+0.01	+0.01	24.99	-1.48	11.54
6	2.64	1.92	0.01	+0.01	37.19	1.48	6.62
7	3.68	3.21	0.01	0.00	49.39	1.49	1.32
8	4.46	4.37	0.01	0.00	61.58	1.50	355.92
9	4.92	5.34	0.01	0.00	73.77	1.50	350.70
10	-5.06	-6.06	+0.01	0.00	85.96	-1.51	345.91
11	4.88	6.47	0.01	0.00	98.14	1.51	341.82
12	4.42	6.52	0.01	0.00	110.33	1.51	338.63
13	3.74	6.20	0.01	0.00	122.52	1.51	336.53
14	2.91	5.51	0.01	0.00	134.70	1.51	335.67
15	-2.01	-4.47	+0.01	0.00	146.90	-1.51	338.17
16	-1.07	-3.16	+0.01	0.00	159.10	-1.51	338.11

EPIHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR GREENWICH MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		<i>c</i>
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
	°	°	°	°	°	°	°
Aug. 16	-1.07	-3.16	+0.01	0.00	159.10	-1.51	338.11
17	-0.14	1.65	0.01	0.00	171.30	1.51	341.44
18	+0.77	-0.04	0.01	0.00	183.51	1.51	346.03
19	1.65	+1.57	0.02	0.00	195.73	1.51	351.56
20	2.50	3.07	0.02	0.00	207.96	1.51	357.61
21	+3.30	+4.39	+0.02	0.00	220.19	-1.52	3.72
22	4.01	5.43	0.02	0.00	232.43	1.52	9.44
23	4.60	6.15	0.02	0.00	244.66	1.52	14.46
24	5.00	6.50	0.02	0.00	256.91	1.52	18.55
25	5.16	6.50	0.02	0.00	269.15	1.53	21.59
26	+5.04	+6.16	+0.02	0.00	281.39	-1.53	23.54
27	4.61	5.51	0.02	0.00	293.63	1.53	24.37
28	3.88	4.61	0.02	0.00	305.86	1.53	24.09
29	2.88	3.52	0.02	0.00	318.10	1.53	22.75
30	1.66	2.28	0.02	0.00	330.32	1.53	20.40
31	+0.30	+0.96	+0.02	0.00	342.54	-1.53	17.12
Sept. 1	-1.11	-0.40	0.01	0.00	354.76	1.53	13.04
2	2.48	1.75	0.01	0.00	6.96	1.53	8.33
3	3.72	3.03	0.01	0.00	19.17	1.52	3.18
4	4.72	4.20	0.01	0.00	31.36	1.52	357.84
5	-5.41	-5.20	+0.01	0.00	43.55	-1.51	352.56
6	5.73	5.97	0.01	0.00	55.73	1.51	347.61
7	5.65	6.44	0.01	0.00	67.91	1.50	343.22
8	5.18	6.56	0.01	0.00	80.09	1.49	339.64
9	4.37	6.31	0.01	0.00	92.26	1.47	337.09
10	-3.28	-5.66	+0.01	0.00	104.43	-1.46	335.77
11	2.04	4.64	0.01	0.00	116.60	1.44	335.85
12	-0.73	3.32	0.01	0.00	128.78	1.42	337.42
13	+0.54	1.78	0.01	0.00	140.96	1.41	340.48
14	1.70	-0.14	0.02	0.00	153.14	1.39	344.87
15	+2.73	+1.50	+0.02	0.00	165.33	-1.38	350.28
16	3.60	3.02	0.02	0.00	177.53	1.36	356.26
17	4.31	4.35	0.02	0.00	189.73	1.35	2.34
18	4.86	5.41	0.02	0.00	201.94	1.34	8.12
19	5.24	6.15	0.02	0.00	214.16	1.33	13.25
20	+5.44	+6.55	+0.02	0.00	226.38	-1.32	17.53
21	5.45	6.59	0.02	0.00	238.60	1.31	20.83
22	5.24	6.29	0.02	0.00	250.82	1.30	23.09
23	4.80	5.68	0.02	0.00	263.05	1.29	24.26
24	4.12	4.80	0.02	0.00	275.28	1.28	24.32
25	+3.20	+3.72	+0.02	0.00	287.50	-1.27	23.31
26	2.07	2.48	0.02	0.00	299.73	1.26	21.26
27	+0.78	+1.14	0.02	0.00	311.95	1.25	18.25
28	-0.62	-0.23	0.02	0.00	324.16	1.24	14.40
29	2.06	1.60	0.02	0.00	336.37	1.22	9.88
30	-3.44	-2.90	+0.01	0.00	348.57	-1.21	4.89
Oct. 1	-4.69	-4.09	+0.01	0.00	0.77	-1.20	359.86

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR GREENWICH MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
Oct.	1	-4.69	-4.09	+0.01	0.00	0.77	-1.20	359.66
	2	5.71	5.12	0.01	0.00	12.96	1.18	354.42
	3	6.41	5.93	0.01	0.00	25.14	1.16	349.41
	4	6.72	6.47	0.01	0.00	37.32	1.14	344.85
	5	6.60	6.69	0.01	0.00	49.49	1.12	340.97
	6	-6.03	-6.54	+0.01	0.00	61.65	-1.10	337.99
	7	5.04	6.00	0.01	0.00	73.81	1.07	336.13
	8	3.69	5.06	0.01	0.00	85.97	1.05	335.61
	9	2.11	3.77	0.01	0.00	98.13	1.02	336.62
	10	-0.42	2.21	0.01	0.00	110.28	0.99	339.22
	11	+1.25	-0.50	+0.02	0.00	122.44	-0.96	343.32
	12	2.79	+1.24	0.02	0.00	134.60	0.93	348.62
	13	4.12	2.86	0.02	0.00	146.77	0.90	354.66
	14	5.18	4.28	0.02	0.00	158.94	0.87	0.90
	15	5.95	5.42	0.02	0.00	171.12	0.84	6.86
	16	+6.44	+6.21	+0.02	0.00	183.30	-0.82	12.18
	17	6.64	6.66	0.02	0.00	195.49	0.80	16.66
	18	6.58	6.74	0.02	0.00	207.68	0.77	20.17
	19	6.26	6.48	0.02	0.00	219.89	0.75	22.66
	20	5.71	5.91	0.02	0.00	232.09	0.74	24.09
	21	+4.95	+5.07	+0.02	0.00	244.30	-0.72	24.44
	22	3.99	4.00	0.02	0.00	256.51	0.70	23.73
	23	2.87	2.77	0.02	0.00	268.72	0.68	21.96
	24	1.60	1.42	0.02	0.00	280.93	0.66	19.21
	25	+0.23	+0.03	0.02	0.00	293.14	0.64	15.58
	26	-1.20	-1.37	+0.01	0.00	305.34	-0.62	11.22
	27	2.64	2.70	0.01	0.00	317.54	0.60	6.35
	28	4.01	3.93	0.01	0.00	329.74	0.58	1.20
	29	5.25	5.00	0.01	0.00	341.93	0.56	356.00
	30	6.29	5.86	0.01	0.00	354.12	0.54	350.98
	31	-7.04	-6.48	+0.01	0.00	6.30	-0.51	346.35
Nov.	1	7.43	6.79	0.01	0.00	18.47	0.49	342.31
	2	7.41	6.76	0.01	0.00	30.64	0.46	339.04
	3	6.94	6.36	0.01	0.00	42.79	0.43	336.74
	4	6.01	5.58	0.01	0.00	54.94	0.40	335.63
	5	-4.67	-4.41	+0.01	0.00	67.09	-0.37	335.93
	6	2.99	2.92	0.01	0.00	79.23	0.33	337.81
	7	-1.10	-1.21	0.01	0.00	91.37	0.29	341.32
	8	+0.87	+0.60	0.01	0.00	103.51	0.26	346.28
	9	2.77	2.36	0.01	0.00	115.65	0.22	352.28
	10	+4.46	+3.93	+0.02	0.00	127.79	-0.18	358.75
	11	5.84	5.21	0.02	0.00	139.94	0.14	5.07
	12	6.86	6.14	0.02	0.00	152.09	0.11	10.79
	13	7.46	6.67	0.02	-0.01	164.25	0.08	15.63
	14	7.68	6.83	0.02	0.01	176.42	0.05	19.45
	15	+7.51	+6.63	+0.02	-0.01	188.59	-0.02	22.21
	16	+7.02	+6.11	+0.02	-0.01	200.77	0.00	23.89

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR GREENWICH MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
Nov. 16	+7.02	+6.11	+0.02	−0.01	200.77	0.00	23.89
17	6.24	5.31	0.02	0.01	212.95	+0.03	24.49
18	5.24	4.28	0.01	0.01	225.14	0.05	24.03
19	4.06	3.08	0.01	0.01	237.34	0.08	22.52
20	2.76	1.75	0.01	0.01	249.53	0.10	20.02
21	+1.38	+0.36	+0.01	−0.01	261.72	+0.12	16.61
22	−0.04	−1.05	0.01	0.01	273.92	0.14	12.42
23	1.46	2.41	0.01	0.01	286.12	0.16	7.64
24	2.83	3.68	+0.01	0.01	298.31	0.19	2.52
25	4.12	4.79	0.00	0.01	310.50	0.21	357.30
26	−5.27	−5.70	0.00	−0.01	322.69	+0.23	352.24
27	6.24	6.36	0.00	0.01	334.87	0.25	347.54
28	6.98	6.75	0.00	0.01	347.05	0.27	343.38
29	7.42	6.82	0.00	0.01	359.22	0.30	339.94
30	7.53	6.54	0.00	0.01	11.38	0.32	337.38
Dec. 1	−7.25	−5.90	0.00	−0.01	23.53	+0.35	335.87
2	6.56	4.91	0.00	0.01	35.68	0.38	335.59
3	5.46	3.59	0.00	0.01	47.82	0.42	336.75
4	3.97	1.99	0.00	0.01	59.96	0.45	339.46
5	2.18	−0.23	+0.01	0.01	72.09	0.49	343.73
6	−0.20	+1.56	+0.01	−0.01	84.22	+0.52	349.32
7	+1.84	3.25	0.01	0.01	96.34	0.56	355.76
8	3.76	4.70	0.01	0.01	108.47	0.59	2.39
9	5.42	5.79	0.01	0.01	120.60	0.63	8.62
10	6.71	6.49	0.01	0.01	132.74	0.66	14.02
11	+7.54	+6.77	+0.01	−0.01	144.87	+0.69	18.35
12	7.89	6.66	0.01	0.01	157.02	0.72	21.54
13	7.79	6.21	0.01	0.01	169.17	0.74	23.57
14	7.27	5.46	0.01	0.01	181.33	0.77	24.46
15	6.41	4.48	0.01	0.01	193.50	0.79	24.26
16	+5.30	+3.31	+0.01	−0.01	205.67	+0.82	23.01
17	4.00	2.02	0.00	0.01	217.85	0.84	20.75
18	2.60	+0.65	0.00	0.01	230.03	0.86	17.56
19	+1.16	−0.74	0.00	0.01	242.21	0.88	13.56
20	−0.26	2.10	0.00	0.01	254.40	0.89	8.90
21	−1.62	−3.38	0.00	−0.01	266.58	+0.91	3.82
22	2.86	4.51	0.00	0.01	278.77	0.93	358.57
23	3.97	5.46	0.00	0.01	290.96	0.94	353.41
24	4.93	6.16	0.00	0.01	303.15	0.96	348.57
25	5.71	6.59	0.00	0.01	315.33	0.98	344.26
26	−6.29	−6.71	−0.01	−0.01	327.51	+0.99	340.65
27	6.65	6.50	0.01	0.01	339.68	1.01	337.90
28	6.76	5.96	0.01	0.01	351.85	1.03	336.14
29	6.59	5.09	0.01	0.01	4.01	1.04	335.51
30	6.12	3.91	−0.01	0.01	16.16	1.07	336.17
31	−5.31	−2.47	0.00	−0.01	28.31	+1.09	338.25
32	−4.17	−0.84	0.00	−0.01	40.45	+1.11	341.79

618 ILLUMINATED DISK OF MERCURY, 1919.

FOR GREENWICH MEAN NOON.

Date.	k	i	θ	L	Stellar Mag.	Date.	k	i	θ	L	Stellar Mag.
Jan. 1	0.451	96	192	48.8	+0.2	July 5	0.648	78	11	37.3	+0.1
6	0.590	79	188	44.5	0.0	10	0.590	82	15	34.5	0.3
11	0.704	66	184	38.3	-0.1	15	0.481	91	18	32.7	0.6
16	0.779	56	180	33.2	0.1	20	0.412	100	21	31.3	0.8
21	0.834	48	175	29.6	0.2	25	0.337	110	24	29.4	1.0
26	0.876	41	170	27.4	-0.2	30	0.236	122	28	26.7	+1.3
31	0.910	35	165	26.4	0.3	Aug. 4	0.143	136	33	18.9	1.7
Feb. 5	0.987	29	159	26.5	0.4	9	0.068	152	44	9.3	2.2
10	0.961	23	153	27.8	0.6	14	0.012	167	57	2.2	2.9
15	0.961	16	144	30.4	0.8	19	0.694	159	108	6.1	2.4
20	0.995	8	128	34.9	-1.1	24	0.135	137	157	22.0	+1.4
25	0.997	6	80	41.7	1.3	29	0.307	113	194	45.3	+0.5
Mar. 2	0.978	17	349	51.3	1.3	Sept. 3	0.519	88	200	63.2	-0.2
7	0.916	34	340	62.5	1.2	8	0.724	63	205	69.4	0.3
12	0.791	54	335	70.7	1.0	13	0.874	42	210	68.5	1.1
17	0.605	78	332	68.7	-0.5	18	0.968	24	216	52.7	-1.2
22	0.395	102	330	54.6	+0.2	23	0.998	10	230	42.3	1.3
27	0.208	126	327	33.6	1.0	28	0.990	4	239	35.4	1.2
Apr. 1	0.074	148	321	13.3	1.9	Oct. 3	0.990	11	18	30.5	0.9
6	0.008	170	296	1.6	2.9	8	0.974	18	20	27.5	0.6
11	0.014	166	174	2.6	+2.8	13	0.953	25	22	26.0	-0.5
16	0.075	148	158	11.7	2.1	18	0.923	31	23	25.6	0.3
21	0.161	133	154	21.1	1.5	23	0.897	37	22	25.3	0.2
26	0.254	120	153	27.2	1.2	28	0.858	44	21	23.2	0.3
May 1	0.342	108	152	30.6	0.9	Nov. 2	0.807	52	19	31.5	0.1
6	0.426	98	152	32.7	+0.7	7	0.739	61	17	36.3	-0.1
11	0.508	89	152	34.6	0.5	12	0.643	73	14	42.5	-0.1
16	0.591	80	153	37.3	+0.2	17	0.507	89	12	48.2	+0.1
21	0.678	69	155	41.3	-0.1	22	0.322	111	11	46.2	0.5
26	0.773	57	158	47.3	0.5	27	0.116	140	9	24.4	1.4
31	0.871	42	162	55.2	-0.9	Dec. 2	0.002	175	325	0.5	+2.9
June 5	0.955	24	169	63.3	1.4	7	0.090	145	204	20.3	1.5
10	0.998	5	202	67.4	1.9	12	0.302	113	200	47.8	+0.5
15	0.980	16	343	64.4	1.6	17	0.505	89	197	52.7	0.0
20	0.911	35	354	56.5	1.1	22	0.656	72	194	46.5	-0.2
25	0.822	50	1	48.2	-0.6	27	0.759	59	190	39.1	-0.2
30	0.732	62	6	41.7	-0.2	32	0.830	49	186	33.3	-0.3

NOTATION.

k =the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i =the angle between the Sun and Earth, as seen from the planet.

θ =the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L =the brilliancy of the disk. The unit of L is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

ILLUMINATED DISK OF VENUS, 1919. 619

FOR GREENWICH MEAN NOON.

Date.	k	i	θ	L	Stellar Mag.	Date.	k	i	θ	L	Stellar Mag.
Jan. 1	0.988	12.6	358.2	48.2	-3.4	July 5	0.490	91.1	19.2	139.6	-4.0
6	0.985	14.3	355.7	48.5	3.4	10	0.462	94.4	20.5	147.8	4.0
11	0.981	15.9	353.3	48.9	3.4	15	0.431	97.9	21.7	156.4	4.0
16	0.977	17.5	351.0	49.3	3.4	20	0.399	101.6	22.8	165.0	4.1
21	0.972	19.2	348.9	49.8	3.4	25	0.365	105.7	23.9	173.3	4.1
26	0.967	20.8	346.9	50.3	-3.4	30	0.329	110.0	25.1	180.6	-4.2
31	0.962	22.5	345.1	50.9	3.3	Aug. 4	0.290	114.8	26.4	185.7	4.2
Feb. 5	0.956	24.2	343.5	51.5	3.3	9	0.249	120.1	27.9	186.6	4.2
10	0.950	25.9	342.1	52.2	3.3	14	0.206	126.0	29.8	181.3	4.2
15	0.943	27.6	341.0	53.0	3.3	19	0.162	132.6	32.3	166.9	4.1
20	0.936	29.4	340.1	53.9	-3.3	24	0.118	139.9	36.0	141.4	-4.0
25	0.928	31.2	339.4	54.8	3.4	29	0.076	148.0	41.7	105.3	3.8
Mar. 2	0.920	33.0	339.0	55.8	3.4	Sept. 3	0.042	156.5	51.8	64.4	3.6
7	0.911	34.8	338.8	56.9	3.4	8	0.019	164.3	72.8	31.0	3.3
12	0.901	36.7	338.8	58.1	3.4	13	0.011	167.9	117.1	19.2	3.2
17	0.891	38.6	339.1	59.3	-3.4	18	0.021	163.4	158.2	35.3	-3.4
22	0.880	40.5	339.6	60.7	3.4	23	0.046	155.2	176.8	72.5	3.7
27	0.869	42.5	340.3	62.2	3.4	28	0.082	146.6	185.9	116.8	3.9
Apr. 1	0.857	44.5	341.3	63.8	3.4	Oct. 3	0.125	138.6	191.1	155.7	4.1
6	0.844	46.5	342.6	65.5	3.4	8	0.171	131.2	194.6	183.2	4.2
11	0.831	48.6	344.1	67.3	-3.4	13	0.216	124.6	197.1	198.9	-4.3
16	0.817	50.7	345.8	69.3	3.4	18	0.259	118.8	199.0	204.9	4.3
21	0.802	52.8	347.7	71.5	3.5	23	0.300	113.5	200.6	204.2	4.3
26	0.787	55.0	349.7	73.8	3.5	28	0.339	108.8	201.8	199.2	4.3
May 1	0.771	57.2	352.0	76.3	3.5	Nov. 2	0.375	104.5	202.8	191.6	4.2
6	0.754	59.5	354.3	79.1	-3.5	7	0.408	100.5	203.6	182.8	-4.2
11	0.737	61.8	356.7	82.1	3.5	12	0.440	96.9	204.1	173.5	4.2
16	0.718	64.1	359.2	85.3	3.6	17	0.470	93.5	204.4	164.1	4.1
21	0.699	66.5	1.7	88.8	3.6	22	0.498	90.3	204.4	155.1	4.1
26	0.680	68.9	4.1	92.7	3.6	27	0.524	87.3	204.2	146.6	4.0
31	0.659	71.4	6.5	96.9	-3.7	Dec. 2	0.549	84.4	203.8	138.6	-4.0
June 5	0.638	74.0	8.7	101.5	3.7	7	0.573	81.7	203.1	131.2	3.9
10	0.616	76.6	10.8	106.6	3.7	12	0.595	79.0	202.1	124.3	3.9
15	0.593	79.3	12.8	112.2	3.8	17	0.617	76.5	200.9	117.9	3.8
20	0.569	82.1	14.6	118.2	3.8	22	0.637	74.1	199.5	112.0	3.8
25	0.544	85.0	16.3	124.7	-3.9	27	0.657	71.7	197.8	106.6	-3.8
30	0.518	88.0	17.8	131.9	-3.9	32	0.676	69.4	195.9	101.7	-3.7

NOTATION.

- k —the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.
- i —the angle between the Sun and Earth, as seen from the planet.
- θ —the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.
- L —the brilliancy of the disk. The unit of L is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

FOR GREENWICH MEAN NOON.

Date.	Light-Time.	Stellar Magnitude.	P	$A_{\oplus} + 180^{\circ}$	D_{\oplus}	$A_{\odot} - A_{\oplus}$	D_{\odot}	\odot_{\oplus}
	m		°	°	°	°	°	°
Oct. 1	18.51	+1.9	6.07	234.31	+20.43	-24.18	+12.59	32.42
3	18.41	1.9	6.82	235.59	20.70	24.59	12.90	33.33
5	18.31	1.9	7.56	236.87	20.96	25.01	13.22	34.23
7	18.21	1.8	8.30	238.16	21.21	25.42	13.52	35.13
9	18.10	1.8	9.03	239.44	21.44	25.84	13.83	36.03
11	18.00	+1.8	9.76	240.73	+21.67	-26.25	+14.13	36.92
13	17.89	1.8	10.48	242.01	21.88	26.67	14.43	37.82
15	17.78	1.8	11.20	243.30	22.08	27.08	14.73	38.72
17	17.67	1.8	11.92	244.59	22.27	27.49	15.02	39.61
19	17.55	1.8	12.62	245.88	22.45	27.91	15.31	40.50
21	17.44	+1.8	13.33	247.16	+22.62	-28.32	+15.59	41.39
23	17.32	1.8	14.02	248.45	22.78	28.72	15.87	42.28
25	17.20	1.8	14.71	249.73	22.93	29.13	16.15	43.17
27	17.08	1.8	15.39	251.02	23.06	29.54	16.42	44.06
29	16.96	1.8	16.07	252.30	23.18	29.94	16.69	44.94
31	16.83	+1.8	16.73	253.58	+23.30	-30.34	+16.95	45.83
Nov. 2	16.71	1.7	17.39	254.86	23.40	30.73	17.21	46.71
4	16.58	1.7	18.04	256.13	23.48	31.12	17.46	47.60
6	16.45	1.7	18.68	257.41	23.56	31.50	17.72	48.48
8	16.32	1.7	19.32	258.68	23.63	31.88	17.96	49.36
10	16.18	+1.7	19.94	259.94	+23.68	-32.26	+18.21	50.24
12	16.04	1.7	20.56	261.20	23.73	32.63	18.45	51.12
14	15.91	1.7	21.16	262.46	23.76	32.99	18.68	52.00
16	15.77	1.7	21.76	263.72	23.78	33.35	18.91	52.88
18	15.63	1.6	22.34	264.97	23.79	33.70	19.14	53.76
20	15.49	+1.6	22.92	266.21	+23.79	-34.05	+19.36	54.64
22	15.34	1.6	23.48	267.45	23.78	34.38	19.57	55.51
24	15.20	1.6	24.03	268.68	23.76	34.71	19.78	56.39
26	15.05	1.6	24.57	269.90	23.73	35.03	19.99	57.26
28	14.90	1.6	25.10	271.12	23.69	35.34	20.19	58.14
30	14.75	+1.5	25.62	272.33	+23.64	-35.64	+20.39	59.01
Dec. 2	14.60	1.5	26.12	273.53	23.58	35.94	20.58	59.89
4	14.45	1.5	26.62	274.72	23.51	36.22	20.77	60.76
6	14.29	1.5	27.10	275.91	23.43	36.49	20.96	61.64
8	14.14	1.5	27.57	277.09	23.34	36.75	21.13	62.51
10	13.98	+1.4	28.02	278.25	+23.24	-37.00	+21.31	63.38
12	13.83	1.4	28.47	279.41	23.14	37.23	21.48	64.26
14	13.67	1.4	28.90	280.56	23.02	37.46	21.64	65.13
16	13.51	1.4	29.32	281.70	22.90	37.67	21.80	66.00
18	13.35	1.4	29.72	282.82	22.77	37.87	21.95	66.88
20	13.18	+1.3	30.11	283.94	+22.63	-38.06	+22.10	67.75
22	13.02	1.3	30.49	285.04	22.49	38.23	22.24	68.62
24	12.86	1.3	30.85	286.13	22.34	38.39	22.38	69.50
26	12.69	1.3	31.20	287.21	22.18	38.53	22.51	70.37
28	12.53	1.2	31.54	288.27	22.01	38.66	22.63	71.24
30	12.36	+1.2	31.87	289.32	+21.84	-38.78	+22.76	72.12
32	12.20	+1.2	32.18	290.36	+21.67	-38.87	+22.87	72.99

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

FOR GREENWICH MEAN NOON.

Date.	k	Diameter.	i	g	Q	Central Meridian.	Mean Time of Transit of Zero Meridian.	
							Of Date.	Of Intermediate Data.
		"	"	"	"	"	h m	h m
Oct.	1	0.955	4.54	24.44	0.20	291.00	105.72	17 25.4
	3	0.954	4.56	24.77	0.21	291.25	86.24	18 45.5
	5	0.953	4.58	25.09	0.22	291.49	66.77	20 5.5
	7	0.952	4.61	25.41	0.22	291.72	47.30	21 25.6
	9	0.950	4.64	25.73	0.23	291.94	27.82	22 45.7
	11	0.949	4.66	26.05	0.24	292.14	8.34	0 5.7
	13	0.948	4.69	26.37	0.24	292.34	348.87	0 45.8
	15	0.947	4.72	26.68	0.25	292.53	329.39	2 5.8
	17	0.946	4.75	27.00	0.26	292.70	309.91	3 25.9
	19	0.944	4.78	27.31	0.27	292.87	290.44	4 46.0
	21	0.943	4.81	27.61	0.27	293.03	270.96	6 6.0
	23	0.942	4.84	27.92	0.28	293.18	251.49	7 26.1
	25	0.941	4.88	28.23	0.29	293.32	232.02	8 46.2
	27	0.939	4.91	28.53	0.30	293.44	212.55	10 6.2
	29	0.938	4.95	28.83	0.31	293.56	193.08	11 26.2
	31	0.937	4.99	29.12	0.32	293.67	173.61	12 46.3
Nov.	2	0.935	5.02	29.42	0.32	293.76	154.15	14 6.3
	4	0.934	5.06	29.71	0.33	293.85	134.69	15 26.3
	6	0.933	5.10	29.99	0.34	293.93	115.23	16 46.2
	8	0.932	5.14	30.28	0.35	294.00	95.78	18 6.2
	10	0.931	5.19	30.55	0.36	294.07	76.33	19 26.2
	12	0.929	5.23	30.83	0.37	294.12	56.89	20 46.1
	14	0.928	5.28	31.10	0.38	294.16	37.44	22 6.0
	16	0.927	5.32	31.37	0.39	294.19	18.01	23 25.9
	18	0.926	5.37	31.64	0.40	294.21	358.58	0 5.8
	20	0.924	5.42	31.90	0.41	294.23	339.15	1 25.7
	22	0.923	5.47	32.15	0.42	294.24	319.73	2 45.5
	24	0.922	5.52	32.40	0.43	294.24	300.32	4 5.3
Dec.	26	0.921	5.58	32.65	0.44	294.23	280.92	5 25.1
	28	0.920	5.63	32.89	0.45	294.21	261.52	6 44.8
	30	0.919	5.69	33.12	0.46	294.18	242.13	8 4.5
	2	0.918	5.75	33.35	0.47	294.14	222.75	9 24.2
	4	0.917	5.81	33.57	0.48	294.10	203.38	10 43.8
	6	0.916	5.87	33.79	0.50	294.05	184.02	12 3.4
	8	0.914	5.94	34.00	0.51	293.99	164.66	13 22.9
	10	0.913	6.00	34.20	0.52	293.92	145.32	14 42.4
	12	0.912	6.07	34.40	0.53	293.85	125.98	16 1.9
	14	0.912	6.14	34.58	0.54	293.76	106.66	17 21.3
	16	0.911	6.21	34.77	0.55	293.67	87.34	18 40.7
	18	0.910	6.29	34.94	0.57	293.58	68.04	20 0.0
	20	0.909	6.37	35.10	0.58	293.47	48.75	21 19.3
	22	0.908	6.44	35.26	0.59	293.36	29.47	22 38.5
	24	0.908	6.53	35.41	0.60	293.25	10.20	23 57.6
	26	0.907	6.61	35.54	0.62	293.12	350.95	0 37.2
	28	0.906	6.70	35.67	0.63	292.99	331.71	1 56.3
	30	0.906	6.79	35.78	0.64	292.86	312.48	3 15.3
	32	0.905	6.88	35.89	0.65	292.72	293.27	4 34.2

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER.
FOR GREENWICH MEAN NOON.

Date.		Light-Time.	Stellar Magnitude.	P	$\Delta_{\odot} + 115^{\circ}$	D_{\odot}	$\Delta_{\odot} + 135^{\circ}$	D_{\odot}
		m		.	.	.	.	.
Jan.	1	34.87	-2.3	5.89	325.18	+1.75	325.01	+1.75
	8	34.94	2.2	5.46	324.23	1.75	325.09	1.74
	15	35.14	2.2	5.04	323.32	1.75	326.18	1.71
	22	35.47	2.2	4.66	322.47	1.75	326.77	1.68
	29	35.91	2.2	4.31	321.72	1.75	327.35	1.65
Feb.	5	36.46	-2.1	4.02	321.09	+1.75	327.93	+1.63
	12	37.10	2.1	3.80	320.60	1.75	328.52	1.60
	19	37.83	2.1	3.64	320.37	1.74	329.10	1.58
	26	38.62	2.0	3.56	320.09	1.74	329.68	1.55
Mar.	5	39.47	2.0	3.55	320.07	1.72	330.26	1.52
	12	40.37	-1.9	3.62	320.22	+1.71	330.84	+1.50
	19	41.28	1.9	3.76	320.52	1.69	331.42	1.47
	26	42.22	1.8	3.96	320.97	1.68	332.00	1.44
Apr.	2	43.16	1.8	4.24	321.55	1.66	332.58	1.41
	9	44.09	1.7	4.57	322.37	1.63	333.16	1.39
	16	45.00	-1.7	4.96	323.11	+1.61	333.73	+1.36
	23	45.88	1.6	5.39	324.06	1.58	334.31	1.33
May	30	46.73	1.6	5.87	325.10	1.55	334.89	1.30
	7	47.54	1.6	6.38	326.24	1.52	335.46	1.28
	14	48.29	1.5	6.93	327.45	1.48	336.04	1.25
	21	48.99	-1.5	7.50	328.74	+1.45	336.61	+1.22
June	28	49.63	1.5	8.10	330.08	1.41	337.19	1.19
	4	50.20	1.4	8.72	331.48	1.37	337.76	1.16
	11	50.70	1.4	9.34	332.92	1.32	338.33	1.13
	18	51.13	1.4	9.98	334.40	1.28	338.90	1.11
	25	51.48	-1.4	10.62	335.90	+1.23	339.48	+1.08
	
	
Aug.	28	50.94	-1.4	16.06	349.93	+0.71	344.68	+0.81
Sept.	4	50.48	1.4	16.56	351.36	0.65	345.25	0.78
	11	49.95	-1.4	17.04	352.74	+0.59	345.81	+0.75
	18	49.35	1.4	17.48	354.08	0.53	346.38	0.72
	25	48.68	1.5	17.89	355.35	0.47	346.94	0.69
Oct.	2	47.96	1.5	18.27	356.54	0.41	347.51	0.66
	9	47.18	1.6	18.61	357.66	0.35	348.07	0.64
	16	46.36	-1.6	18.92	358.68	+0.30	348.63	+0.61
	23	45.51	1.6	19.20	359.60	0.24	349.20	0.58
Nov.	30	44.62	1.7	19.43	0.41	0.19	349.76	0.55
	6	43.72	1.7	19.63	1.09	0.15	350.32	0.52
	13	42.81	1.8	19.79	1.64	0.10	350.88	0.49
	20	41.90	-1.8	19.90	2.05	+0.06	351.44	+0.46
Dec.	27	41.01	1.8	19.98	2.31	+0.03	352.00	0.43
	4	40.16	1.9	20.01	2.40	0.00	352.56	0.40
	11	39.34	1.9	19.99	2.34	-0.03	353.12	0.37
	18	38.59	2.0	19.93	2.12	0.05	353.68	0.34
	25	37.91	-2.0	19.83	1.74	-0.06	354.24	+0.31
	32	37.31	-2.0	19.69	1.22	-0.07	354.80	+0.28

JUPITER, 1919.

623

EPIHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER.

FOR GREENWICH MEAN NOON.

Date.	Equatorial Diameter.	Excess of Equat. Diameter over Polar.	i	q	Q	Central Meridian.		Correction for Phase.	
						System I.	System II.		
	"	"	"	"	"	"	"	"	
Jan.	1	47.76	2.89	0.16	0.00	272.42	10.54	0.52	0.00
	8	47.66	2.89	1.36	0.01	94.70	36.74	333.32	-0.01
	15	47.38	2.87	2.86	0.03	94.12	62.83	306.00	0.04
	22	46.94	2.84	4.29	0.07	93.72	88.77	278.53	0.08
	29	46.37	2.81	5.62	0.11	93.38	114.55	250.91	0.14
Feb.	5	45.68	2.77	6.84	0.16	93.08	140.15	223.10	-0.20
	12	44.88	2.72	7.91	0.21	92.84	165.55	195.09	0.27
	19	44.02	2.67	8.83	0.26	92.69	190.74	166.88	0.34
	26	43.12	2.61	9.59	0.30	92.59	215.74	138.46	0.40
Mar.	5	42.18	2.56	10.19	0.33	92.57	240.54	109.86	0.45
	12	41.25	2.50	10.62	0.35	92.62	265.15	81.06	-0.49
	19	40.33	2.44	10.90	0.36	92.73	289.58	52.10	0.52
Apr.	26	39.44	2.39	11.03	0.37	92.90	313.86	22.97	0.53
	2	38.58	2.34	11.02	0.36	93.13	338.01	353.71	0.53
	9	37.77	2.29	10.88	0.34	93.41	2.02	324.32	0.52
	16	37.01	2.24	10.62	0.32	93.74	25.93	294.82	-0.49
	23	36.29	2.20	10.25	0.29	94.13	49.74	265.23	0.46
May	30	35.63	2.16	9.78	0.26	94.54	73.48	235.56	0.42
	7	35.03	2.12	9.22	0.23	94.98	97.15	205.83	0.37
	14	34.48	2.09	8.58	0.20	95.45	120.78	176.05	0.32
	21	33.99	2.06	7.88	0.16	95.94	144.37	146.23	-0.27
	28	33.55	2.03	7.11	0.13	96.43	167.94	116.39	0.22
June	4	33.17	2.01	6.28	0.10	96.93	191.49	86.54	0.17
	11	32.84	1.99	5.42	0.07	97.41	215.04	56.69	0.13
	18	32.57	1.97	4.51	0.05	97.86	238.61	26.84	0.09
	25	32.35	1.96	3.58	0.03	98.22	262.19	357.01	-0.06
	
	
Aug.	28	32.69	1.98	5.25	0.07	284.94	274.09	240.59	+0.12
Sept.	4	32.99	2.00	6.12	0.09	285.30	298.24	211.33	0.16
	11	33.34	2.02	6.93	0.12	285.66	322.48	182.15	+0.21
	18	33.75	2.05	7.70	0.15	286.00	346.81	153.08	0.26
Oct.	25	34.21	2.08	8.41	0.18	286.32	11.25	124.10	0.31
	2	34.72	2.11	9.04	0.22	286.62	35.79	95.23	0.36
	9	35.29	2.14	9.59	0.25	286.89	60.45	66.47	0.40
	16	35.92	2.18	10.05	0.28	287.13	85.23	37.83	+0.44
Nov.	23	36.59	2.22	10.41	0.30	287.34	110.13	9.32	0.47
	30	37.32	2.26	10.66	0.32	287.51	135.16	340.94	0.49
	6	38.09	2.31	10.78	0.34	287.64	160.33	312.69	0.50
	13	38.90	2.36	10.77	0.34	287.72	185.63	284.58	0.50
	20	39.74	2.41	10.61	0.34	287.76	211.08	256.61	+0.49
Dec.	27	40.60	2.46	10.31	0.33	287.74	236.66	228.78	0.46
	4	41.47	2.52	9.85	0.31	287.66	262.39	201.09	0.42
	11	42.32	2.57	9.23	0.28	287.52	288.24	173.53	0.37
	18	43.15	2.62	8.45	0.24	287.31	314.22	146.10	0.31
	25	43.93	2.66	7.52	0.19	287.02	340.32	118.78	+0.25
	32	44.63	2.71	6.43	0.14	286.61	6.50	91.56	+0.17

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER,
SYSTEM I.

GREENWICH MEAN TIME.

Transit of Zone Meridian.			Interval between Successive Transits.		Transit of Zone Meridian.			Interval between Successive Transits.		Transit of Zone Meridian.			Interval between Successive Transits.	
d	h	m	h	m	d	h	m	h	m	d	h	m	h	m
Jan.	1	9 38.13	9 50.41		Apr.	18	0 31.45	9 50.04		Sept.	19	15 48.54	9 50.1	
	3	10 45.18				20	1 44.05				21	16 58.44		
	5	11 57.25				22	2 57.06				23	18 0.32		
	7	13 9.34				24	4 11.07				25	19 22.19		
	9	14 21.45				26	5 24.30				27	30 35.04		
	11	15 33.57			May	28	6 37.58	9 50.05		Oct.	29	21 47.06	9 50.1	
	13	16 45.72				30	7 50.78				1	23 0.70		
	15	17 57.80				2	9 4.08				4	0 13.51		
	17	19 10.06				4	10 17.20				6	1 28.30		
	19	20 22.20				6	11 30.56				8	2 39.08		
Feb.	21	21 34.53	9 50.46		June	8	12 43.83	9 50.06		Nov.	10	3 51.84	9 50.1	
	23	22 46.79				10	13 57.11				12	5 4.58		
	25	23 59.06				12	15 10.30				14	6 17.31		
	28	1 11.40				14	16 23.65				16	7 30.02		
	30	2 23.74				16	17 36.97				18	8 42.71		
	1	3 36.11			July	18	18 50.27	9 50.06		Dec.	20	9 55.30	9 50.1	
	3	4 48.51				20	20 3.58				22	11 8.06		
	5	6 0.94				22	21 16.88				24	12 20.60		
	7	7 13.80				24	22 30.19				26	13 33.32		
	9	8 26.86				26	23 43.50				28	14 45.93		
Mar.	11	9 38.20	9 50.51		Aug.	29	0 56.81	9 50.06		Jan.	30	15 58.52	9 50.1	
	13	10 50.93				31	2 10.13				1	17 11.09		
	15	12 3.50				2	3 23.44				3	18 23.65		
	17	13 16.10				4	4 36.76				5	19 36.18		
	19	14 28.73				6	5 50.08				7	20 48.71		
	21	15 41.38			Sept.	8	7 3.40	9 50.06		Feb.	9	22 1.21	9 50.1	
	23	16 54.06				10	8 16.72				11	23 13.70		
	25	18 6.78				12	9 30.03				14	0 26.17		
	27	19 19.49				14	10 43.35				16	1 38.62		
	29	20 32.25				16	11 56.67				18	2 51.05		
Apr.	3	21 45.03	9 50.56		Oct.	18	13 9.98	9 50.06		Mar.	20	4 3.47	9 50.1	
	5	22 57.84				20	14 23.30				22	5 15.86		
	8	0 10.67				22	15 36.61				24	6 28.24		
	10	1 23.53				24	16 49.91				26	7 40.60		
	12	2 36.41				26	18 3.22				28	8 52.94		
	14	3 49.31			Nov.	28	19 16.53	9 50.06		Apr.	30	10 5.27	9 50.1	
	16	5 2.23				30	20 29.83				2	11 17.58		
	18	6 15.18				2	21 43.12				4	12 29.87		
	20	7 28.15				4	22 56.42				6	13 42.14		
	22	8 41.13				.....	.....				8	14 54.40
May	24	9 54.14	9 50.61		Dec.	9 50.61		May	10	16 6.64	9 50.1	
	26	11 7.16				28	2 20.75				12	17 18.86		
	28	12 20.20				30	3 33.80				14	18 31.07		
	30	13 33.26				1	4 46.83				16	19 43.28		
	1	14 46.33				3	5 59.85				18	20 55.44		
	3	15 59.42			Jan.	5	7 12.86	9 50.60		June	20	22 7.60	9 50.1	
	5	17 12.53				7	8 25.86				22	23 19.74		
	7	18 25.65				9	9 38.84				25	0 31.88		
	9	19 38.78				11	10 51.81				27	1 44.00		
	11	20 51.93				13	12 4.76				29	2 56.11		
June	13	22 5.10	9 50.64		Feb.	15	13 17.70	9 50.58		July	31	4 8.20	9 50.1	
	15	23 18.27				17	14 30.63				33	5 20.29		

JUPITER, 1919.

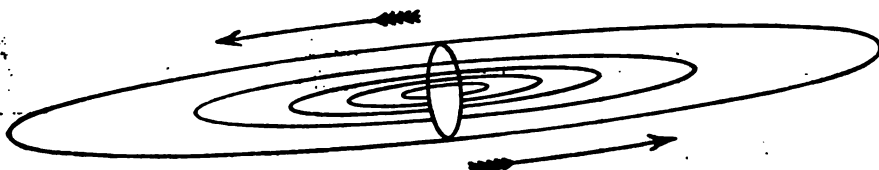
625

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER,
SYSTEM II.

GREENWICH MEAN TIME.

Transit of Zero Meridian.	Interval between Successive Transits.	Transit of Zero Meridian.	Interval between Successive Transits.	Transit of Zero Meridian.	Interval between Successive Transits.
Jan. d h m	h m	Apr. d h m	h m	Sept. d h m	h m
1 9 54.72	9 55.59	18 23 19.41	9 55.82	19 21 25.05	9 55.76
3 11 32.65		21 0 58.50		21 23 3.84	
5 13 10.60		23 2 37.61		24 0 42.62	
7 14 48.57		25 4 16.73		26 2 21.38	
9 16 26.55		27 5 55.86		28 4 0.12	
11 18 4.56	9 55.61	29 7 35.00	9 55.83	30 5 38.85	9 55.74
13 19 42.58		1 9 14.14		2 7 17.56	
15 21 20.63		3 10 53.29		4 8 56.26	
17 22 58.70		5 12 32.45		6 10 34.94	
20 0 36.80		7 14 11.62		8 12 13.61	
22 2 14.92	9 55.64	9 15 50.79	9 55.84	10 13 52.26	9 55.72
24 3 53.07		11 17 29.97		12 15 30.89	
26 5 31.24		13 19 9.16		14 17 9.51	
28 7 9.44		15 20 48.35		16 18 48.10	
30 8 47.67		17 22 27.54		18 20 26.69	
Feb. 1 10 25.93	9 55.66	20 0 6.74	9 55.84	20 22 5.25	9 55.71
3 12 4.21		22 1 45.94		22 23 48.80	
5 13 42.52		24 3 25.15		25 1 22.32	
7 15 20.87		26 5 4.36		27 3 0.84	
9 16 59.24		28 6 43.57		29 4 39.33	
11 18 37.64	9 55.69	30 8 22.78	9 55.84	31 6 17.80	9 55.69
13 20 16.08		1 10 1.99		2 7 56.26	
15 21 54.54		3 11 41.21		4 9 34.70	
17 23 33.02		5 13 20.42		6 11 13.12	
20 1 11.54		7 14 59.64		8 12 51.53	
22 2 50.08	9 55.72	9 16 38.86	9 55.84	10 14 29.91	9 55.67
24 4 28.65		11 18 18.07		12 16 8.28	
26 6 7.25		13 19 57.29		14 17 46.63	
28 7 45.88		15 21 36.51		16 19 24.96	
Mar. 2 9 24.53		17 23 15.72		18 21 3.28	
4 11 3.21	9 55.75	20 0 54.93	9 55.84	20 22 41.57	9 55.65
6 12 41.91		22 2 34.15		23 0 19.85	
8 14 20.64		24 4 13.36		25 1 58.10	
10 15 59.40		26 5 52.56		27 3 36.34	
12 17 38.17		28 7 31.77		29 5 14.56	
14 19 16.97	9 55.77	30 9 10.97	9 55.84	Dec. 1 6 52.77	9 55.63
16 20 55.80		2 10 50.17		3 8 30.98	
18 22 34.64		4 12 29.36		5 10 9.12	
21 0 13.50		6 14 8.56		7 11 47.27	
23 1 52.39		.....		9 13 25.40	
25 3 31.29	9 55.79	.....		11 15 3.52	9 55.62
27 5 10.21		28 3 17.42	9 55.79	13 16 41.62	
29 6 49.15		30 4 56.36		15 18 19.70	
31 8 28.11		1 6 35.30		17 19 57.77	
Apr. 2 10 7.08		3 8 14.21		19 21 35.82	
4 11 46.07	9 55.81	5 9 53.12	9 55.77	21 23 13.85	9 55.60
6 13 25.08		7 11 32.01		24 0 51.87	
8 15 4.10		9 13 10.88		26 2 29.88	
10 16 43.14		11 14 49.75		28 4 7.87	
12 18 22.19		13 16 28.60		30 5 45.85	
14 20 1.25	9 55.82	15 18 7.43	9 55.76	32 7 23.82	9 55.58
16 21 40.32		17 19 46.25		34 9 1.78	

South



North

APPARENT ORBITS OF THE SATELLITES OF JUPITER AT DATE OF OPPOSITION, JANUARY 1, 1919, AS SEEN IN AN INVERTING TELESCOPE, AND ELONGATED IN THE RATIO OF THREE TO ONE IN THE DIRECTION OF THEIR MINOR AXES.

In the above diagram the central ellipse represents the disk of Jupiter, and the inner orbit is that of Satellite V.

In the diagrams of the configurations of Jupiter's four brighter satellites, pages 631-651, Jupiter is represented by a light disk, ○, in the center of the page, and the relative positions of the satellites at the Greenwich time stated above the diagrams are indicated by dots. The designation of each satellite is shown by a numeral placed to the right or left of the dot, according as the motion of the satellite at the instant in question is toward the east or toward the west, the motion being always toward the numeral. In constructing the diagrams the latitudes of the satellites are always considered zero, except where two or more of them chance to be at nearly the same distance from the planet, when they are placed one above the other, according to their apparent latitudes. If, at the epoch of any configuration, one or more satellites are projected on the disk of the planet, that phenomenon is indicated by a light disk, ○, at the left-hand side of the page; and if any satellites are invisible on account of being occulted behind the disk of the planet, or eclipsed by its shadow, that circumstance is indicated by a dark disk, ●, at the right-hand side of the page. In both cases the annexed numerals serve to point out which satellites are thus rendered invisible.

MEAN SYNODIC PERIODS OF THE SATELLITES.

	d	h	m	s		d			d	h	m	s		d
I.	1	18	28	35.946	-	1.769	860	49	V.	0	11	57	27.635	- 0.498 236 52
II.	3	13	17	53.736	-	3.554	094	17	VI.					-266.00
III.	7	3	59	35.856	-	7.166	387	22	VII.					-276.67
IV.	16	18	5	6.916	-	16.753	552	27						

SATELLITES OF JUPITER, 1919.

627

SATELLITE V.

GREENWICH MEAN TIME OF EVERY TWENTIETH GREATEST ELONGATION.

Jan.	d	h	E.	Apr.	d	h	E.	Jan.	d	h	W.	Apr.	d	h	W.
	1	20.6	E.		1	12.7	E.		1	14.6	W.		1	6.7	W.
	11	19.7	E.		11	18.4	E.		11	13.7	W.		11	12.4	W.
	21	18.7	E.	Nov.	1	19.2	E.		21	12.8	W.	Nov.	1	13.3	W.
	31	17.8	E.		21	17.5	E.		31	11.9	W.		21	11.5	W.
Feb.	10	17.0	E.	Dec.	1	16.6	E.	Feb.	10	11.0	W.	Dec.	1	10.6	W.
	20	16.1	E.		11	15.7	E.	Mar.	2	9.2	W.		11	9.7	W.
Mar.	2	15.2	E.		21	14.8	E.		12	8.4	W.		21	8.8	W.
	12	14.4	E.		31	13.9	E.		22	7.6	W.		31	7.9	W.
	22	13.5	E.												

GREENWICH MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE I.

an.	d	h	m	Mar.	d	h	m	June	d	h	m	Oct.	d	h	m	
	1	3	27.2		23	12	13.9		12	23	1.9		13	3	31.4	
	2	21	53.2		25	6	42.7		14	17	32.2		14	22	0.5	
	4	16	19.1		27	1	11.5		16	12	2.5		16	16	29.5	
	6	10	45.0		28	19	40.4		18	6	32.9		18	10	58.5	
	8	5	10.9		30	14	9.3		20	1	3.2		20	5	27.4	
	9	23	37.0	Apr.	1	8	38.4		21	19	33.5		21	23	56.2	
	11	18	3.0		3	3	7.3		23	14	3.9		23	18	25.0	
	13	12	29.0		4	21	36.5		25	8	34.2		25	12	53.8	
	15	6	55.1		6	16	5.6		...	...	...		27	7	22.5
	17	1	21.2		8	10	34.9		...	...	...		29	1	51.1
	18	19	47.4		10	5	4.1		...	...	...		30	20	19.7
	20	14	13.6		11	23	33.5		...	...	...	Nov.	1	14	48.3
	22	8	39.8		13	18	2.8	Aug.	13	22	42.2		3	9	16.8	
	24	3	6.2		15	12	32.3		15	17	12.3		5	3	45.2	
	25	21	32.5		17	7	1.7		17	11	42.4		6	22	13.6	
	27	15	59.0		19	1	31.3		19	6	12.5		8	16	41.9	
	29	10	25.4		20	20	0.8		21	0	42.5		10	11	10.1	
Feb.	31	4	52.0		22	14	30.5		22	19	12.6		12	5	38.3	
	1	23	18.6		24	9	0.1		24	13	42.6		14	0	6.4	
	3	17	45.3		26	3	29.8		26	8	12.6		15	18	34.5	
	5	12	12.0		27	21	59.5		28	2	42.6		17	13	2.5	
	7	6	38.9		29	16	29.3		29	21	12.5		19	7	30.5	
	9	1	5.7	May	1	10	59.0		31	15	42.5		21	1	58.3	
	10	19	32.7		3	5	28.9	Sept.	2	10	12.3		22	20	26.1	
	12	13	59.7		4	23	58.7		4	4	42.2		24	14	53.9	
	14	8	26.9		6	18	28.7		5	23	12.1		26	9	21.5	
	16	2	54.1		8	12	58.6		7	17	41.9		28	3	49.1	
	17	21	21.4		10	7	28.6		9	12	11.7		29	22	16.7	
	19	15	48.7		12	1	58.5		11	6	41.5	Dec.	1	16	44.1	
	21	10	16.1		13	20	28.6		13	1	11.2		3	11	11.6	
	23	4	43.6		15	14	58.6		14	19	40.9		5	5	38.9	
	24	23	11.2		17	9	28.7		16	14	10.6		7	0	6.2	
	26	17	38.8		19	3	58.8		18	8	40.2		8	18	33.3	
	28	12	6.6		20	22	28.9		20	3	9.9		10	13	0.5	
Mar.	2	6	34.4		22	16	59.0		21	21	39.4		12	7	27.5	
	4	1	2.3		24	11	29.2		23	16	8.9		14	1	54.5	
	5	19	30.2		26	5	59.3		25	10	38.5		15	20	21.4	
	7	13	58.3		28	0	29.6		27	5	8.0		17	14	48.3	
	9	8	26.4		29	18	59.7		28	23	37.4		19	9	15.1	
	11	2	54.7		31	13	30.0		30	18	6.8		21	3	41.9	
	12	21	22.8	June	2	8	0.2		Oct.	2	12	36.1		22	22	8.5
	14	15	51.2		4	2	30.5		4	7	5.5		24	16	35.2	
	16	10	19.6		5	21	0.7		6	1	34.7		26	11	1.7	
	18	4	48.2		7	15	31.0		7	20	4.0		28	5	23.2	
	19	23	16.6		9	10	1.3		9	14	33.1		29	23	54.6	
	21	17	45.3		11	4	31.6		11	9	2.3		31	18	21.1	

SATELLITES OF JUPITER, 1919.

GREENWICH MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE II.

	d	h	m		d	h	m		d	h	m		d	h	m
Jan.	0	1	13.0	Mar.	23	16	16.6	June	12	11	26.8	Oct.	15	0	43.1
	3	14	19.4		26	5	33.5		16	0	51.2		18	14	4.5
	7	3	26.0		29	18	51.0		19	14	16.0		22	3	24.7
	10	16	32.6	Apr.	2	8	9.0		23	3	40.7		25	16	45.1
	14	5	39.4		5	21	27.5		26	17	5.9		29	6	4.3
												Nov.	1	19	23.9
	17	18	46.5		9	10	46.4			...	...		5	8	42.2
	21	7	53.9		13	0	5.8	Aug.	15	13	1.1		8	22	0.7
	24	21	1.6		16	18	25.6		19	2	25.9		12	11	17.9
	28	10	9.8		20	2	45.8		22	15	51.4		16	0	35.2
	31	23	18.3		23	16	6.4		26	5	16.0				
Feb.	4	12	27.3		27	5	27.4		29	13	41.3		19	13	51.3
	8	1	36.9		30	18	48.7	Sept.	2	8	5.5		23	3	7.5
	11	14	47.1	May	4	8	10.4		5	21	30.5		26	16	22.5
	15	3	57.7		7	21	32.4		9	10	54.4		30	5	37.4
	18	17	9.0		11	10	54.7		13	0	19.0	Dec.	3	18	51.1
													7	8	4.9
	22	6	20.8		15	0	17.3		16	13	42.4		10	21	17.5
	25	19	33.3		18	13	40.1		20	3	6.5		14	10	29.9
Mar.	1	8	46.2		22	8	3.3		23	16	29.4		17	23	41.3
	4	21	59.8		25	16	26.6		27	5	53.0		21	12	52.6
	8	11	14.0		29	5	50.3		30	19	15.3				
								Oct.	4	8	38.3		25	2	2.8
	12	0	28.8	June	1	19	14.0		7	23	0.0		28	15	13.0
	15	13	44.2		5	8	38.1		11	11	22.1		32	4	22.3
	19	8	0.1		8	22	2.2								

SATELLITE III.

	d	h	m		d	h	m		d	h	m		d	h	m
Jan.	6	17	41.0	Apr.	2	13	2.5		...	...	...	Oct.	13	10	44.2
	13	20	56.6		9	17	7.7		...	...	...		20	14	54.4
	21	0	14.2		16	21	16.2		...	...	...		27	19	0.6
	28	3	35.1		24	1	27.5		...	...	...	Nov.	3	23	2.8
Feb.	4	6	59.8	May	1	5	41.8	Aug.	17	0	3.0		11	3	1.1
													18	6	55.3
	11	10	29.2		8	9	59.2		24	4	29.0		25	10	45.9
	18	14	2.5		15	14	19.0		31	8	54.4	Dec.	2	14	31.6
	25	17	40.5		22	18	41.2	Sept.	7	13	17.6		9	18	12.9
Mar.	4	21	23.1		29	23	4.4		14	17	38.9		16	21	48.8
	12	1	10.5	June	6	3	28.8		21	21	58.2				
													24	1	19.8
	19	5	3.3		13	7	54.1	Oct.	29	2	15.6		31	4	46.4
	26	9	0.5		20	12	20.3		6	6	31.3				

SATELLITE IV.

	d	h	m		d	h	m		d	h	m		d	h	m
Jan.	14	1	17.5	Apr.	7	10	36.6		...	...	...	Oct.	26	11	52.0
	30	15	43.5		24	5	35.7	Aug.	20	4	35.3	Nov.	12	6	8.7
Feb.	16	6	56.8	May	11	1	12.5	Sept.	6	1	2.3		23	23	29.9
Mar.	4	23	10.4		27	21	17.9		22	21	10.4	Dec.	15	15	50.5
	21	16	25.5	June	13	17	44.2	Oct.	9	16	49.6		32	7	12.5

SATELLITES OF JUPITER, 1919.

629

DIFFERENTIAL COORDINATES OF SATELLITE VI.

FOR GREENWICH MEAN NOON.

Date.	$\alpha_{VI}-\alpha_{Jup.}$	$\delta_{VI}-\delta_{Jup.}$	Date.	$\alpha_{VI}-\alpha_{Jup.}$	$\delta_{VI}-\delta_{Jup.}$	Date.	$\alpha_{VI}-\alpha_{Jup.}$	$\delta_{VI}-\delta_{Jup.}$
	m s	'		m s	'		m s	'
1	-1 34	-32.7	Apr. 11	+3 18	+11.4	Sept. 27	-1 49	-15.4
5	1 9	32.6	15	3 7	12.9	Oct. 1	1 39	15.1
9	0 44	32.3	19	2 55	14.2	5	1 28	14.7
13	-0 20	31.7	23	2 41	15.2	9	1 16	14.2
17	+0 5	30.8	27	2 26	16.1	13	1 3	13.7
21	+0 30	-29.7	May 1	+2 9	+16.7	17	-0 50	-13.1
25	0 53	28.3	5	1 51	17.1	21	0 36	12.5
29	1 16	26.7	9	1 32	17.2	25	0 21	11.8
b. 2	1 38	24.9	13	1 12	17.0	29	-0 6	11.0
6	1 58	23.0	17	0 51	16.6	Nov. 2	+0 10	10.2
10	+2 16	-20.9	21	+0 30	+16.0	6	+0 26	- 9.3
14	2 33	18.7	25	+0 9	15.1	10	0 42	8.4
18	2 49	16.5	29	-0 12	14.0	14	0 59	7.4
22	3 2	14.1	June 2	0 32	12.7	18	1 16	6.4
26	3 14	11.8	6	0 51	11.3	22	1 33	5.3
r. 2	+3 24	- 9.4	10	-1 10	+ 9.6	26	+1 50	- 4.2
6	3 32	7.0	14	-1 27	+ 8.0	30	2 7	3.0
10	3 37	4.7				Dec. 4	2 23	1.8
14	3 41	2.4	Aug. 30	-2 44	-15.1	8	2 38	- 0.5
18	3 44	- 0.2	Sept. 3	2 39	15.4	12	2 52	+ 0.9
22	+3 44	+ 2.0	7	-2 32	-15.6	16	+3 5	+ 2.3
26	3 42	4.1	11	2 25	15.8	20	3 17	3.7
30	3 39	6.1	15	2 17	15.8	24	3 26	5.1
r. 3	3 34	8.0	19	2 9	15.7	28	3 32	6.5
7	+3 26	+ 9.8	23	-1 59	-15.6	32	+3 36	+ 7.9

DIFFERENTIAL COORDINATES OF SATELLITE VII.

Date.	$\alpha_{VII}-\alpha_{Jup.}$	$\delta_{VII}-\delta_{Jup.}$	Date.	$\alpha_{VII}-\alpha_{Jup.}$	$\delta_{VII}-\delta_{Jup.}$	Date.	$\alpha_{VII}-\alpha_{Jup.}$	$\delta_{VII}-\delta_{Jup.}$
	m s	'		m s	'		m s	'
1	+2 5	+17.2	Apr. 11	-3 51	+22.8	Sept. 27	+2 39	+ 8.3
5	1 44	19.9	15	3 49	21.3	Oct. 1	2 34	10.0
9	1 21	22.3	19	3 46	19.8	5	2 28	11.7
13	0 58	24.6	23	3 42	18.1	9	2 21	13.5
17	0 34	26.7	27	3 37	16.3	13	2 14	15.2
21	+0 10	+28.6	May 1	-3 31	+14.5	17	+2 6	+17.0
25	-0 14	30.3	5	3 24	12.6	21	1 57	18.8
29	0 38	31.7	9	3 16	10.5	25	1 47	20.6
b. 2	1 1	32.9	13	3 7	8.4	29	1 36	22.3
6	1 23	33.8	17	2 57	6.3	Nov. 2	1 24	24.0
10	-1 44	+34.5	21	-2 45	+ 4.1	6	+1 11	+25.6
14	2 4	35.0	25	2 32	+ 1.8	10	0 58	27.2
18	2 22	35.1	29	2 19	- 0.4	14	0 43	28.6
22	2 38	35.1	June 2	2 4	2.6	18	0 28	29.9
26	2 53	34.8	6	1 48	4.7	22	+0 12	31.1
r. 2	-3 6	+34.2	10	-1 30	- 6.8	26	-0 5	+32.1
6	3 17	33.6	14	-1 13	- 8.7	30	0 22	33.0
10	3 26	32.7				Dec. 4	0 39	33.8
14	3 34	31.8	Aug. 30	+2 53	- 3.6	8	0 57	34.4
18	3 40	30.7	Sept. 3	2 54	1.8	12	1 15	34.9
22	-3 45	+29.5	7	+2 53	- 0.1	16	-1 32	+35.2
26	3 49	28.3	11	2 52	+ 1.6	20	1 50	35.3
30	3 51	27.0	15	2 50	3.3	24	2 7	35.2
r. 3	3 52	25.7	19	2 47	5.0	28	2 24	35.0
7	-3 52	+24.3	23	+2 43	+ 6.7	32	-2 41	+34.5

GREENWICH MEAN TIME.

JANUARY.



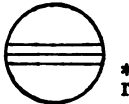

d	h	m		d	h	m		d	h	m		d	h	m		d	h	m	
1	2	18.3	I. Ec. D.	9	1	32	I. Sh. I.	17	12	23	III.*Tr. E.	25	2	4	I. Sh. E.				
	4	35	I. Oc. R.		3	36	I. Tr. E.		14	1	III.*Sh. E.		20	25	I.*Oc. D.				
	18	5	II.*Tr. I.		3	47	I. Sh. E.		17	26	II.*Oc. D.		23	16.6	I. Ec. R.				
	18	5	II.*Sh. I.		22	29	I.*Oc. D.		20	55.3	II.*Ec. R.								
	20	47	II.*Tr. E.						21	31	I.*Tr. I.	26	14	1	II.*Tr. I.				
	20	48	II.*Sh. E.	10	0	57.8	I. Ec. R.		21	55	I.*Sh. I.		15	15	II.*Sh. I.				
	23	37	I.*Tr. I.		5	58	III. Tr. I.		23	45	I. Tr. E.		16	43	II.*Tr. E.				
	23	38	I.*Sh. I.		6	49	III. Sh. I.						17	42	I.*Tr. I.				
					9	6	III. Tr. E.	18	0	10	I. Sh. E.		17	58	II.*Sh. E.				
2	1	52	I. Tr. E.		10	1	III. Sh. E.		18	39	I.*Oc. D.		18	18	I.*Sh. I.				
	1	53	I. Sh. E.		15	12	II.*Oc. D.		21	21.5	I.*Ec. R.		19	56	I.*Tr. E.				
	20	45	I.*Oc. D.		18	20.5	II.*Ec. R.						20	33	I.*Sh. E.				
	23	2.9	I.*Ec. R.		19	47	I.*Tr. I.	19	11	43	II.*Tr. I.								
					20	1	I.*Sh. I.		12	38	II.*Sh. I.	27	14	51	I.*Oc. D.				
3	2	41	III. Tr. I.		22	1	I.*Tr. E.		14	28	II.*Tr. E.		17	45.5	I.*Ec. R.				
	2	50	III. Sh. I.		22	16	I.*Sh. E.		15	21	II.*Sh. E.								
	5	51	III. Tr. E.						15	57	I.*Tr. I.	28	2	0	III. Oc. D.				
	6	1	III. Sh. E.		11	16	55	I.*Oc. D.	16	24	I.*Sh. I.		7	49.9	III. Ec. R.				
	12	59	II.*Oc. D.		19	26.5	I.*Ec. R.		18	11	I.*Tr. E.		8	49	II. Oc. D.				
	15	45.7	II.*Ec. R.						18	38	I.*Sh. E.		12	8	I.*Tr. I.				
	18	3	I.*Tr. I.	12	9	27	II. Tr. I.						12	47	I.*Sh. I.				
	18	6	I.*Sh. I.		10	0	II. Sh. I.	20	13	6	I.*Oc. D.		12	47.7	II.*Ec. R.				
	20	18	I.*Tr. E.		12	9	II.*Tr. E.		15	50.3	I.*Ec. R.		14	23	I.*Tr. E.				
	20	21	I.*Sh. E.		12	43	II.*Sh. E.		22	39	III.*Oc. D.		15	1	I.*Sh. E.				
					14	13	I.*Tr. I.												
4	15	11	I.*Oc. D.		14	29	I.*Sh. I.	21	3	48.9	III. Ec. R.	29	9	17	I. Oc. D.				
	17	31.6	I.*Ec. R.		16	27	I.*Tr. E.		6	33	II. Oc. D.		12	14.2	I.*Ec. R.				
					16	44	I.*Sh. E.		10	12.8	II. Ec. R.								
5	7	12	II. Tr. I.						10	23	I. Tr. I.	30	3	11	II. Tr. I.				
	7	23	II. Sh. I.	13	11	21	I.*Oc. D.		10	52	I.*Sh. I.		4	34	II. Sh. I.				
	9	54	II. Tr. E.		13	55.2	I.*Ec. R.		12	38	I.*Tr. E.		5	53	II. Tr. E.				
	10	6	II. Sh. E.		19	21	III.*Oc. D.		13	7	I.*Sh. E.		6	35	I. Tr. I.				
	12	29	I.*Tr. I.		23	48.6	III. Ec. R.						7	15	I. Sh. I.				
	12	35	I.*Sh. I.						23	7	32	I. Oc. D.		7	18	II. Sh. E.			
	14	44	I.*Tr. E.	14	0	12	IV. Oc. D.		7	51	IV. Tr. I.		8	49	I. Tr. E.				
	14	50	I.*Sh. E.		2	23	IV. Oc. R.		10	4	IV. Tr. E.		9	30	I. Sh. E.				
	17	37	IV.*Tr. I.		3	8.6	IV. Ec. D.		10	19.0	I. Ec. R.		14	37	IV.*Oc. D.				
	18	34	IV.*Sh. I.		4	19	II. Oc. D.		12	32	IV.*Sh. I.		16	50	IV.*Ec. R.				
	19	49	IV.*Tr. E.		5	29.0	IV. Ec. R.		15	1	IV.*Sh. E.		21	9.3	IV.*Oc. D.				
	20	49	IV.*Sh. E.		7	37.9	II. Ec. R.						23	43.6	IV. Ec. R.				
					8	39	I. Tr. I.	23	0	52	II. Tr. I.								
6	9	37	I. Oc. D.		8	58	I. Sh. I.		1	57	II. Sh. I.	31	3	44	I. Oc. D.				
	12	0.3	I.*Ec. R.		10	53	I.*Tr. E.		3	35	II. Tr. E.		6	43.1	I. Ec. R.				
	16	6	III.*Oc. D.		11	13	I.*Sh. E.		4	40	II. Sh. E.		15	55	III.*Tr. I.				
	19	48.6	III.*Ec. R.						4	49	I. Tr. I.		18	48	III.*Sh. I.				
					15	5	47	I. Oc. D.	5	21	I. Sh. I.		19	5	III.*Tr. E.				
7	2	6	II. Oc. D.		8	23.9	I. Ec. R.		7	4	I. Tr. E.		21	58	II. Oc. D.				
	5	3.1	II. Ec. R.		22	35	II.*Tr. I.		7	36	I. Sh. E.		22	2	III. Sh. E.				
	6	55	I. Tr. I.		23	19	II. Sh. I.												
	7	3	I. Sh. I.																
	9	10	I. Tr. E.	16	1	18	II. Tr. E.	24	1	58	I. Oc. D.								
	9	18	I. Sh. E.		2	3	II. Sh. E.		4	47.9	I. Ec. R.								
					3	5	I. Tr. I.		12	33	III.*Tr. I.								
8	4	3	I. Oc. D.		3	26	I. Sh. I.		14	48	III.*Sh. I.								
	6	29.0	I. Ec. R.		5	19	I. Tr. E.		15	42	III.*Tr. E.								
	20	20	II.*Tr. I.		5	41	I. Sh. E.		18	2	III.*Sh. E.								
	20	42	II.*Sh. I.						19	41	II.*Oc. D.								
	23	2	II.*Tr. E.	17	0	13	I. Oc. D.		23	16	I. Tr. I.								
	23	25	II.*Sh. E.		2	52.7	I. Ec. R.		23	30.2	II. Ec. R.								
					9	14	III. Tr. I.		23	49	I. Sh. I.								
9	1	21	I. Tr. I.		10	49	III.*Sh. I.	25	1	30	I. Tr. E.								

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; *transit of the satellite; Sh., transit of the shadow. *visible at Washington.

SATELLITES OF JUPITER, 1919.

631

GREENWICH MEAN TIME.

JANUARY.			
<i>Phases of the Eclipses of the Satellites for an Inverting Telescope.</i>			
I.		III.	
II.		IV.	

<i>Configurations at 16^h 15^m for an Inverting Telescope.</i>	
Day.	West. East.
1	○ 2. 1. 3. 4.
2	2. .1 ○ 3. 4.
3	3. ○ 1. 4.
4	3. ○ 2. 4. .1 ●
5	.3 2. 1. ○
6	4. .2 ○ .1 .3 ●
7	4. 1. ○ .2 .3
8	4. ○ 2. 1. 3.
9	4. 2. .1 ○ 3.
10	.4 3. ○ 1. .2 ●
11	.4 3. .1 ○ 2.
12	○ 1. .4 2. ○
13	.2 .4 .3 ○ .1
14	1. ○ .4 .3
15	○ .1 .4
16	2. .1 ○ 3. .4
17	3. .2 1. .4
18	3. .1 ○ 2. 4.
19	○ 1. .3 2. ○ 4.
20	.2 .3 ○ .1 4.
21	1. ○ .4 .3
22	4. ○ .4 .3
23	4. 2. 1. ○ 3.
24	4. .4 ○ 1.
25	4. 3. .1 ○ .2
26	○ 2. .4 .3 ○ 1.
27	.4 .2 .3 ○ .1 ●
28	.4 1. ○ .2 .3
29	.4 ○ .12. .3
30	2. 1. ○ 3. .4 ●
31	○ 3. .2 ○ 1. .4

GREENWICH MEAN TIME.

FEBRUARY.

d	h	m		d	h	m		d	h	m		d	h	m		d	h	m		
1	1	1	I. Tr. I.	9	18	42	II.*Tr. I.	17	1	17	I. Tr. E.	25	16	5	III.*Oc. D.					
	1	44	I. Sh. I.		20	30	II.*Sh. I.		1	52	II. Sh. E.		18	13	II.*Oc. D.					
	2	5.2	II. Ec. R.		21	15	I. Tr. I.		2	17	I. Sh. E.		19	16	III.*Oc. R.					
	3	15	I. Tr. E.		21	24	II. Tr. E.		20	13	I.*Oc. D.		19	19	I.*Tr. I.					
	3	59	I. Sh. E.		22	7	I. Sh. I.		23	31.7	I. Ec. R.		20	26	I. Sh. I.					
	22	11	I. Oc. D.		23	14	II. Sh. E.						20	35.8	III. Ec. D.					
					23	29	I. Tr. E.		18	12	27	III.*Oc. D.		21	33	I. Tr. E.				
2	1	11.9	I. Ec. R.						15	38	III.*Oc. R.		22	40	I. Sh. E.					
	16	20	II.*Tr. I.	10	0	22	I. Sh. E.		15	48	II.*Oc. D.		23	8.1	II. Ec. R.					
	17	53	II.*Sh. I.		18	25	I.*Oc. D.		16	35.8	III.*Ec. D.		23	54.5	III. Ec. R.					
	19	2	II.*Tr. E.		21	36.2	I. Ec. R.		17	30	I.*Tr. I.									
	19	28	I.*Tr. I.						18	31	I.*Sh. I.	26	16	31	I.*Oc. D.					
	20	13	I.*Sh. I.	11	8	54	III. Oc. D.		19	44	I.*Tr. E.		19	56.1	I.*Ec. R.					
	20	36	II.*Sh. E.		12	5	III.*Oc. R.		19	53.7	III.*Ec. R.									
	21	42	I.*Tr. E.		12	35.6	III.*Ec. D.		20	32.9	II.*Ec. R.	27	12	47	II.*Tr. I.					
	22	27	I. Sh. E.		13	27	II.*Oc. D.		20	45	I. Sh. E.		13	47	I.*Tr. I.					
					15	42	I.*Tr. I.						14	54	I.*Sh. I.					
3	16	37	I.*Oc. D.		15	52.6	III.*Ec. R.	19	14	41	I.*Oc. D.		15	6	II.*Sh. I.					
	19	40.8	I.*Ec. R.		16	36	I.*Sh. I.		18	0.5	I.*Ec. R.		15	29	II.*Tr. E.					
					17	56	I.*Tr. E.						16	1	I.*Tr. E.					
4	5	24	III. Oc. D.		17	57.8	II.*Ec. R.	20	10	19	II. Tr. I.		17	9	I.*Sh. E.					
	11	7	II.*Oc. D.		18	51	I.*Sh. E.		11	57	I.*Tr. I.		17	50	II.*Sh. E.					
	11	50.9	III.*Ec. R.						12	28	II.*Sh. I.									
	13	54	I.*Tr. I.	12	12	52	I.*Oc. D.		12	59	I.*Sh. I.	28	10	59	I. Oc. D.					
	14	41	I.*Sh. I.		16	5.0	I.*Ec. R.		13	1	II.*Tr. E.		14	25.1	I.*Ec. R.					
	15	22.7	II.*Ec. R.						14	11	I.*Tr. E.									
	16	9	I.*Tr. E.	13	7	54	II. Tr. I.		15	12	II.*Sh. E.									
	16	56	I.*Sh. E.		9	50	II. Sh. I.		15	14	I.*Sh. E.									
					10	9	I. Tr. I.													
5	11	4	I.*Oc. D.		10	36	II. Tr. E.	21	9	8	I. Oc. D.									
	14	9.6	I.*Ec. R.		11	5	I. Sh. I.		12	29.5	I.*Ec. R.									
					12	23	I.*Tr. E.													
6	5	31	II. Tr. I.		12	34	II.*Sh. E.	22	2	28	III. Tr. I.									
	7	12	II. Sh. I.		13	19	I.*Sh. E.		5	0	II. Oc. D.									
	8	13	II. Tr. E.						5	37	III. Tr. E.									
	8	21	I. Tr. I.	14	7	19	I. Oc. D.		6	25	I. Tr. I.									
	9	10	I. Sh. I.		10	33.9	I. Ec. R.		6	46	III. Sh. I.									
	9	56	II. Sh. E.		22	52	III. Tr. I.		7	28	I. Sh. I.									
	10	35	I. Tr. E.						8	38	I. Tr. E.									
	11	25	I.*Sh. E.	15	2	1	III. Tr. E.		9	43	I. Sh. E.									
					2	37	II. Oc. D.		9	50.4	II. Ec. R.									
7	5	31	I. Oc. D.		2	46	III. Sh. I.		10	2	III. Sh. E.									
	8	38.5	I. Ec. R.		4	36	I. Tr. I.													
	19	22	III.*Tr. I.		5	33	I. Sh. I.	23	3	36	I. Oc. D.									
	22	31	III. Tr. E.		6	2	III. Sh. E.		6	58.3	I. Ec. R.									
	22	41	IV. Tr. I.		6	50	I. Tr. E.		23	32	II. Tr. I.									
	22	47	III. Sh. I.		7	15.3	II. Ec. R.													
					7	48	I. Sh. E.													
8	0	16	II. Oc. D.						24	0	52	I. Tr. I.								
	0	57	IV. Tr. E.	16	1	46	I. Oc. D.			1	46	II. Sh. I.								
	2	2	III. Sh. E.		5	2.8	I. Ec. R.			1	57	I. Sh. I.								
	2	48	I. Tr. I.		5	48	IV. Oc. D.			2	14	II. Tr. E.								
	3	39	I. Sh. I.		8	6	IV. Oc. R.			3	6	I. Tr. E.								
	4	40.2	II. Ec. R.		15	11.0	IV.*Ec. D.			4	30	II. Sh. E.								
	5	2	I. Tr. E.		17	57.8	IV.*Ec. R.			14	22	IV.*Tr. I.								
	5	53	I. Sh. E.		21	6	II. Tr. I.			16	44	IV.*Tr. E.								
	6	31	IV. Sh. I.		23	3	I. Tr. I.			22	3	I. Oc. D.								
	9	12	IV. Sh. E.		23	8	II. Sh. I.													
	23	58	I. Oc. D.		23	48	II. Tr. E.	25	0	31	IV. Sh. I.									
										1	27.3	I. Ec. R.								
9	3	7.3	I. Ec. R.	17	0	2	I. Sh. I.			3	23	IV. Sh. E.								

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow.

*Visible at Washington.

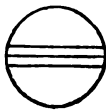
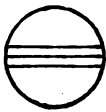
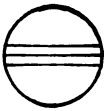
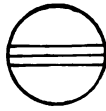
SATELLITES OF JUPITER, 1919.

633

GREENWICH MEAN TIME.

FEBRUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

	* r	III.		* d	* r
	* r	IV.		* d	* r

Configurations at 15^h 45^m for an Inverting Telescope.

West.	East.
3 [•] 1 [•] ○ 2 [•] 4 [•]	
3 [•] 2 [•] 3 [•] ○ 1 [•] 4 [•]	
2 [•] 3 [•] ○ 1 [•] 4 [•]	
	○ 2 [•] 3 [•] 4 [•]
	○ 1 [•] 2 [•] 3 [•] 4 [•]
1 [•] ○ 4 [•]	
2 [•] ○ 1 [•] 4 [•]	
3 [•] 4 [•] 1 [•] ○ 2 [•]	
4 [•] 3 [•] ○ 2 [•] 1 [•]	
4 [•] 3 [•] 1 [•] ○	
4 [•] ○	2 [•] 3 [•] ●
4 [•] ○ 2 [•] 3 [•]	1 [•] ●
4 [•] 1 [•] ○ 3 [•]	
4 [•] 2 [•] ○ 3 [•] 1 [•]	
3 [•] 1 [•] 4 [•] ○ 2 [•]	
3 [•] ○ 1 [•] 4 [•]	4 [•] ●
3 [•] 1 [•] ○ 4 [•]	
○ 1 [•] 3 [•] 4 [•]	
○ 2 [•] 3 [•] 4 [•] 1 [•] ●	
2 [•] 1 [•] ○ 3 [•] 4 [•]	
2 [•] 1 [•] ○ 2 [•] 4 [•]	
3 [•] ○ 1 [•] 4 [•]	
3 [•] 2 [•] 1 [•] ○	
4 [•] 1 [•] 3 [•] ○ 1 [•]	
4 [•] ○ 1 [•] 3 [•]	
4 [•] 2 [•] ○ 1 [•] 3 [•]	

MARCH.

d	h	m		d	h	m		d	h	m		d	h	m		d	h	m	
1	6	8	III. Tr. I.	8	13	32	I.*Sh. E.	16	12	45.2	I.*Ec. R.	24	11	51	I. Sh. E.				
	7	26	II. Oc. D.		14	46	III.*Sh. I.						12	19	II.*Sh. I.				
	8	15	I. Tr. I.		15	1.0	II.*Ec. R.	17	6	27	I. Tr. I.		12	24	II.*Tr. E.				
	9	17	III. Tr. E.		18	4	III.*Sh. E.		7	6	II. Tr. I.		15	3	II.*Sh. E.				
	9	23	I. Sh. I.						7	41	I. Sh. I.								
	10	29	I. Tr. E.	9	7	18	I. Oc. D.		8	41	I. Tr. E.	25	5	35	I. Oc. D.				
	10	46	III. Sh. I.		10	49.6	I. Ec. R.		9	41	II. Sh. I.		9	9.9	I. Ec. R.				
	11	37	I.*Sh. E.						9	48	II. Tr. E.								
	12	25.7	II.*Ec. R.	10	4	32	II. Tr. I.		9	56	I. Sh. E.	26	2	49	I. Tr. I.				
	14	3	III.*Sh. E.		4	34	I. Tr. I.		12	25	II.*Sh. E.		4	5	I. Sh. I.				
					5	47	I. Sh. I.						4	13	II. Oc. D.				
2	5	26	I. Oc. D.		6	48	I. Tr. E.	18	3	40	I. Oc. D.		5	3	I. Tr. E.				
	8	53.9	I. Ec. R.		7	3	II. Sh. I.		7	14.2	I. Ec. R.		6	20	I. Sh. E.				
					7	14	II. Tr. E.						7	23	III. Oc. D.				
3	2	1	II. Tr. I.		8	1	I. Sh. E.	19	0	55	I. Tr. I.		9	29.4	II. Ec. R.				
	2	42	I. Tr. I.		9	47	II. Sh. E.		1	39	II. Oc. D.		10	38	III. Oc. R.				
	3	52	I. Sh. I.						2	10	I. Sh. I.		12	36.4	III.*Ec. D.				
	4	25	II. Sh. I.	11	1	47	I. Oc. D.		3	9	I. Tr. E.		15	58.3	III.*Ec. R.				
	4	43	II. Tr. E.		5	18.6	I. Ec. R.		3	26	III. Oc. D.								
	4	56	I. Tr. E.		23	2	I. Tr. I.		4	25	I. Sh. E.	27	0	3	I. Oc. D.				
	6	6	I. Sh. E.		23	8	II. Oc. D.		6	40	III. Oc. R.		3	38.7	I. Ec. R.				
	7	8	II. Sh. E.		23	34	III. Oc. D.		6	54.0	II. Ec. R.		21	18	I. Tr. I.				
	23	54	I. Oc. D.						8	36.0	III. Ec. D.		22	34	I. Sh. I.				
				12	0	15	I. Sh. I.		11	57.1	III.*Ec. R.		23	1	II. Tr. I.				
4	3	22.9	I. Ec. R.		1	16	I. Tr. E.		22	9	I. Oc. D.		23	32	I. Tr. E.				
	19	47	III. Oc. D.		2	30	I. Sh. E.												
	20	39	II. Oc. D.		2	47	III. Oc. R.	20	1	43.0	I. Ec. R.	28	0	48	I. Sh. E.				
	21	10	I. Tr. I.		4	18.6	II. Ec. R.		19	24	I. Tr. I.		1	38	II. Sh. I.				
	21	58	IV. Oc. D.		4	35.4	III. Ec. D.		20	24	II. Tr. I.		1	43	II. Tr. E.				
	22	20	I. Sh. I.		7	55.8	III. Ec. R.		20	39	I. Sh. I.		4	23	II. Sh. E.				
	22	59	III. Oc. R.		20	15	I. Oc. D.		21	37	I. Tr. E.		18	32	I. Oc. D.				
	23	24	I. Tr. E.		23	47.4	I. Ec. R.		22	53	I. Sh. E.		22	7.6	I. Ec. R.				
									23	0	II. Sh. I.								
5	0	23	IV. Oc. R.	13	7	4	IV. Tr. I.		23	6	II. Tr. E.	29	15	47	I.*Tr. I.				
	0	35	I. Sh. E.		9	32	IV. Tr. E.						17	3	I.*Sh. I.				
	0	35.5	III. Ec. D.		17	30	I.*Tr. I.	21	1	44	II. Sh. E.		17	30	II.*Oc. D.				
	1	43.3	II. Ec. R.		17	49	II.*Tr. I.		15	9	IV.*Oc. D.		18	0	I.*Tr. E.				
	3	55.0	III. Ec. R.		18	32	IV.*Sh. I.		16	37	I.*Oc. D.		19	17	I. Sh. I.				
	9	13.8	IV. Ec. D.		18	44	I.*Sh. I.		17	42	IV.*Oc. R.		21	35	III. Tr. I.				
	12	12.3	IV.*Ec. R.		19	44	I. Tr. E.		20	12.0	I. Ec. R.		22	47.2	II. Ec. R.				
	18	22	I.*Oc. D.		20	22	II. Sh. I.												
	21	51.7	I. Ec. R.		20	31	II. Tr. E.	22	3	16.9	IV. Ec. D.	30	0	42	IV. Tr. I.				
					20	58	I. Sh. E.		6	25.9	IV. Ec. R.		0	47	III. Tr. E.				
6	15	17	II.*Tr. I.		21	33	IV. Sh. E.		13	52	I.*Tr. I.		2	46	III. Sh. I.				
	15	38	I.*Tr. I.		23	6	II. Sh. E.		14	56	II.*Oc. D.		3	19	IV. Tr. E.				
	16	49	I.*Sh. I.						15	8	I.*Sh. I.		6	5	III. Sh. E.				
	17	44	II.*Sh. I.	14	14	43	I.*Oc. D.		16	6	I.*Tr. E.		12	33	IV.*Sh. I.				
	17	52	I.*Tr. E.		18	16.3	I.*Ec. R.		17	22	I.*Sh. E.		13	1	I.*Oc. D.				
	17	59	II.*Tr. E.						17	37	III.*Tr. I.		15	44	IV.*Sh. E.				
	19	3	I.*Sh. E.	15	11	59	I.*Tr. I.		20	11.7	II. Ec. R.		16	38.5	I.*Ec. R.				
	20	28	II. Sh. E.		12	23	II.*Oc. D.		20	48	III. Tr. E.								
					13	13	I.*Sh. I.		22	46	III. Sh. I.	31	10	15	I. Tr. I.				
7	12	50	I.*Oc. D.		13	43	III.*Tr. I.						11	31	I. Sh. I.				
	16	20.7	I.*Ec. R.		14	12	I.*Tr. E.	23	2	5	III. Sh. E.		12	20	II.*Tr. I.				
					15	27	I.*Sh. E.		11	6	I. Oc. D.		12	29	I.*Tr. E.				
8	9	53	III. Tr. I.		16	53	III.*Tr. E.		14	40.9	I.*Ec. R.		13	46	I.*Sh. E.				
	9	53	II. Oc. D.		17	36.3	II.*Ec. R.						14	57	II.*Sh. I.				
	10	6	I. Tr. I.		18	46	III.*Sh. I.	24	8	21	I. Tr. I.		15	2	II.*Tr. E.				
	11	18	I. Sh. I.		22	4	III. Sh. E.		9	36	I. Sh. I.		17	41	II.*Sh. E.				
	12	20	I.*Tr. E.						9	42	II. Tr. I.								
	13	3	III.*Tr. E.	16	9	12	I. Oc. D.		10	34	I. Tr. E.								

NORX.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow.

*Visible at Washington.





SATELLITES OF JUPITER, 1919.

635

GREENWICH MEAN TIME.

MARCH.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		* r	III.		* d	* r
II.		* r	IV.		* d	* r

Configurations at 15^h 15^m for an Inverting Telescope.

Day.	West.			East.		
1	•4		³ ₁ ○	•2		
2		•4	³ ₁ ○		³ ₁	
3			³ ₄ 2•1 ○			
4			³ ₄ ○	1•		
5			•1 ○	•4 ³ ₃		
6			³ ₁ ○		³ ₄	
7			•2 ○	3•	•4	•1 ●
8			³ ₁ ○	•2		•4
9		3•	○	•12•		4•
10		•3	³ ₁ ○		4•	
11			³ ₃ ○	1•	4•	
12			•1 ○	⁴ ₃		
13			4• ○	³ ₁	•3	
14		4• 2•	○	3•		•1 ●
15	○ 3•	4•	1• ○			•2 ●
16	4•	3•	○	•1 2•		
17	•4	•3	³ ₁ ○			
18	•4		³ ₃ ○	•1		
19		•4	•1 ○	•3 2		
20			•4 ○	³ ₁	•3	
21		2•	• ○ 1	3•		•4 ●
22	○ 1•		3 ○	•4		•2 ●
23		3•	○	•1 2•	•4	
24		•3	1•2 ○		•4	
25			³ ₃ ○	•1		•4
26			•1 ○	•2	4•	•3 ●
27			○	³ ₁	•3 4•	
28		2•	•1 ○		⁴ ₃	
29			³ ₁ ○	⁴ ₃		
30		3• 4•	○	•2		•1 ●
31		⁴ ₃	1• ³ ₁ ○			

GREENWICH MEAN TIME.

APRIL.

d	h	m		d	h	m		d	h	m		d	h	m		d	h	m	
1	7	30	I. Oc. D.	9	10	10	I. Sh. E.	17	5	54	I. Oc. D.	25	9	46	II. Tr. I.	31	16	5	I. Tr. I.
11	5.5		I. Ec. R.	14	40.6		II.*Ec. R.	9	25.5		I. Ec. R.	12	10		II. Sh. I.	17	16		I. Sh. I.
				15	30		III.*Oc. D.					12	30		II.*Tr. E.	18	10		I. Tr. E.
2	4	44	I. Tr. I.	18	46		III. Oc. R.	18	3	6	I. Tr. I.	14	55		II.*Sh. E.	19	10		I. Sh. I.
6	0		I. Sh. I.	20	37.6		III. Ec. D.				I. Sh. I.					20	10		I. Tr. E.
6	48		II. Oc. D.								I. Tr. E.	20	2	22	I. Oc. D.	21	10		I. Ec. R.
6	58		I. Tr. E.	10	0	1.2	III. Ec. R.				I. Sh. E.	5	40.9		I. Ec. R.	21	11		I. Sh. I.
8	15		I. Sh. E.	8	56		I. Oc. D.				II. Tr. I.	23	34		I. Tr. I.	22	11		I. Sh. I.
11	25		III. Oc. D.	7	29.9		I. Ec. R.				II. Sh. I.					23	11		I. Tr. E.
12	5.0		II.*Ec. R.								II. Tr. E.	27	0	43	I. Sh. I.	24	11		I. Tr. E.
14	40		III.*Oc. R.	11	1	9	I. Tr. I.				II.*Sh. E.	1	43		I. Tr. E.	25	11		I. Sh. E.
16	37.4		III.*Ec. D.	2	24		I. Sh. I.					2	58		I. Sh. E.	26	11		II. Oc. D.
20	0.1		III. Ec. R.	3	23		I. Tr. E.	19	0	23	I. Oc. D.	4	6		II. Ec. R.	27	11		III.*Tr. I.
				4	20		II. Tr. I.				I. Ec. R.	9	9.9		III. Ec. R.	28	11		III. Tr. E.
3	1	59	I. Oc. D.	4	39		I. Sh. E.	21	36		I. Tr. I.	14	5		III.*Tr. I.	29	11		I. Sh. I.
5	34.3		I. Ec. R.	6	54		II. Sh. I.	22	48		I. Sh. I.	17	21		III. Tr. E.	30	11		I. Sh. E.
23	13		I. Tr. I.	7	3		II. Tr. E.	23	50		I. Tr. E.	18	45		III. Sh. I.	31	11		I. Ec. R.
				9	39		II. Sh. E.					20	51		I. Oc. D.				
4	0	29	I. Sh. I.	22	25		I. Oc. D.	20	1	3	I. Sh. E.	22	8		III. Sh. E.				
1	27		I. Tr. E.								II. Oc. D.								
1	40		II. Tr. I.	12	1	58.9	I. Ec. R.				II. Ec. R.	26	0	18.7	I. Ec. R.				
2	43		I. Sh. E.	19	59		I. Tr. I.				III. Tr. I.	15	3		I. Tr. I.				
4	16		II. Sh. I.	20	53		I. Sh. I.	13	7		III.*Tr. E.	19	11		I. Sh. I.				
4	22		II. Tr. E.	21	53		I. Tr. E.	14	45		III.*Sh. I.	20	18		I. Tr. E.				
7	1		II. Sh. E.	22	45		II. Oc. D.	18	7		III. Sh. E.	21	26		I. Sh. E.				
20	28		I. Oc. D.	23	7		I. Sh. E.	18	53		I. Oc. D.	23	8		II. Tr. I.				
								22	23.2		I. Ec. R.								
5	0	3.3	I. Ec. R.	13	3	58.4	II. Ec. R.					20	1	28	II. Sh. I.				
17	42		I. Tr. I.	5	43		III. Tr. I.	21	16	5	I.*Tr. I.	1	52		II. Tr. E.				
18	58		I. Sh. I.	8	57		III. Tr. E.	17	16		I. Sh. I.	4	13		II. Sh. E.				
19	56		I. Tr. E.	10	45		III. Sh. I.	18	19		I. Tr. E.	15	21		I.*Oc. D.				
20	6		II. Oc. D.	14	6		III.*Sh. E.	19	31		I. Sh. E.	18	47.6		I. Ec. R.				
21	12		I. Sh. E.	16	55		I.*Oc. D.	20	24		II. Tr. I.								
				20	27.7		I. Ec. R.	22	50		II. Sh. I.	30	12	33	I.*Tr. I.				
6	1	22.8	II. Ec. R.					23	7		II. Tr. E.	13	40		I.*Sh. I.				
1	37		III. Tr. I.	14	14	8	I.*Tr. I.					14	47		I.*Tr. E.				
4	50		III. Tr. E.	15	21		I.*Sh. I.	22	1	36	II. Sh. E.	15	55		I.*Sh. E.				
6	45		III. Sh. I.	16	22		I.*Tr. E.	13	22		I.*Oc. D.	17	27		II. Oc. D.				
10	6		III. Sh. E.	17	36		I. Sh. E.	16	52.1		I. Ec. R.	22	27.9		II. Ec. R.				
14	57		I.*Oc. D.	17	41		II. Tr. I.												
18	32.1		I. Ec. R.	20	13		II. Sh. I.	23	10	35	I. Tr. I.								
				20	24		II. Tr. E.				I. Sh. I.								
7	9	15	IV. Oc. D.	22	58		II. Sh. E.				I.*Tr. E.								
11	58		IV. Oc. R.								I.*Sh. E.								
12	11		I.*Tr. I.	15	11	24	I. Oc. D.				II.*Oc. D.								
13	26		I.*Sh. I.	14	56.7		I.*Ec. R.	19	52.0		II. Ec. R.								
14	25		I.*Tr. E.	19	10		IV. Tr. I.	23	49		III. Oc. D.								
14	59		II.*Tr. I.	21	57		IV. Tr. E.												
15	41		I.*Sh. E.																
17	35		II. Sh. I.	16	6	34	IV. Sh. I.	24	3	6	III. Oc. R.								
17	42		II. Tr. E.	8	37		I. Tr. I.	4	9		IV. Oc. D.								
20	20		II. Sh. E.	9	50		I. Sh. I.	4	37.3		III. Ec. D.								
21	19.9		IV. Ec. D.	9	53		IV. Sh. E.	7	2		IV. Oc. R.								
				10	51		I. Tr. E.	8	2.1		I. Oc. D.								
8	0	38.6	IV. Ec. R.	12	4		II. Oc. D.	11	21.0		I. Ec. R.								
9	27		I. Oc. D.	12	5		I. Sh. E.	15	23.5		IV.*Ec. D.								
13	1.1		I.*Ec. R.	17	16.3		II. Ec. R.	18	51.5		IV. Ec. R.								
				19	38		III. Oc. D.												
9	6	40	I. Tr. I.	22	55		III. Oc. R.	25	5	4	I. Tr. I.								
7	55		I. Sh. I.								I. Sh. I.								
8	54		I. Tr. E.	17	0	37.6	III. Ec. D.				I. Tr. E.								
9	25		II. Oc. D.	4	1.8		III. Ec. R.				I. Sh. E.								

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; *Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

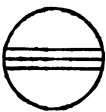
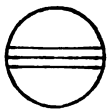
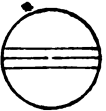
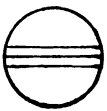
SATELLITES OF JUPITER, 1919.

637

GREENWICH MEAN TIME.

APRIL.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		* r	III.		* d	* r
II.		* r	IV.		* d	* r

Configurations at 14^h 45^m for an Inverting Telescope.

Day	West.	East.
1	4. 3.2	○ 1.
2	4. 1.	○ 2.
3	4. 2. 1.	○ 1. 3.
4	4. 2. 1.	○ 3.
5	4. 2.	○ 1. 3.
6	4. 2.	○ 2.
7	3. 1. 4.	○ 4.
8	3. 2. 1.	○ 1. 4.
9	1. 3. 2.	○ 4.
10	1. 12. 3.	○ 4.
11	1. 3.	○ 4.
12	2. 1. 3.	○ 4.
13	3. 1. 2.	○ 4.
14	○ 1. 3.	○ 2. 4.
15	3. 2. 4.	○ 1. 2.
16	4. 1. 3.	○ 2. 4.
17	4. 1. 2.	○ 3.
18	4. 2.	○ 1. 3.
19	4. 1. 3.	○ 2.
20	4. 3. 1.	○ 2.
21	4. 3. 1.	○ 2.
22	4. 3. 1.	○ 2.
23	4. 3. 1.	○ 2.
24	4. 3. 1.	○ 2.
25	1. 2. 3.	○ 4. 3.
26	2. 1. 3.	○ 4.
27	○ 3. 1. 2.	○ 4.
28	3. 1. 2.	○ 4.
29	3. 2. 1.	○ 4.
30	○ 1. 3. 2.	○ 4.

GREENWICH MEAN TIME.

MAY.

d	h	m		d	h	m		d	h	m		d	h	m		d	h	m	
1	4	2	III. Oc. D.	8	15	11.7	I.*Ec. R.	16	11	59	I. Sh. I.	26	22	33	II. Sh. I.	16	11	59	I.*Tr. E.
7	21		III. Oc. R.	16	3.4		III. Ec. R.	13	16		I.*Tr. E.	23	36		II. Tr. E.	13	16		I.*Sh. E.
8	36.8		III. Ec. D.					14	14		I.*Sh. E.					14	14		II. Tr. I.
9	51		I. Oc. D.	9	9	1	I. Tr. I.	18	4		II. Tr. I.	24	1	24	II. Sh. E.	18	4		II. Tr. E.
12	2.5		III. Ec. R.	10	4		I. Sh. I.	20	1		II. Sh. I.	10	21		I. Oc. D.	20	1		I. Sh. E.
13	16.4		I.*Ec. R.	11	16		I. Tr. E.	20	48		II. Tr. E.	13	30.9		I.*Ec. R.	20	48		II. Sh. E.
				12	19		I. Sh. E.	22	47		II. Sh. E.								
2	7	2	I. Tr. I.	15	17		II.*Tr. I.	17	8	20	I. Oc. D.	25	7	31	I. Tr. I.	15	17		I. Sh. I.
8	9		I. Sh. I.	17	24		II. Sh. I.	11	35.8		I. Ec. R.	8	22		I. Sh. I.	17	24		I. Tr. E.
9	17		I. Tr. E.	18	1		II. Tr. E.					9	46		I. Tr. E.	18	1		I. Sh. E.
10	24		I. Sh. E.	20	10		II. Sh. E.					10	38		II. Oc. D.	20	10		II. Ec. R.
12	31		II.*Tr. I.					18	5	31	I. Tr. I.	15	4		II. Ec. R.				
14	18		IV.*Tr. I.	10	6	20	I. Oc. D.	6	27		I. Sh. I.	19	33.9						
14	47		II.*Sh. I.	9	40.6		I. Ec. R.	7	46		I. Tr. E.								
15	15		II.*Tr. E.	23	39		IV. Oc. D.	8	43		I. Sh. E.	26	4	51	I. Oc. D.				
17	17		IV. Tr. E.					12	18		II. Oc. D.	7	18		III. Tr. I.				
17	33		II. Sh. E.	11	2	45	IV. Oc. R.	16	57.8		II. Ec. R.	7	59.7		I. Ec. R.				
				3	31		I. Tr. I.					10	39		III. Tr. E.				
3	0	35	IV. Sh. I.	4	32		I. Sh. I.	19	2	50	I. Oc. D.	10	44		III. Sh. I.				
4	3		IV. Sh. E.	5	46		I. Tr. E.	2	57		III. Tr. I.	14	10		III.*Sh. E.				
4	21		I. Oc. D.	6	48		I. Sh. E.	6	4.6		I. Ec. R.								
7	45.2		I. Ec. R.	9	28.7		IV. Ec. D.	6	17		III. Tr. E.	27	2	1	I. Tr. I.				
				9	33		II. Oc. D.	6	44		III. Sh. I.	2	51		I. Sh. I.				
4	1	32	I. Tr. I.	13	3.0		IV.*Ec. R.	9	59		IV. Tr. I.	4	16		I. Tr. E.				
2	38		I. Sh. I.	14	21.7		II.*Ec. R.	10	10		III. Sh. E.	5	7		I. Sh. E.				
3	47		I. Tr. E.	22	38		III. Tr. I.	13	9		IV.*Tr. E.	10	15		II. Tr. I.				
4	53		I. Sh. E.					18	35		IV. Sh. I.	11	56		II. Sh. I.				
6	49		II. Oc. D.	12	0	50	I. Oc. D.	22	12		IV. Sh. E.	13	0		II.*Tr. E.				
11	45.8		II. Ec. R.	1	56		III. Tr. E.					14	43		II.*Sh. E.				
18	20		III. Tr. I.	2	45		III. Sh. I.	20	0	1	I. Tr. I.	19	38		IV. Oc. D.				
21	37		III. Tr. E.	4	9.3		I. Ec. R.	0	56		I. Sh. I.	22	57		IV. Oc. R.				
22	45		III. Sh. I.	6	9		III. Sh. E.	2	16		I. Tr. E.	23	21		I. Oc. D.				
22	50		I. Oc. D.	22	1		I. Tr. I.	3	12		I. Sh. E.								
				23	1		I. Sh. I.	7	27		II. Tr. I.	23	2	28.5	I. Ec. R.				
5	2	9	III. Sh. E.					9	20		II. Sh. I.	3	29.4		IV. Ec. D.				
2	14.0		I. Ec. R.	13	0	16	I. Tr. E.	10	12		II. Sh. E.	7	13.6		IV. Ec. R.				
20	2		I. Tr. I.	1	17		I. Sh. E.	12	6		II. Sh. E.	20	31		I. Tr. I.				
21	6		I. Sh. I.	4	40		II. Tr. I.	21	21		I. Oc. D.	21	20		I. Sh. I.				
22	17		I. Tr. E.	6	43		II. Sh. I.					22	46		I. Tr. E.				
23	22		I. Sh. E.	7	24		II. Tr. E.	21	0	33.4	I. Ec. R.	23	36		I. Sh. E.				
				9	28		II. Sh. E.	18	31		I. Tr. I.								
6	1	54	II. Tr. I.	19	20		I. Oc. D.	19	25		I. Sh. I.	29	4	28	II. Oc. D.				
4	5		II. Sh. I.	22	38.2		I. Ec. R.	20	46		I. Tr. E.	8	52.0		II. Ec. R.				
4	38		II. Tr. E.					21	41		I. Sh. E.	17	51		I. Oc. D.				
6	51		II. Sh. E.	14	16	31	I. Tr. I.					20	57.2		I. Ec. R.				
17	20		I. Oc. D.	17	30		I. Sh. I.	22	1	41	II. Oc. D.	21	23		III. Oc. D.				
20	42.9		I. Ec. R.	18	46		I. Tr. E.	6	15.9		II. Ec. R.								
				19	45		I. Sh. E.	15	51		I. Oc. D.	20	4	5.7	III. Ec. R.				
7	14	32	I.*Tr. I.	22	55		II. Oc. D.	17	0		III. Oc. D.	15	1		I. Tr. I.				
15	35		I.*Sh. I.					19	2.1		I. Ec. R.	15	48		I. Sh. I.				
16	46		I. Tr. E.	15	3	39.8	II. Ec. R.	20	22		III. Oc. R.	17	17		I. Tr. E.				
17	50		I. Sh. E.	12	38		III. Oc. D.	20	37.8		III. Ec. D.	18	4		I. Sh. E.				
20	11		II. Oc. D.	13	50		I.*Oc. D.					23	40		II. Tr. I.				
				15	59		III. Oc. R.	23	0	5.4	III. Ec. R.								
8	1	3.8	II. Ec. R.	16	37.2		III. Ec. D.	13	1		I.*Tr. I.	31	1	15	II. Sh. I.				
8	19		III. Oc. D.	17	7.0		I. Ec. R.	13	53		I.*Sh. I.	2	25		II. Tr. E.				
11	39		III. Oc. R.	20	4.2		III. Ec. R.	15	16		I. Tr. E.	4	1		II. Sh. E.				
11	50		I. Oc. D.					16	9		I. Sh. E.	12	22		I. Oc. D.				
12	37.1		III.*Ec. D.	16	11	1	I. Tr. I.	20	52		II. Tr. I.	15	26.0		I. Ec. R.				

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.





SATELLITES OF JUPITER, 1919.

639

GREENWICH MEAN TIME.

MAY

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		* r	III.		* d	* r
II.		* r	IV.		* d	* r

Configurations at 14^h 15^m for an Inverting Telescope.

Day.	West.				East.			
1					○	-1.3	⁴ / ₂	
2	○ 2.			1.	○		⁴ / ₂	
3			⁴ / ₂		○	1	3.	
4		4.		1.	○	3.2		
5		4.	3.		○	1. 2.		
6		4.	3.	2.	1	○		
7		4.		3.	2.	¹ / ₁ ○		
8		4.			○	2.		1. ● 3. ●
9			4.	1. 2.	○		3.	
10			2.	4.	○	1.	3.	
11				1.	○	³ / ₄		2. ●
12				3.	○	1. 2.	4.	
13			3.	2. 1.	○			4.
14			3.	2.	○	1.		4.
15					○	2.	4.	1. ● 3. ●
16					1. ○	2.	3.	4.
17			2.		○	1.	3. 4.	
18				1.	○	⁴ / ₃		2. ●
19				3.	4. ○	12.		
20			3. 4.	³ / ₁	○			
21		4.	3.	2.	○	1.		
22		4.			○	¹ / ₃	2.	
23	○ 1.	4.			○	2.	3.	
24		4.		2.	○	1.	3.	
25			4.	1.	○	2.	3.	
26			4.	3.	○	1. 2.		
27			3.	1.	³ / ₄ ○			
28			3.	2.	○	1. 4.		
29				¹ / ₃	○	2.	4.	
30					1 ○	2. 3.	4.	
31			2.		○	3.	4.	1. ●

ELLITES OF JUPITER, 1919.

GREENWICH MEAN TIME.

JUNE.

d h m		d h m		d h m		d h m	
1 9 31	I. Tr. I.	7 5 14	II. Tr. E.	13 21 54	I. Sh. E.	20 21 32	I. Sh. I.
10 17	I. Sh. I.	6 38	II. Sh. E.			23 20	I. Tr. E.
11 47	I. Tr. E.	14 23	I. Oc. D.	14 1 24.0	IV. Ec. R.	23 49	I. Sh. E.
12 33	I. Sh. E.	17 20.8	I. Ec. R.	5 18	II. Tr. I.		
17 51	II. Oc. D.			6 28	II. Sh. I.	21 8 7	II. Tr. I.
22 10.0	II. Ec. R.	8 11 32	I. Tr. I.	8 3	II. Tr. E.	9 4	II. Sh. I.
		12 12	I. Sh. I.	9 14	II. Sh. E.	10 53	II. Tr. E.
2 6 52	I. Oc. D.	13 48	I.*Tr. E.	16 24	I. Oc. D.	11 50	II. Sh. E.
9 54.7	I. Ec. R.	14 28	I. Sh. E.	19 15.7	I. Ec. R.	18 25	I. Oc. D.
11 41	III. Tr. I.	20 39	II. Oc. D.			21 10.4	I. Ec. R.
14 43	III. Sh. I.			15 13 33	I.*Tr. I.		
15 4	III. Tr. E.	9 0 46.3	II. Ec. R.	14 6	I. Sh. I.	22 2 22	IV. Tr. I.
18 10	III. Sh. E.	8 53	I		I. Tr. E.	5 59	IV. Tr. E.
		11 49.5			I. Sh. E.	6 35	IV. Sh. I.
3 4 1	I. Tr. I.	16 6			II. Oc. D.	10 27	IV. Sh. E.
4 46	I. Sh. I.	18 43				15 34	I. Tr. I.
6 17	I. Tr. E.	19 30		6	II. Ec. R.	16 1	I. Sh. I.
7 2	I. Sh. E.	22 11			I. Oc. D.	17 50	I. Tr. E.
13 4	II.*Tr. I.			3	I.*Ec. R.	18 18	I. Sh. E.
14 33	II. Sh. I.	10 6 2			III. Tr. I.		
15 49	II. Tr. E.	6 40			III. Sh. I.	23 2 17	II. Oc. D.
17 20	II. Sh. E.	8 18			III. Tr. E.	5 59.0	II. Ec. R.
		8 57				12 55	I. Oc. D.
4 1 22	I. Oc. D.	15 53			III. Sh. E.	15 39.0	I. Ec. R.
4 23.4	I. Ec. R.	17 9			I. Tr. I.		
22 31	I. Tr. I.	18 38			I. Sh. I.	24 0 58	III. Tr. I.
23 14	I. Sh. I.	19 56			I. Tr. E.	2 42	III. Sh. I.
					I. Sh. E.	4 24	III. Tr. E.
5 0 47	I. Tr. E.	11 3 23	I. Oc. D.	10 10	II. Tr. I.	6 11	III. Sh. E.
1 31	I. Sh. E.	6 18.3	I. Ec. R.	19 45	II. Sh. I.	10 4	I. Tr. I.
6 3	IV. Tr. I.			21 28	II. Sh. E.	10 30	I. Sh. I.
7 15	II. Oc. D.	12 0 32	I. Tr. I.	22 32	II. Tr. E.	12 21	I. Tr. E.
9 26	IV. Tr. E.	1 9	I. Sh. I.			12 47	I. Sh. E.
11 28.2	II. Ec. R.	2 48	I. Tr. E.	18 5 24	I. Oc. D.	21 31	II. Tr. I.
12 35	IV. Sh. I.	3 26	I. Sh. E.	8 13.1	I. Ec. R.	22 21	II. Sh. I.
16 20	IV. Sh. E.	10 4	II. Oc. D.				
19 52	I. Oc. D.	14 4.6	II. Ec. R.	19 2 33	I. Tr. I.	25 0 17	II. Tr. E.
22 52.1	I. Ec. R.	21 53	I. Oc. D.	3 4	I. Sh. I.	1 8	II. Sh. E.
				4 50	I. Tr. E.	7 26	I. Oc. D.
6 1 47	III. Oc. D.	13 0 47.0	I. Ec. R.	5 21	I. Sh. E.	10 7.7	I. Ec. R.
8 5.6	III. Ec. R.	6 11	III. Oc. D.	12 53	II. Oc. D.		
17 2	I. Tr. I.	12 5.3	III. Ec. R.	16 40.9	II. Ec. R.	26 4 35	I. Tr. I.
17 43	I. Sh. I.	15 58	IV. Oc. D.	23 55	I. Oc. D.	4 58	I. Sh. I.
19 18	I. Tr. E.	19 2	I. Tr. I.			6 51	I. Tr. E.
19 59	I. Sh. E.	19 30	IV. Oc. R.	20 2 41.7	I. Ec. R.	7 15	I. Sh. E.
		19 38	I. Sh. I.	10 37	III. Oc. D.	15 42	II. Oc. D.
7 2 29	II. Tr. I.	21 19	I. Tr. E.	16 4.9	III. Ec. R.	19 17.4	II. Ec. R.
3 51	II. Sh. I.	21 32.5	IV. Ec. D.	21 4	I. Tr. I.		

By reason of the proximity of JUPITER to the SUN the phenomena of the satellites are not given from June 27 to August 11.

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

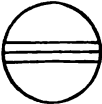
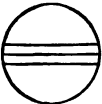
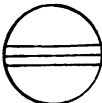
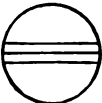
SATELLITES OF JUPITER, 1919.

641

GREENWICH MEAN TIME.

JUNE.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		III.	
II.		IV.	

Configurations at 13^h 45^m for an Inverting Telescope.

Day.	West.	East.
1		$\frac{1}{2}$ O 3 [•] 4 [•]
2	O 3 [•]	O 1 [•] 2 [•] 4 [•]
3	O 2 [•]	3 [•] 1 [•] O 4 [•]
4	3 [•] 2 [•]	O 1 [•] 4 [•]
5		3 [•] 14 [•] O 2 [•]
6	4 [•]	O 1 [•] 3 [•] 4 [•]
7	4 [•] 2 [•]	O 1 [•] 3 [•]
8	O 1 [•] 4 [•]	O 3 [•]
9	4 [•]	O 1 [•] 2 [•]
10	4 [•] 3 [•] 1 [•]	O 2 [•]
11	4 [•] 3 [•] 2 [•]	O 1 [•]
12	4 [•] 3 [•] 1 [•]	O 2 [•]
13		O 4 [•] 1 [•] 2 [•]
14	2 [•] 1 [•]	O 4 [•] 3 [•]
15	O 1 [•] 2 [•]	O 3 [•] 4 [•]
16		O 13 [•] 2 [•] 4 [•]
17	3 [•] 1 [•]	O 2 [•] 4 [•]
18	3 [•] 2 [•]	O 1 [•] 4 [•]
19	3 [•] 1 [•]	O 4 [•] 2 [•]
20		O 1 [•] 2 [•] 4 [•] 3 [•]
21		O 4 [•] 3 [•]
22	2 [•] 4 [•]	O 1 [•] 3 [•]
23	4 [•]	O 3 [•] 2 [•] 1 [•]
24	4 [•] 3 [•] 1 [•]	O 2 [•]
25	4 [•] 3 [•] 2 [•]	O 1 [•]
26	4 [•] 3 [•] 1 [•] 2 [•]	O

TELLITES OF JUPITER, 1919.

GREENWICH MEAN TIME.

AUGUST.

By reason of the proximity of JUPITER to the SUN the phenomena of the satellites are not given from June 27 to August 11.

d h m		d h m		d h m		d h m	
12 23 51	I. Sh. I.	18 7 45	I. I.		I. Tr. E.	28 22 46	I. Tr. I.
		9 34	I.				
13 0 14	I. Tr. I.	10 3	I.	1	III. Ec. D.	29 0 26	I. Sh. E.
2 9	I. Sh. E.				III. Oc. R.	1 4	I. Tr. E.
2 32	I. Tr. E.	19 0 1.4			II. Sh. I.	15 56.5	II. Ec. D.
6 35	III. Sh. I.	3 51			II. Tr. I.	19 25.5	I. Ec. D.
8 10	III. Tr. I.	4 35.1	I.		II. Sh. E.	20 7	II. Oc. R.
10 8	III. Sh. E.	7 21	I.	3	I. Ec. D.	22 21	I. Oc. R.
11 44	III. Tr. E.	21 38.8	IV. Ec.		II. Tr. E.		
16 26	II. Sh. I.			1	I. Oc. R.	30 16 37	I. Sh. I.
17 13	II. Tr. I.	20 1 45	I. Sh. I.			17 16	I. Tr. I.
19 13	II. Sh. E.	1 54.8	IV. Ec. R.	25 9 11	I. Sh. I.	18 54	I. Sh. E.
20 1	II. Tr. E.	2 15	I. Tr. I.	9 46	I. Tr. I.	19 34	I. Tr. E.
21 9.8	I. Ec. D.	2 25	IV. Oc. D.	11 29	I. Sh. E.		
23 51	I. Oc. R.	4 3	I. Sh. E.	12 4	I. Tr. E.	31 4 24.1	III. Ec. D.
		4 33	I. Tr. E.			10 43	III. Oc. R.
14 18 20	I. Sh. I.	6 46	IV. Oc. R.	26 2 37.9	II. Ec. D.	10 51	II. Sh. I.
18 44	I. Tr. I.	10 34	III. Sh. I.	6 28.7	I. Ec. D.	12 9	II. Tr. I.
20 37	I. Sh. E.	12 36	III. Tr. I.	6 42	II. Oc. R.	13 38	II. Sh. E.
21 2	I. Tr. E.	14 8	III. Sh. E.	9 21	I. Oc. R.	13 53.9	I. Ec. D.
		16 11	III. Tr. E.			14 58	II. Tr. E.
15 10 43.6	II. Ec. D.	19 0	II. Sh. I.	27 3 40	I. Sh. I.	16 51	I. Oc. R.
14 27	II. Oc. R.	20 0	II. Tr. I.	4 16	I. Tr. I.		
15 38.2	I. Ec. D.	21 47	II.*Sh. E.	5 57	I. Sh. E.		
18 21	I. Oc. R.	22 48	II. Tr. E.	6 34	I. Tr. E.		
		23 3.5	I. Ec. D.	14 33	III. Sh. I.		
16 12 48	I. Sh. I.			17 1	III. Tr. I.		
13 15	I. Tr. I.	21 1 51	I. Oc. R.	18 6	III. Sh. E.		
15 6	I. Sh. E.	20 14	I. Sh. I.	20 37	III. Tr. E.		
15 33	I. Tr. E.	20 45	I. Tr. I.	21 34	II.*Sh. I.		
20 26.5	III. Ec. D.	22 32	I. Sh. E.	22 46	II. Tr. I.		
		23 3	I. Tr. E.				
17 1 51	III. Oc. R.			28 0 21	II. Sh. E.		
5 43	II. Sh. I.	22 13 20.0	II. Ec. D.	0 57.1	I. Ec. D.		
6 36	II. Tr. I.	17 17	II. Oc. R.	1 35	II. Tr. E.		
8 30	II. Sh. E.	17 31.9	I. Ec. D.	3 51	I. Oc. R.		
9 24	II. Tr. E.	20 21	I. Oc. R.	6 32	IV. Sh. I.		
10 6.7	I. Ec. D.			10 46	IV. Sh. E.		
12 51	I. Oc. R.	23 14 43	I. Sh. I.	12 19	IV. Tr. I.		
		15 16	I. Tr. I.	16 40	IV. Tr. E.		
18 7 17	I. Sh. I.	17 0	I. Sh. E.	22 8	I. Sh. I.		

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow.

*Visible at Washington.




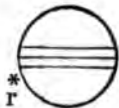
SATELLITES OF JUPITER, 1919.

643

GREENWICH MEAN TIME.

AUGUST

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		III.	
II.		IV.	

Configurations at 21^h 30^m for an Inverting Telescope.

Day.	West.	East.
1		○
2		○
3		○
4		○
5		○
6		○
7		○
8		○
9		○
10		○
11		○
12		○
13	4• 3• 2•	○ 1●
14	4• 3• 2• 1•	○
15	4• 3•	○ 1• 2
16	4• 1•	○ 2• 3●
17	4• 2•	○ 1• 3
18	4• 1• 2	○ 3•
19	4•	○ 1• 2• 3•
20	○ 2• 3• 1•	○ 4•
21	○ 1• 3• 2•	○ 4•
22	3• 2•	○ 1• 2 4•
23	1• 2•	○ 2• 4•
24	2• 1• 3•	○ 4•
25	1• 2•	○ 3• 4•
26	1• 2• 3•	○ 4•
27	13• 2• 4•	○ 1•
28	3• 2• 4•	○ 1•
29	4• 2•	○ 1•
30	4• 2• 1•	○ 2•
31	4• 2•	○ 1• 3

GREENWICH MEAN TIME.

SEPTEMBER.

d h m		d h m		d h m		d h m	
1 11 5	I. Sh. I.	9 13 20	I. Oc. R.	18 5 15	II. Sh. I.	25 11 47	I. Oc. R.
11 46	I. Tr. I.			6 3	III. Sh. E.	12 33	II. Tr. E.
13 23	I. Sh. E.	10 7 28	I. Sh. I.	6 9	III. Tr. I.	14 5	III. Tr. E.
14 4	I. Tr. E.	8 16	I. Tr. I.	6 37.4	I. Ec. D.		
		9 46	I. Sh. E.	7 1	II. Tr. I.	25 5 45	I. Sh. I.
2 5 14.3	II. Ec. D.	10 34	I. Tr. E.	8 2	II. Sh. E.	6 45	I. Tr. I.
8 22.2	I. Ec. D.	22 30	III. Sh. I.	9 45	III. Tr. E.	8 2	I. Sh. E.
9 32	II. Oc. R.			9 49	I. Oc. R.	9 2	I. Tr. E.
11 21	I. Oc. R.	11 1 48	III. Tr. I.	9 50	II. Tr. E.		
		2 5	III. Sh. E.			27 2 23.1	II. Ec. D.
3 5 34	I. Sh. I.	2 41	II. Sh. I.	19 3 51	I. Sh. I.	2 58.9	I. Ec. D.
6 16	I. Tr. I.	4 17	II. Tr. I.	4 46	I. Tr. I.	6 17	I. Oc. R.
7 51	I. Sh. E.	4 44.0	I. Ec. D.	6 8	I. Sh. E.	7 20	II. Oc. R.
8 34	I. Tr. E.	5 24	III. Tr. E.	7 3	I. Tr. E.		
18 31	III. Sh. I.	5 29	II. Sh. E.	23 45.8	II. Ec. D.	28 0 13	I. Sh. I.
21 25	III.*Tr. I.	7 6	II. Tr. E.			1 14	I. Tr. I.
22 5	III.*Sh. E.	7 50	I. Oc. R.	20 1 5.7	I. Ec. D.	2 31	I. Sh. E.
				4 19	I. Oc. R.	3 32	I. Tr. E.
4 0 8	II. Sh. I.	12 1 57	I. Sh. I.	4 33	II. Oc. R.	20 15.4	III.*Ec. D.
1 1	III. Tr. E.	2 46	I. Tr. I.	22 19	I.*Sh. I.	21 5	II.*Sh. I.
1 32	II. Tr. I.	4 14	I. Sh. E.	23 16	I. Tr. I.	21 27.2	I.*Ec. D.
2 50.6	I. Ec. D.	5 4	I. Tr. E.			23 6	II. Tr. I.
2 55	II. Sh. E.	21 9.4	II.*Ec. D.	21 0 37	I. Sh. E.	23 51.8	III. Ec. R.
4 21	II. Tr. E.	23 12.4	I. Ec. D.	1 33	I. Tr. E.	23 53	II. Sh. E.
5 51	I. Oc. R.			16 17.8	III. Ec. D.		
		13 1 45	II. Oc. R.	18 32	II. Sh. I.	29 0 26	III. Oc. D.
5 0 3	I. Sh. I.	2 20	I. Oc. R.	19 34.0	I.*Ec. D.	0 46	I. Oc. R.
0 46	I. Tr. I.	20 25	I.*Sh. I.	19 53.8	III.*Ec. R.	1 55	II. Tr. E.
2 20	I. Sh. E.	21 16	I.*Tr. I.	20 9	III.*Oc. D.	4 5	III. Oc. R.
3 4	I. Tr. E.	22 43	I. Sh. E.	20 23	II.*Tr. I.	18 42	I. Sh. I.
15 39.0	IV. Ec. D.	23 34	I. Tr. E.	21 19	II.*Sh. E.	19 44	I.*Tr. I.
18 32.9	II. Ec. D.			22 48	I. Oc. R.	20 59	I.*Sh. E.
19 59.9	IV. Ec. R.	14 0 30	IV. Sh. I.	23 12	II. Tr. E.	22 1	I.*Tr. E.
21 19.0	I.*Ec. D.	4 48	IV. Sh. E.	23 47	III. Oc. R.		
22 47	IV. Oc. D.	8 27	IV. Tr. I.			30 15 39.8	II. Ec. D.
22 57	II. Oc. R.	12 20.2	III. Ec. D.	23 9 39.5	IV. Ec. D.	15 55.5	I. Ec. D.
		12 56	IV. Tr. E.	14 5.1	IV. Ec. R.	18 28	IV. Sh. I.
6 0 21	I. Oc. R.	15 58	II. Sh. I.	16 48	I. Sh. I.	19 15	I.*Oc. R.
3 18	IV. Oc. R.	17 39	II. Tr. I.	17 45	I. Tr. I.	20 42	II.*Oc. R.
18 31	I. Sh. I.	17 40.7	I. Ec. D.	18 51	IV. Oc. D.	22 49	IV. Sh. E.
19 16	I. Tr. I.	18 46	II. Sh. E.	19 5	I. Sh. E.		
20 49	I.*Sh. E.	19 28	III. Oc. R.	20 3	I.*Tr. E.		
21 34	I.*Tr. E.	20 28	II.*Tr. E.	23 29	IV. Oc. R.		
		20 50	I.*Oc. R.				
7 8 22.3	III. Ec. D.			23 13 3.5	II. Ec. D.		
13 25	II. Sh. I.	15 14 54	I. Sh. I.	14 2.3	I. Ec. D.		
14 55	II. Tr. I.	15 46	I. Tr. I.	17 18	I. Oc. R.		
15 6	III. Oc. R.	17 11	I. Sh. E.	17 56	II. Oc. R.		
15 47.3	I. Ec. D.	18 4	I. Tr. E.				
16 12	II. Sh. E.			24 11 16	I. Sh. I.		
17 43	II. Tr. E.	16 10 27.1	II. Ec. D.	12 15	I. Tr. I.		
18 51	I. Oc. R.	12 9.0	I. Ec. D.	13 34	I. Sh. E.		
		15 9	II. Oc. R.	14 33	I. Tr. E.		
8 13 0	I. Sh. I.	15 19	I. Oc. R.				
13 46	I. Tr. I.			25 6 28	III. Sh. I.		
15 17	I. Sh. E.	17 9 22	I. Sh. I.	7 48	II. Sh. I.		
16 4	I. Tr. E.	10 16	I. Tr. I.	8 30.6	I. Ec. D.		
		11 40	I. Sh. E.	9 45	II. Tr. I.		
9 7 50.7	II. Ec. D.	12 34	I. Tr. E.	10 3	III. Sh. E.		
10 15.7	I. Ec. D.			10 28	III. Tr. I.		
12 21	II. Oc. R.	18 2 29	III. Sh. I.	10 36	II. Sh. E.		

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow.

*Visible at Washington.

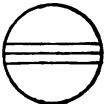
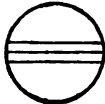
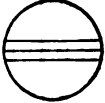
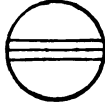
SATELLITES OF JUPITER, 1919.

645

GREENWICH MEAN TIME.

SEPTEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

[*] d 	III.	[*] d 
[*] d 	IV.	[*] d [*] r 

Configurations at 21^h 0^m for an Inverting Telescope.

West.		East.	
·4	·1 [·]	○	·3
·4		○	1· ·2 3·
		· [·]	
·4	·1	○	2·
	· [·] · [·]	○	1·
	· [·]		
·3		○ ¹ ₄	·2 ●
	·3	○	· [·]
	2·	○	· ¹ ₃ ·4
	·2 1·	○	·3 ·4
		○	· ¹ ₃ 3· ·4
	·1	○	3·2· 4·
	· [·] · [·]	○	1· 4·
3·	· ¹	○ ₃	4·
	·3	○	4· ·2
	4· 2·	○ ¹ ₃	
	4· ·2 1·	○	·3
	4·	○	· ¹ ₃ 3·
	4·	○	· [·] · [·]
·4	· [·] · [·]	○	1·
·4	3·	○	· ¹ ₂
·4	·3	○	1· ·2
	·4	○	·1 ● ·3 ●
	·2 1·	○	·3
		○	· ¹ ₂ ·4 3·
	1·	○	· [·] · [·] ·4
	· [·] · [·]	○	·1 ·4
3·	· ¹ ₂	○	·4
·3		○	1· ·2 4·
	·1 2·	○	4· ·3 ●
2·		○	·3 4·
		○	· ¹ ₂ ·3


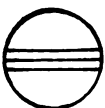

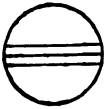
OCTOBER.

d h m				d h m				d h m				d h m							
1 4 13	IV. Tr. I.	9 14 25	III. Sh. I.	17 11 26	I. Sh. I.	25 14 3	I. Oc. R.												
8 47	IV. Tr. E.	14 28	IV. Oc. D.	12 26	IV. Sh. I.	18 12	II.*Oc. R.												
13 10	I. Sh. I.	15 7	II. Tr. I.	12 38	I. Tr. I.	21 38.1	IV.*Ec. D.												
14 13	I. Tr. I.	15 42	I. Oc. R.	13 43	I. Sh. E.														
15 28	I. Sh. E.	15 42	II. Sh. E.	14 55	I. Tr. E.	26 2 12.1	IV. Ec. R.												
16 31	I. Tr. E.	17 56	II. Tr. E.	16 51	IV. Sh. E.	7 49	I. Sh. I.												
		18 0	III. Sh. E.	23 28	IV. Tr. I.	9 3	I. Tr. I.												
2 10 22	II. Sh. I.	18 59	III.*Tr. I.			9 28	IV. Oc. D.												
10 23.8	I. Ec. D.	19 11	IV.*Oc. R.	18 4 7	IV. Tr. E.	10 6	I. Sh. E.												
10 27	III. Sh. I.	22 36	III.*Tr. E.	8 38.3	I. Ec. D.	11 20	I. Tr. E.												
12 27	II. Tr. I.			10 10.8	II. Ec. D.	14 16	IV. Oc. R.												
13 9	II. Sh. E.	10 9 33	I. Sh. I.	12 7	I. Oc. R.														
13 45	I. Oc. R.	10 41	I. Tr. I.	15 31	II. Oc. R.	27 4 59.6	I. Ec. D.												
14 1	III. Sh. E.	11 50	I. Sh. E.			7 18	II. Sh. I.												
14 45	III. Tr. I.	12 58	I. Tr. E.	19 5 55	I. Sh. I.	8 31	I. Oc. R.												
15 16	II. Tr. E.			7 7	I. Tr. I.	9 43	II. Tr. I.												
18 22	III. Tr. E.	11 6 45.2	I. Ec. D.	8 12	I. Sh. E.	10 6	II. Sh. E.												
		7 34.6	II. Ec. D.	9 24	I. Tr. E.	12 8.1	III. Ec. D.												
3 7 39	I. Sh. I.	10 11	I. Oc. R.			12 33	II. Tr. E.												
8 43	I. Tr. I.	12 49	II. Oc. R.	20 8 6.6	I. Ec. D.	15 45.7	III. Ec. R.												
9 56	I. Sh. E.			4 45	II. Sh. I.	17 11	III. Oc. D.												
11 0	I. Tr. E.	12 4	I. Sh. I.	6 36	I. Oc. R.	20 50	III. Oc. R.												
		5 10	I. Tr. I.	7 6	II. Tr. I.														
4 4 52.1	I. Ec. D.	6 18	I. Sh. E.	7 32	II. Sh. E.	28 2 17	I. Sh. I.												
4 58.4	II. Ec. D.	7 27	I. Tr. E.	8 10.3	I. Tr. E.	3 31	I. Tr. I.												
8 14	I. Oc. R.			9 55	II. Tr. E.	4 34	I. Sh. E.												
10 5	II. Oc. R.	13 1 13.5	I. Ec. D.	11 47.7	III. Ec. R.	5 49	I. Tr. E.												
		2 12	II. Sh. I.	13 5	III. Oc. D.	23 27.8	I. Ec. D.												
5 2 7	I. Sh. I.	4 11.8	III. Ec. D.	16 44	III. Oc. R.														
3 12	I. Tr. I.	4 27	II. Tr. I.																
4 24	I. Sh. E.	4 40	I. Oc. R.	21 0 23	I. Sh. I.	3 0	II. Ec. D.												
5 30	I. Tr. E.	4 59	II. Sh. E.	1 36	I. Tr. I.	7 31	I. Oc. R.												
23 20.4	I. Ec. D.	7 17	II. Tr. E.	2 40	I. Sh. E.	20 46	II. Oc. R.												
23 38	II. Sh. I.	7 48.8	III. Ec. R.	3 53	I. Tr. E.	22 0	I.*Sh. I.												
		8 54	III. Oc. D.	21 34.8	I.*Ec. D.	23 3	I.*Tr. I.												
6 0 13.7	III. Ec. D.	12 34	III. Oc. R.	23 28.4	II. Ec. D.														
1 47	II. Tr. I.	22 30	I.*Sh. I.																
2 26	II. Sh. E.	23 39	I. Tr. I.	22 1	I. Oc. R.	30 0 17	I. Tr. E.												
2 43	I. Oc. R.			22 452	II. Oc. R.	17 56.1	I.*Ec. D.												
3 50.4	III. Ec. R.	14 0 47	I. Sh. E.	18 52	I.*Sh. I.	20 34	II.*Sh. I.												
4 36	II. Tr. E.	1 57	I. Tr. E.	20 5	I.*Tr. I.	21 29	I.*Oc. R.												
4 42	III. Oc. D.	19 41.7	I.*Ec. D.	21 9	I.*Sh. E.	23 1	II.*Tr. I.												
8 21	III. Oc. R.	20 52.2	II.*Ec. D.	22 22	I.*Tr. E.	23 22	II. Sh. E.												
20 36	I.*Sh. I.	23 9	I. Oc. R.																
21 42	I.*Tr. I.			23 16 3.1	I. Ec. D.	31 1 51	II. Tr. E.												
22 53	I. Sh. E.	15 2 10	II. Oc. R.	18 1	II.*Sh. I.	2 20	III. Sh. I.												
23 59	I. Tr. E.	16 58	I. Sh. I.	19 34	I.*Oc. R.	5 55	III. Sh. E.												
		18 8	I. Tr. I.	20 25	II.*Tr. I.	7 23	III. Tr. I.												
7 17 48.6	I. Ec. D.	19 15	I.*Sh. E.	20 49	II.*Sh. E.	11 0	III. Tr. E.												
18 16.1	II. Ec. D.	20 26	I.*Tr. E.	22 21	III.*Sh. I.	15 14	I. Sh. I.												
21 13	I.*Oc. R.			23 14	II. Tr. E.	16 29	I. Tr. I.												
23 27	II. Oc. R.	16 14 10.0	I. Ec. D.			17 31	I.*Sh. E.												
		15 28	II. Sh. I.	24 1 56	III. Sh. E.	18 46	I.*Tr. E.												
8 15 4	I. Sh. I.	17 38	I. Oc. R.	3 18	III. Tr. I.														
16 11	I. Tr. I.	17 47	II. Tr. I.	6 55	I. Sh. I.														
17 21	I. Sh. E.	18 16	II.*Sh. E.	13 20	I. Tr. I.														
18 29	I. Tr. E.	18 23	III.*Sh. I.	14 34	I. Sh. E.														
		20 36	II.*Tr. E.	15 37	I. Tr. E.														
9 3 38.9	IV. Ec. D.	21 58	III.*Sh. E.	16 51	I. Ec. D.														
8 9.0	IV. Ec. R.	23 10	III. Tr. I.		II. Ec. D.														
12 16.9	I. Ec. D.			25 10 31.3															
12 55	II. Sh. I.	17 2 47	III. Tr. E.	12 46.8															

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

SATELLITES OF JUPITER, 1919.
GREENWICH MEAN TIME.

647

OCTOBER.	
Phases of the Eclipses of the Satellites for an Inverting Telescope.	
I.	
III.	
II.	
IV.	

Configurations at 20 ^h 45 ^m for an Inverting Telescope.	
Day.	West. East.
1	⁴ ₁ O ³ ₂
2	4 [•] 2 [•] 3 [•] O [•] 1
3	4 [•] 3 [•] [•] 1 [•] O
4	4 [•] [•] 3 O 1 [•] [•] 2
5	[•] 4 [•] 2 [•] [•] 1 [•] O 2 [•]
6	[•] 4 2 [•] 1 O [•] 3
7	[•] 4 O [•] 3 [•] 1 ● [•] 2 ●
8	[•] 4 1 [•] O 2 [•] 3 [•]
9	O 3 [•] 2 [•] O [•] 4 [•] 1
10	3 [•] [•] 21 [•] O [•] 4
11	[•] 3 O ¹ ₂ [•] 4
12	[•] 3 [•] 1 O 2 [•] [•] 4
13	2 [•] O 1 [•] [•] 3 [•] 4
14	[•] 2 O [•] 3 4 [•] [•] 1 ●
15	1 [•] O [•] 2 3 [•] 4 [•]
16	[•] 3 O 3 [•] [•] 1 4 [•]
17	3 [•] [•] 2 1 [•] 4 O [•]
18	[•] 3 4 [•] O [•] 1 [•]
19	4 [•] [•] 3 [•] 1 O 2 [•]
20	4 [•] 2 [•] O ¹ ₂
21	4 [•] [•] 1 [•] O [•] 3
22	O 1 [•] [•] 4 O [•] 2 3 [•]
23	O 2 [•] [•] 4 O [•] 1 [•] 3
24	[•] 4 [•] 1 [•] 1 [•] O
25	3 [•] [•] 4 O [•] 2 [•] 1
26	[•] 3 1 [•] O [•] 4 2 [•]
27	2 [•] O 1 [•] [•] 4 [•] 3 ●
28	[•] 2 [•] 1 O [•] 3 [•] 4
29	1 O [•] 2 3 [•] [•] 4
30	O 2 [•] 3 [•] [•] 4 [•] 1 ●
31	2 [•] 3 [•] 1 [•] O 4 [•]

GREENWICH MEAN TIME.

NOVEMBER.

d h m	I. Ec. D.	d h m	I. Tr. I.	d h m	II. Sh. I.	d h m	III. Ec. R.
1 12 24.4	I. Ec. D.	9 12 52	I. Tr. I.	17 14 57	II. Sh. I.	25 7 57.1	III. Ec. R.
15 22.8	II. Ec. D.	13 53	I. Sh. E.	17 25	II.*Tr. I.	8 56	III. Oc. D.
15 57	I. Oc. R.	15 9	I. Tr. E.	17 48	II.*Sh. E.	9 52	I. Sh. I.
20 51	II.*Oc. R.			20 15	II.*Tr. E.	11 4	I. Tr. I.
		10 8 45.6	I. Ec. D.			12 9	I. Sh. E.
2 9 42	I. Sh. I.	12 19	I. Oc. R.	18 0 0.3	III. Ec. D.	12 36	III. Oc. R.
10 58	I. Tr. I.	12 24	II. Sh. I.	3 38.7	III. Ec. R.	13 21	I. Tr. E.
11 59	I. Sh. E.	14 53	II. Tr. I.	5 5	III. Oc. D.		
13 15	I. Tr. E.	15 12	II. Sh. E.	7 58	I. Sh. I.	26 7 0.0	I. Ec. D.
		17 43	II.*Tr. E.	8 45	III. Oc. R.	10 30	I. Oc. R.
3 6 23	IV. Sh. I.	20 2.9	III.*Ec. D.	9 13	I. Tr. I.	12 27.6	II. Ec. D.
6 52.6	I. Ec. D.	23 41.0	III. Ec. R.	10 15	I. Sh. E.	17 49	II.*Oc. R.
9 51	II. Sh. I.			11 30	I. Tr. E.		
10 26	I. Oc. R.	11 1 11	III. Oc. D.			27 4 20	I. Sh. I.
10 51	IV. Sh. E.	4 51	III. Oc. R.	19 5 6.9	I. Ec. D.	5 32	I. Tr. I.
12 19	II. Tr. I.	6 4	I. Sh. I.	8 39	I. Oc. R.	6 37	I. Sh. E.
12 39	II. Sh. E.	7 20	I. Tr. I.	9 51.9	II. Ec. D.	7 49	I. Tr. E.
15 9	II. Tr. E.	8 21	I. Sh. E.	15 18	II. Oc. R.		
16 5.6	III. Ec. D.	9 37	I. Tr. E.			28 1 23.2	I. Ec. D.
18 4	IV.*Tr. I.	15 38.0	IV. Ec. D.	20 0 19	IV. Sh. I.	4 58	I. Oc. R.
19 43.4	III.*Ec. R.	20 15.3	IV.*Ec. R.	2 26	I. Sh. I.	6 47	II. Sh. I.
21 13	III.*Oc. D.			3 41	I. Tr. I.	9 9	II. Tr. I.
22 45	IV.*Tr. E.	12 3 13.9	I. Ec. D.	4 43	I. Sh. E.	9 36	II. Sh. E.
		3 44	IV. Oc. D.	4 51	IV. Sh. E.	9 36.9	IV. Ec. D.
4 0 53	III. Oc. R.	6 47	I. Oc. R.	5 58	I. Tr. E.	11 59	II. Tr. E.
4 11	I. Sh. I.	7 16.1	II. Ec. D.	11 50	IV. Tr. I.	14 17.6	IV. Ec. R.
5 26	I. Tr. I.	8 34	IV. Oc. R.	16 33	IV.*Tr. E.	18 12	III.*Sh. I.
6 28	I. Sh. E.	12 45	II. Oc. R.	23 35.2	I. Ec. D.	21 4	IV.*Oc. D.
7 43	I. Tr. E.					21 48	III.*Sh. E.
		13 0 33	I. Sh. I.	21 3 7	I. Oc. R.	22 48	I.*Sh. I.
5 1 20.8	I. Ec. D.	1 48	I. Tr. I.	4 14	II. Sh. I.	23 1	III.*Tr. I.
4 40.3	II. Ec. D.	2 50	I. Sh. E.	6 40	II. Tr. I.		
4 54	I. Oc. R.	4 5	I. Tr. E.	7 3	II. Sh. E.	29 0 0	I. Tr. I.
10 9	II. Oc. R.	21 42.1	I.*Ec. D.	9 30	II. Tr. E.	1 5	I. Sh. E.
22 39	I.*Sh. I.			14 14	III. Sh. I.	1 55	IV. Oc. R.
23 55	I. Tr. I.	14 1 15	I. Oc. R.	17 50	III.*Sh. E.	2 17	I. Tr. E.
		1 41	II. Sh. I.	19 14	III.*Tr. I.	2 38	III. Tr. E.
6 0 56	I. Sh. E.	4 9	II. Tr. I.	20 55	I.*Sh. I.	19 56.6	I.*Ec. D.
2 12	I. Tr. E.	4 29	II. Sh. E.	22 9	I.*Tr. I.	23 26	I.*Oc. R.
19 49.1	I.*Ec. D.	6 59	II. Tr. E.	22 50	III.*Tr. E.		
23 8	II.*Sh. I.	10 16	III. Sh. I.	23 12	I.*Sh. E.	30 1 45.7	II. Ec. D.
23 22	I. Oc. R.	13 52	III. Sh. E.			7 4	II. Oc. R.
		15 21	III. Tr. I.	22 0 26	I. Tr. E.	17 17	I.*Sh. I.
7 1 36	II. Tr. I.	18 58	III.*Tr. E.	18 3.5	I.*Ec. D.	18 27	I.*Tr. I.
1 56	II. Sh. E.	19 1	I.*Sh. I.	21 35	I.*Oc. R.	19 34	I.*Sh. E.
4 26	II. Tr. E.	20 16	I.*Tr. I.	23 10.1	II.*Ec. D.	20 44	I.*Tr. E.
6 18	III. Sh. I.	21 18	I.*Sh. E.				
9 53	III. Sh. E.	22 33	I.*Tr. E.	23 4 34	II. Oc. R.		
11 24	III. Tr. I.			15 23	I. Sh. I.		
15 1	III. Tr. E.	15 16 10.5	I. Ec. D.	16 36	I.*Tr. I.		
17 8	I.*Sh. I.	19 43	I.*Oc. R.	17 40	I.*Sh. E.		
18 23	I.*Tr. I.	20 34.4	II.*Ec. D.	18 53	I.*Tr. E.		
19 25	I.*Sh. E.						
20 40	I.*Tr. E.	16 2 2	II. Oc. R.	24 12 31.7	I. Ec. D.		
		13 30	I. Sh. I.	16 3	I.*Oc. R.		
8 14 17.4	I. Ec. D.	14 45	I. Tr. I.	17 31	II.*Sh. I.		
17 51	I.*Oc. R.	15 47	I. Sh. E.	19 54	II.*Tr. I.		
17 58.7	II.*Ec. D.	17 2	I.*Tr. E.	20 19	II.*Sh. E.		
23 28	II. Oc. R.			22 45	II.*Tr. E.		
		17 10 38.7	I. Ec. D.				
9 11 36	I. Sh. I.	14 11	I. Oc. R.	25 3 58.5	III. Ec. D.		

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow.

*Visible at Washington.





SATELLITES OF JUPITER, 1919.

649

GREENWICH MEAN TIME.

NOVEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.	[*] _d		III.	[*] _d	[*] _r	
II.	[*] _d		IV.	[*] _d	[*] _r	

Configurations at 20^h 15^m for an Inverting Telescope.

Day.	West.				East.			
1		3.		○	1.	4.		2●
2		3	1.	○		2 ⁴		
3	○4.		2.	○3	1.			
4			4. 2. 1	○		3		
5		4.		○	1. 2	3.		
6		4.		○	2. 3.			1●
7	○1.	4.	2. 3.	○				
8		4	3.	○	1			2●
9		4	3	1.	○	2.		
10			4	2.	○	1		3●
11			2	1	○	3		4●
12				○	1 ² 4	3		
13				1	○	2. 3.	4	
14			2.	3.	○		4	
15		3.		2	○1		4	
16		3	1.	○	2		4.	
17	○2.		3	○	1		4.	
18			2	1.	○	3	4.	
19				○	1 ² 4.	3		
20			1 ⁴	○	2.	3.		
21	○3.		4. 2.	○1.				
22		4.	3.	2	○			1●
23		4.	3	1.	○	2		
24	○2.	4		3	○	1		
25		4		2	1.	○	3	
26		4		○	2	1.	3	
27			4	1	○	2.	3.	
28			2.	○	1 ²			
29			3.	2	○	4		1●
30	○1.		3	○	2	4		

SATELLITES OF JUPITER, 1919.

GREENWICH MEAN TIME.

DECEMBER.

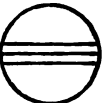
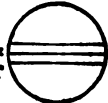


d h m		d h m		d h m		d h m	
1 14 24.8	I. Ec. D.	9 3 39	II. Tr. E.	16 19 32.3	III.*Ec. R.	24 22 49.4	II.*Ec. D.
17 53	I.*Oc. R.	11 55.2	III. Ec. D.	19 59	III.*Oc. D.		
20 4	II.*Sh. I.	13 39	I. Sh. I.	23 38	III.*Oc. R.	25 3 30	II. Oc. R.
22 22	II.*Tr. I.	14 44	I. Tr. I.			11 54	I. Sh. I.
22 53	II.*Sh. E.	15 34.2	III.*Ec. R.	17 12 39.6	I. Ec. D.	12 46	I. Tr. I.
		15 56	I.*Sh. E.	15 57	I.*Oc. R.	14 11	I.*Sh. E.
2 1 13	II. Tr. E.	16 23	III.*Oc. D.	20 14.0	II.*Ec. D.	15 3	I.*Tr. E.
7 56.6	III. Ec. D.	17 1	I.*Tr. E.				
11 35.4	III. Ec. R.	20 2	III.*Oc. R.	18 1 8	II. Oc. R.	26 9 1.3	I. Ec. D.
11 45	I. Sh. I.			10 0	I. Sh. I.	12 11	I. Oc. R.
12 42	III. Oc. D.	10 10 46.3	I. Ec. D.	10 59	I. Tr. I.	17 2	II.*Sh. I.
12 55	I. Tr. I.	14 9	I. Oc. R.	12 18	I. Sh. E.	18 43	II.*Tr. I.
14 2	I. Sh. E.	17 38.6	II.*Ec. D.	13 16	I. Tr. E.	19 52	II.*Sh. E.
15 12	I. Tr. E.	22 44	II.*Oc. R.			21 34	II.*Tr. E.
16 21	III.*Oc. R.			19 7 7.9	I. Ec. D.		
		11 8 7	I. Sh. I.	10 24	I. Oc. R.	27 6 22	I. Sh. I.
3 8 53.1	I. Ec. D.	9 11	I. Tr. I.	14 28	II.*Sh. I.	7 13	I. Tr. I.
12 20	I. Oc. R.	10 24	I. Sh. E.	16 22	II.*Tr. I.	8 40	I. Sh. E.
15 3.1	II. Ec. D.	11 28	I. Tr. E.	17 18	II.*Sh. E.	9 30	I. Tr. E.
20 18	II.*Oc. R.			19 14	II.*Tr. E.	10 4	III. Sh. I.
		12 5 14.6	I. Ec. D.			13 27	III. Tr. I.
4 6 13	I. Sh. I.	8 36	I. Oc. R.	20 4 29	I. Sh. I.	13 41	III.*Sh. E.
7 22	I. Tr. I.	11 54	II. Sh. I.	5 26	I. Tr. I.	17 4	III.*Tr. E.
8 31	I. Sh. E.	14 0	II. Tr. I.	6 6	III. Sh. I.		
9 39	I. Tr. E.	14 44	II.*Sh. E.	6 46	I. Sh. E.	28 3 29.7	I. Ec. D.
		16 51	II.*Tr. E.	7 43	I. Tr. E.	6 37	I. Oc. R.
				9 43	III. Sh. E.	12 7.3	II. Ec. D.
5 3 21.4	I. Ec. D.			9 57	III. Tr. I.	16 40	II.*Oc. R.
6 48	I. Oc. R.	13 2 8	III. Sh. I.	13 34	III. Tr. E.		
9 21	II. Sh. I.	2 35	I. Sh. I.			29 0 51	I. Sh. I.
11 35	II. Tr. I.	3 38	I. Tr. I.			1 39	I. Tr. I.
12 10	II. Sh. E.	4 53	I. Sh. E.	21 1 36.3	I. Ec. D.	3 8	I. Sh. E.
14 26	II. Tr. E.	5 44	III. Sh. E.	4 51	II. Ec. D.	3 57	I. Tr. E.
22 10	III.*Sh. I.	5 55	I. Tr. E.	9 32.0	II.*Oc. R.	21 58.0	I.*Ec. D.
		6 23	III. Tr. I.	14 19	I.*Sh. I.		
6 0 42	I. Sh. I.	10 0	III. Tr. E.	22 57	I.*Tr. I.		
1 46	III. Sh. E.	23 42.9	I.*Ec. D.	23 53		30 1 4	I. Oc. R.
1 49	I. Tr. I.					6 18	II. Sh. I.
2 45	III. Tr. I.	14 3 3	I. Oc. R.	22 1 15	I. Sh. E.	7 52	II. Tr. I.
2 59	I. Sh. E.	6 56.6	II. Ec. D.	2 10	I. Tr. E.	9 9	II. Sh. E.
4 7	I. Tr. E.	11 57	II. Oc. R.	20 4.6	I.*Ec. D.	10 44	II. Tr. E.
6 21	III. Tr. E.	21 4	I.*Sh. I.	23 17	I.*Oc. R.	19 19	I.*Sh. I.
18 16	IV.*Sh. I.	22 5	I.*Tr. I.			20 6	I.*Tr. I.
21 49.7	I.*Ec. D.	23 21	I.*Sh. E.	23 3 45	II. Sh. I.	21 37	I.*Sh. E.
22 51	IV.*Sh. E.			5 33	II. Tr. I.	22 23	I.*Tr. E.
		15 0 23	I. Tr. E.	6 35	II. Sh. E.	23 48.6	III.*Ec. D.
		3 36.1	IV. Ec. D.	8 24	II. Tr. E.		
7 1 15	I. Oc. R.	8 19.5	IV. Ec. R.	12 12	IV. Sh. I.	31 6 36	III. Oc. R.
4 21.2	II. Ec. D.	13 25	IV. Oc. D.	16 50	IV.*Sh. E.	16 26.4	I.*Ec. D.
4 42	IV. Tr. I.	18 11.2	I.*Ec. D.	17 26	I.*Sh. I.	19 30	I.*Oc. R.
9 25	IV. Tr. E.	18 16	IV.*Oc. R.	18 19	I.*Tr. I.	21 36.4	IV.*Ec. D.
9 32	II. Oc. R.	21 30	I.*Oc. R.	19 43	I.*Sh. E.		
19 10	I.*Sh. I.			19 50.9	III.*Ec. D.		
20 17	I.*Tr. I.	16 1 11	II. Sh. I.	20 33	IV.*Tr. I.		
21 27	I.*Sh. E.	3 11	II. Tr. I.	20 37	I.*Tr. E.		
22 34	I.*Tr. E.	4 1	II. Sh. E.	23 30.1	III.*Ec. R.		
		6 3	II. Tr. E.	23 30	III.*Oc. D.		
8 16 18.0	I.*Ec. D.	15 32	I.*Sh. I.				
19 42	I.*Oc. R.	15 53.1	III.*Ec. D.	24 1 18	IV. Tr. E.		
22 37	II.*Sh. I.	16 32	I.*Tr. I.	3 9	III. Oc. R.		
		17 49	I.*Sh. E.	14 32.9	I.*Ec. D.		
9 0 48	II. Tr. I.	18 50	I.*Tr. E.	17 44	I.*Oc. R.		

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

SATELLITES OF JUPITER, 1919.

651

GREENWICH MEAN TIME.

DECEMBER.						
<i>Phases of the Eclipses of the Satellites for an Inverting Telescope.</i>						
I.	* d		III.	* d	* r	
II.	* d		IV.	* d	* r	

Configurations at 19^h 30^m for an Inverting Telescope.

Day.	West.				East.			
1		.3	○	[*] 1		.4		
2		2.	1.	○	.3		.4	
3				○	.1	.3	4.	.2●
4		.1	○		2.	3.	4.	
5		2.	○	[*] 1		4.		
6		[*] 2	.1	○	4.			
7		3.	4.	1○	.2			
8		4.	.3	○	2.			.1●
9		4.	2.	1.	○			.3●
10		4.		○	.1	.3		.2●
11		.4		1.	○	2.	3.	
12		.4		2.	○	[*] 3		
13		.4	.23.	.1	○			
14		3.	.4	○	1.	.2		
15		.3		○	.4	2.		.1●
16			2.	1.	○		.4	.3●
17				.2	○	.1	.3	.4
18			1.	○		.2	3.	.4
19				[*] 1	○	.1	[*] 3	4.
20			.2	[*] 1	○			4.
21			3.		○	[*] 3		4.
22			.3		.1○	2.	4.	
23	○1.		2.	.3	○			
24			4.	.2	○	.1	.3	
25			4.	1.	○	.2	.3	
26	○2.		4.		○	.1	3.	
27			4.		.2	.1	3.	○
28		.4	3.		○	[*] 1		
29		.4	.3	.1	○	2.		
30			.4	2.	.3	1○		
31			[*] 4	○		.3		

652 MAGNITUDE AND RINGS OF SATURN, 1919.

ELEMENTS FOR DETERMINING THE GEOCENTRIC POSITION, APPEAR-
ANCE, AND MAGNITUDE OF SATURN'S RINGS.

Greenwich Mean Midnight.	<i>a</i>	<i>b</i>	<i>P</i>	<i>B</i>	<i>U</i>	<i>Δ</i>	<i>B'</i>	<i>U'</i>	Stellar Mag.
Jan. 7	44.49	- 8.41	-6 24.9	-10 53.7	24 21.2	42 19.9	-12 34.0	338 18.2	+0.5
15	44.91	8.66	6 26.4	11 7.1	23 57.2	42 19.9	12 27.0	338 34.4	0.4
23	45.24	8.92	6 28.1	11 22.6	23 28.8	42 19.8	12 20.6	338 50.5	0.4
31	45.48	9.19	6 30.1	11 39.5	22 56.9	42 19.8	12 13.0	339 6.7	0.3
Feb. 8	45.61	9.45	6 32.1	11 57.2	22 22.6	42 19.8	12 6.0	339 22.8	0.3
16	45.63	- 9.69	-6 34.2	-12 15.0	21 47.2	42 19.7	-11 59.0	339 38.9	+0.2
24	45.54	9.89	6 36.2	12 32.4	21 12.1	42 19.7	11 52.0	339 54.9	0.3
Mar. 4	45.34	10.06	6 38.0	12 48.7	20 38.5	42 19.7	11 44.9	340 11.0	0.3
12	45.04	10.18	6 39.7	13 3.5	20 7.6	42 19.6	11 37.9	340 27.0	0.4
20	44.65	10.25	6 41.2	13 16.3	19 40.4	42 19.6	11 30.9	340 43.0	0.4
28	44.19	-10.27	-6 42.3	-13 26.5	19 18.0	42 19.5	-11 23.7	340 59.0	+0.4
Apr. 5	43.67	10.24	6 43.2	13 33.9	19 1.0	42 19.5	11 16.6	341 14.9	0.5
13	43.10	10.17	6 43.8	13 38.6	18 49.9	42 19.5	11 9.5	341 30.9	0.5
21	42.51	10.05	6 44.0	13 40.3	18 45.0	42 19.4	11 2.4	341 46.8	0.6
29	41.91	9.89	6 43.9	13 59.0	18 46.4	42 19.4	10 55.2	342 2.7	0.6
May 7	41.31	- 9.69	-6 43.5	-13 34.7	18 54.1	42 19.4	-10 48.1	342 18.6	+0.7
15	40.71	9.46	6 42.7	13 27.5	19 8.0	42 19.3	10 41.0	342 34.4	0.7
23	40.13	9.22	6 41.7	13 17.5	19 27.7	42 19.3	10 33.8	342 50.3	0.7
31	39.58	8.96	6 40.3	13 5.0	19 53.0	42 19.2	10 26.6	343 6.1	0.8
June 8	39.06	8.68	6 38.6	12 50.1	20 23.4	42 19.2	10 19.4	343 21.9	0.8
16	38.59	- 8.39	-6 36.6	-12 33.0	20 58.5	42 19.2	-10 12.2	343 37.7	+0.8
24	38.16	8.09	6 34.4	12 13.8	21 37.8	42 19.1	10 5.0	343 53.4	0.8
July 2	37.78	7.78	6 31.9	11 52.8	22 20.7	42 19.1	9 57.8	344 9.2	0.8
10	37.44	7.47	6 29.2	11 30.2	23 6.8	42 19.1	9 50.6	344 24.9	0.9
18	37.16	7.16	6 26.3	11 6.2	23 55.7	42 19.0	9 43.4	344 40.6	0.9
26	36.93	- 6.85	-6 23.2	-10 41.1	24 46.8	42 19.0	- 9 36.2	344 56.3	+0.9
Aug. 3	36.75	6.54	6 19.9	10 15.1	25 39.5	42 19.0	9 29.0	345 12.0	0.9
11	36.62	6.24	6 16.4	9 48.4	26 33.5	42 18.9	9 21.7	345 27.6	0.9
19	36.55	5.94	6 12.9	9 21.3	27 28.3	42 18.9	9 14.4	345 43.3	0.8
27	36.54	5.65	6 9.2	8 54.0	28 23.4	42 18.8	9 7.2	345 58.9	0.8
Sept. 4	36.58	- 5.37	-6 5.5	- 8 26.7	29 18.3	42 18.8	- 8 59.9	346 14.5	+0.9
12	36.67	5.10	6 1.7	7 59.7	30 12.5	42 18.8	8 52.6	346 30.1	0.9
20	36.82	4.84	5 58.0	7 33.4	31 5.5	42 18.7	8 45.3	346 45.6	1.0
28	37.03	4.60	5 54.3	7 8.0	31 56.9	42 18.7	8 38.0	347 1.2	1.0
Oct. 6	37.29	4.37	5 50.7	6 43.7	32 46.2	42 18.6	8 30.7	347 16.7	1.0
14	37.61	- 4.16	-5 47.2	- 6 20.8	33 32.8	42 18.6	- 8 23.4	347 32.2	+1.1
22	37.97	3.96	5 44.0	5 59.6	34 16.2	42 18.6	8 16.1	347 47.7	1.1
30	38.38	3.79	5 41.0	5 40.5	34 55.9	42 18.5	8 8.8	348 3.2	1.1
Nov. 7	38.84	3.65	5 38.3	5 23.7	35 31.5	42 18.5	8 1.5	348 18.6	1.1
15	39.34	3.53	5 35.9	5 9.4	36 2.4	42 18.5	7 54.1	348 34.1	1.1
23	39.88	- 3.45	-5 33.9	- 4 57.9	36 28.2	42 18.4	- 7 46.8	348 49.5	+1.1
Dec. 1	40.45	3.40	5 32.3	4 49.4	36 48.5	42 18.4	7 39.5	349 4.9	1.0
9	41.03	3.39	5 31.2	4 44.1	37 2.8	42 18.4	7 32.1	349 20.3	1.0
17	41.62	3.41	5 30.6	4 42.1	37 11.0	42 18.3	7 24.8	349 35.7	1.0
25	42.21	3.48	5 30.5	4 43.3	37 13.0	42 18.3	7 17.4	349 51.1	1.0
33	42.78	- 3.58	-5 30.9	- 4 47.9	37 8.7	42 18.2	- 7 10.0	350 6.4	+0.9

The factor to be multiplied by *a* and *b* to obtain the axes of—

The inner ellipse of the outer ring—0.8801, log factor—9.9445
The outer ellipse of the inner ring—0.8599, log factor—9.9344
The inner ellipse of the inner ring—0.6650, log factor—9.8228
The inner ellipse of the dusky ring—0.5486, log factor—9.7392

NOTE.—The negative sign of *B* indicates that the visible surface of the rings is the southern one.

SATELLITES OF SATURN, 1919.

GREENWICH MEAN TIME.

In the diagram on the preceding page, the points of the orbits marked "0" are those of the eastern elongation, as seen in an inverting telescope. The times of these elongations may be found from the following tables, and the apparent position of a satellite at any other time may be marked on the diagram by setting off on the proper orbit the elapsed interval in days and hours since the last eastern elongation. The orbits of the five inner satellites are regarded as circular, and the time of any greatest elongation not given in the tables may be readily found from those given by adding or subtracting the proper multiple of the mean synodic period. For Titan, Hyperion, and Iapetus the eccentricity is taken into account, and for Iapetus the times both of the greatest elongations and of the conjunctions are given. The following abbreviations are used in the tables:

- E., Eastern Elongation.
W., Western Elongation.
- I., Inferior Conjunction (north of planet).
S., Superior Conjunction (south of planet).

MIMAS.

Greatest Elongations Visible in the United States.

Jan.	d h 1 18.5 W. 2 17.1 W. 3 15.7 W. 4 14.3 W. 5 1.6 E.	Jan.	d h 30 23.5 W. 31 22.1 W. Feb. 1 20.8 W. 2 19.4 W. 3 18.0 W.	Feb.	d h 28 17.2 E. Mar. 1 15.9 E. 2 14.5 E. 3 13.1 E. 4 0.4 W.	Apr.	d h 1 18.3 E. 2 16.8 E. 3 15.4 E. 4 14.0 E. 5 12.7 E.	May	d h 14 15.4 W. 15 14.0 W. 16 12.8 E. 20 18.5 E. 21 17.1 E.	Nov.	d h 22 0.0 W. 23 22.6 W. 24 21.3 W. 25 19.9 W. 26 18.5 W.
	6 0.3 E. 6 22.9 E. 7 21.5 E. 8 20.1 E. 9 18.7 E.		4 16.6 W. 5 15.2 W. 6 13.8 W. 7 1.1 E. 7 12.4 W.		4 11.7 E. 4 23.0 W. 5 21.6 W. 6 20.2 W. 7 18.8 W.		6 22.6 W. 7 21.2 W. 8 19.8 W. 9 18.4 W. 10 17.1 W.		22 15.7 E. 23 14.3 E. 24 12.9 E. 28 18.8 W. 29 17.4 W.		29 1.6 E. 30 0.3 E. 30 22.9 E. Dec. 1 21.5 E. 2 20.1 E.
	10 17.3 E. 11 15.9 E. 12 14.6 E. 13 1.9 W. 14 0.5 W.		7 23.7 E. 8 22.4 E. 9 21.0 E. 10 19.6 E. 11 18.2 E.		8 17.5 W. 9 16.1 W. 10 14.7 W. 11 13.3 W. 12 11.9 W.		11 15.7 W. 12 14.3 W. 13 12.9 W. 15 21.5 E. 16 20.1 E.	June	30 16.0 W. 31 14.6 W. 1 13.2 W. 6 17.7 E. 7 16.3 E.		3 18.7 E. 4 17.4 E. 7 1.9 W. 8 0.5 W. 8 23.1 W.
	14 23.1 W. 15 21.7 W. 16 20.3 W. 17 18.9 W. 18 17.5 W.		12 16.8 E. 13 15.4 E. 14 14.0 E. 15 1.3 W. 15 12.6 E.		12 23.2 E. 13 21.8 E. 14 20.5 E. 15 19.1 E. 16 17.7 E.		17 18.7 E. 18 17.3 E. 19 15.9 E. 20 14.6 E. 21 13.2 E.		8 14.9 E. 9 13.6 E. 14 18.0 W. 15 16.6 W. 16 15.2 W.		9 21.8 W. 10 20.4 W. 11 19.0 W. 12 17.6 W. 15 2.2 E.
	19 16.2 W. 20 14.8 W. 21 2.1 E. 21 13.4 W. 22 0.7 E.		16 0.0 W. 16 22.6 W. 17 21.2 W. 18 19.8 W. 19 18.4 W.		17 16.3 E. 18 14.9 E. 19 13.5 E. 20 12.2 E. 20 23.5 W.		23 21.7 W. 24 20.4 W. 25 19.0 W. 26 17.6 W. 27 16.2 W.		17 13.8 W. Oct. 30 20.4 E. 31 19.1 E.		16 0.8 E. 16 23.4 E. 17 22.0 E. 18 20.6 E. 19 19.2 E.
	22 23.3 E. 23 21.9 E. 24 20.5 E. 25 19.1 E. 26 17.8 E.		20 17.0 W. 21 15.6 W. 22 14.2 W. 23 1.6 E. 23 12.9 W.		21 22.1 W. 22 20.7 W. 23 19.3 W. 24 17.9 W. 25 16.6 W.	May	28 14.8 W. 29 13.5 W. 2 20.6 E. 3 19.2 E. 4 17.9 E.	Nov.	5 0.8 W. 5 23.5 W. 6 22.1 W. 7 20.7 W. 8 19.3 W.		20 17.8 E. 21 16.5 E. 23 2.4 W. 24 1.0 W. 24 23.6 W.
	27 16.4 E. 28 15.0 E. 29 2.3 W. 29 13.6 E. 30 0.9 W.		24 0.2 E. 24 11.5 W. 24 22.8 E. 25 21.4 E. 26 20.0 E.		26 15.2 W. 27 13.8 W. 28 12.4 W. 29 22.3 E. 30 21.0 E.		5 16.5 E. 6 15.1 E. 7 13.7 E. 11 19.5 W. 12 18.2 W.		13 1.1 E. 13 23.7 E. 14 22.4 E. 15 21.0 E. 16 19.6 E.		25 22.2 W. 26 20.8 W. 27 19.5 W. 28 18.1 W. 29 16.7 W.
	30 12.2 E.		27 18.6 E.		31 19.6 E.		13 16.8 W.		21 1.4 W.		31 2.6 E.

SATELLITES OF SATURN, 1919.

655

GREENWICH MEAN TIME.

ENCELADUS.

Jan.	d h	Feb.	d h	Mar.	d h	Apr.	d h	June	d h	Nov.	d h
	1 9.7 E.	10 3.1 E.		21 20.5 E.		30 14.2 E.		9 8.1 E.		23 13.6 E.	
	2 18.6 E.	11 12.0 E.		23 5.4 E.		1 23.1 E.		10 17.0 E.		24 22.4 E.	
	4 3.4 E.	12 20.8 E.		24 14.3 E.		3 8.0 E.		12 1.9 E.		26 7.3 E.	
	5 12.3 E.	14 5.7 E.		25 23.2 E.		4 16.9 E.		13 10.8 E.		27 16.2 E.	
	6 21.2 E.	15 14.6 E.		27 8.1 E.		6 1.8 E.		14 19.7 E.		29 1.1 E.	
	8 6.1 E.	16 23.5 E.		28 17.0 E.		7 10.7 E.		16 4.6 E.		30 10.0 E.	
	9 14.9 E.	18 8.3 E.		30 1.8 E.		8 19.6 E.		17 13.5 E.		Dec. 1 18.9 E.	
	10 23.8 E.	19 17.2 E.		31 10.7 E.		10 4.5 E.		18 22.4 E.		3 3.8 E.	
	12 8.7 E.	21 2.1 E.	Apr.	1 19.6 E.		11 13.3 E.		20 7.3 E.		4 12.7 E.	
	13 17.6 E.	22 11.0 E.		3 4.5 E.		12 22.2 E.		...		5 21.5 E.	
	15 2.4 E.	23 19.8 E.		4 13.4 E.		14 7.1 E.		...		7 6.4 E.	
	16 11.3 E.	25 4.7 E.		5 22.3 E.		15 16.0 E.		Oct. 29 21.5 E.		8 15.3 E.	
	17 20.2 E.	26 13.6 E.		7 7.1 E.		17 0.9 E.		31 6.4 E.		10 0.2 E.	
	19 5.1 E.	27 22.5 E.		8 16.0 E.		18 9.8 E.		Nov. 1 15.3 E.		11 9.1 E.	
	20 14.0 E.	Mar. 1 7.4 E.		10 0.9 E.		19 18.7 E.		3 0.2 E.		12 18.0 E.	
	21 22.8 E.	2 16.2 E.		11 9.8 E.		21 3.6 E.		4 9.1 E.		14 2.9 E.	
	23 7.7 E.	4 1.1 E.		12 18.7 E.		22 12.5 E.		5 18.0 E.		15 11.7 E.	
	24 16.6 E.	5 10.0 E.		14 3.6 E.		23 21.4 E.		7 2.9 E.		16 20.6 E.	
	26 1.5 E.	6 18.9 E.		15 12.4 E.		25 6.3 E.		8 11.8 E.		18 5.5 E.	
	27 10.3 E.	8 3.8 E.		16 21.3 E.		26 15.2 E.		9 20.7 E.		19 14.4 E.	
	28 19.2 E.	9 12.6 E.		18 6.2 E.		28 0.1 E.		11 5.5 E.		20 23.3 E.	
	30 4.1 E.	10 21.5 E.		19 15.1 E.		29 9.0 E.		12 14.4 E.		22 8.2 E.	
	31 13.0 E.	12 6.4 E.		21 0.0 E.		30 17.9 E.		13 23.3 E.		23 17.0 E.	
Feb.	1 121.8 E.	13 15.3 E.		22 8.9 E.		June 1 2.8 E.		15 8.2 E.		25 1.9 E.	
	3 6.7 E.	15 0.1 E.		23 17.8 E.		2 11.7 E.		16 17.1 E.		26 10.8 E.	
	4 15.6 E.	16 9.0 E.		25 2.7 E.		3 20.6 E.		18 2.0 E.		27 19.7 E.	
	6 0.5 E.	17 17.9 E.		26 11.6 E.		5 5.4 E.		19 10.9 E.		29 4.6 E.	
	7 9.3 E.	19 2.8 E.		27 20.4 E.		6 14.3 E.		20 19.8 E.		30 13.4 E.	
	8 18.2 E.	20 11.7 E.		29 5.3 E.		7 23.2 E.		22 4.7 E.		31 22.3 E.	

TETHYS.

Jan.	d h	Feb.	d h	Mar.	d h	Apr.	d h	June	d h	Nov.	d h
	1 121.7 E.	10 12.9 E.		22 4.0 E.		30 19.4 E.		9 11.2 E.		22 16.2 E.	
	3 19.0 E.	12 10.2 E.		24 1.3 E.		May 2 16.8 E.		11 8.5 E.		24 13.5 E.	
	5 16.3 E.	14 7.4 E.		25 22.6 E.		4 14.1 E.		13 5.8 E.		26 10.8 E.	
	7 13.6 E.	16 4.7 E.		27 19.9 E.		6 11.4 E.		15 3.2 E.		28 8.2 E.	
	9 10.9 E.	18 2.0 E.		29 17.2 E.		8 8.7 E.		17 0.5 E.		30 5.5 E.	
	11 8.2 E.	19 23.3 E.		31 14.5 E.		10 6.0 E.		18 21.8 E.		Dec. 2 2.8 E.	
	13 5.5 E.	21 20.6 E.	Apr.	2 11.8 E.		12 3.3 E.		20 19.2 E.		4 0.1 E.	
	15 2.8 E.	23 17.9 E.		4 9.1 E.		14 0.7 E.		...		5 21.4 E.	
	17 0.1 E.	25 15.2 E.		6 6.4 E.		15 22.0 E.		...		7 18.7 E.	
	18 21.4 E.	27 12.5 E.		8 3.7 E.		17 19.3 E.		Oct. 31 0.4 E.		9 16.0 E.	
	20 18.7 E.	Mar. 1 9.8 E.		10 1.0 E.		19 16.6 E.		Nov. 1 21.7 E.		11 13.3 E.	
	22 16.0 E.	3 7.1 E.		11 22.3 E.		21 14.0 E.		3 19.0 E.		13 10.6 E.	
	24 13.3 E.	5 4.4 E.		13 19.7 E.		23 11.3 E.		5 16.4 E.		15 7.9 E.	
	26 10.6 E.	7 1.6 E.		15 17.0 E.		25 8.6 E.		7 13.7 E.		17 5.2 E.	
	28 7.8 E.	8 22.9 E.		17 14.3 E.		27 5.9 E.		9 11.0 E.		19 2.6 E.	
	30 5.1 E.	10 20.2 E.		19 11.6 E.		29 3.2 E.		11 8.3 E.		20 23.9 E.	
Feb.	1 2.4 E.	12 17.5 E.		21 8.9 E.		31 0.6 E.		13 5.6 E.		22 21.2 E.	
	2 23.7 E.	14 14.8 E.		23 6.2 E.		June 1 21.9 E.		15 2.9 E.		24 18.5 E.	
	4 21.0 E.	16 12.1 E.		25 3.5 E.		3 19.2 E.		17 0.3 E.		26 15.8 E.	
	6 18.3 E.	18 9.4 E.		27 0.8 E.		5 16.5 E.		18 21.6 E.		28 13.1 E.	
	8 15.6 E.	20 6.7 E.		28 22.1 E.		7 13.9 E.		20 18.9 E.		30 10.4 E.	

SATELLITES OF SATURN, 1919:

GREENWICH MEAN TIME:

DIONE.

Jan.	d h	Feb.	d h	Mar.	d h	May	d h	June	d h	Nov.	d h
	2 5.7 E.		12 6.5 E.		25 7.4 E.		5 8.6 E.		15 10.4 E.		21 6.9 E.
	4 23.4 E.		15 0.2 E.		28 1.0 E.		8 2.3 E.		18 4.1 E.		24 0.6 E.
	7 17.0 E.		17 17.8 E.		30 18.7 E.		10 20.0 E.		20 21.8 E.		26 18.3 E.
	10 10.7 E.		20 11.5 E.	Apr.	2 12.4 E.		12 13.7 E.		23 15.5 E.		29 12.0 E.
	13 4.4 E.		23 5.1 E.		5 6.0 E.		16 7.4 E.		....	Dec.	2 5.7 E.
	15 22.0 E.		25 22.8 E.		7 23.7 E.		19 1.2 E.		....		4 23.4 E.
	18 15.7 E.		28 16.4 E.		10 17.4 E.		21 18.9 E.	Oct.	27 15.5 E.		7 17.1 E.
	21 9.3 E.	Mar.	3 10.1 E.		13 11.1 E.		24 12.6 E.		30 9.2 E.		10 10.8 E.
	24 3.0 E.		6 3.7 E.		16 4.8 E.		27 6.3 E.	Nov.	2 3.0 E.		13 4.5 E.
	26 20.6 E.		8 21.4 E.		18 22.4 E.		30 0.0 E.		4 30.7 E.		15 22.2 E.
	29 14.3 E.		11 15.0 E.		21 16.1 E.	June	1 17.7 E.		7 14.4 E.		18 15.9 E.
Feb.	1 7.9 E.		14 8.7 E.		24 9.8 E.		4 11.5 E.		10 8.1 E.		21 9.6 E.
	4 1.6 E.		17 2.4 E.		27 3.5 E.		7 5.2 E.		13 1.8 E.		24 3.2 E.
	6 19.2 E.		19 20.0 E.		29 21.2 E.		9 22.9 E.		15 19.5 E.		26 20.9 E.
	9 12.9 E.		22 13.7 E.	May	2 14.9 E.		12 16.6 E.		18 13.2 E.		29 14.6 E.

RHEA.

Jan.	d h	Feb.	d h	Mar.	d h	May	d h	June	d h	Nov.	d h
	1 16.3 E.		11 7.3 E.		23 22.3 E.		3 13.9 E.		13 6.4 E.		23 2.2 E.
	6 4.6 E.		15 19.6 E.		28 10.6 E.		8 2.4 E.		17 18.9 E.		27 14.7 E.
	10 16.9 E.		20 7.9 E.	Apr.	1 23.0 E.		12 14.8 E.		....	Dec.	2 3.1 E.
	15 5.3 E.		24 20.2 E.		6 11.4 E.		17 3.3 E.		....		6 15.6 E.
	19 17.6 E.	Mar.	1 8.6 E.		10 23.8 E.		21 15.8 E.	Oct.	31 11.7 E.		11 4.0 E.
	24 6.0 E.		5 20.9 E.		15 12.2 E.		26 4.3 E.	Nov.	5 0.2 E.		15 16.5 E.
	28 18.3 E.		10 9.2 E.		20 0.6 E.		30 16.8 E.		9 12.7 E.		20 4.9 E.
Feb.	2 6.6 E.		14 21.6 E.		24 13.0 E.	June	4 5.3 E.		14 1.2 E.		24 17.3 E.
	6 19.0 E.		19 9.9 E.		29 1.5 E.		8 17.8 E.		18 13.7 E.		29 5.7 E.

TITAN.

Jan.	d h	Feb.	d h	Apr.	d h	May	d h	Oct.	d h	Dec.	d h
	3 18.8 W.		20 11.5 W.		9 4.8 W.		27 1.8 W.		18 5.9 W.		5 5.2 W.
	11 23.2 E.		28 16.0 E.		17 9.9 E.	June	4 7.5 E.		26 10.6 E.		13 9.2 E.
	19 16.6 W.	Mar.	8 9.0 W.		25 3.4 W.		12 1.6 W.	Nov.	3 6.0 W.		21 4.2 W.
	27 20.9 E.		16 13.6 E.	May	3 8.7 E.		20 7.4 E.		11 10.5 E.		29 7.9 E.
Feb.	4 14.1 W.		24 6.8 W.		11 2.4 W.		....		19 5.8 W.		....
	12 18.5 E.	Apr.	1 11.6 E.		19 7.9 E.		....		27 10.0 E.		....

HYPERION.

Jan.	d h	Feb.	d h	Apr.	d h	May	d h	Oct.	d h	Nov.	d h
	11 8.0 W.		22 14.0 W.		5 22.6 W.		18 12.5 W.		....		27 14.5 W.
	21 19.8 E.	Mar.	5 1.8 E.		16 11.9 E.		29 5.0 E.		26 23.8 E.	Dec.	8 22.1 E.
Feb.	1 11.0 W.		15 17.8 W.		27 4.9 W.	June	8 21.6 W.	Nov.	6 4.5 W.		18 23.4 W.
	11 22.6 E.		26 6.1 E.	May	7 19.6 E.		19 16.0 E.		17 11.7 E.		30 6.9 E.

IAPETUS.

Jan.	d h	Feb.	d h	Apr.	d h	May	d h	Oct.	d h	Dec.	d h
	20 8.4 I.		27 14.3 S.		8 15.7 I.		17 12.3 S.		26 22.5 S.		6 15.0 I.
Feb.	7 21.9 W.	Mar.	20 3.8 E.		27 10.7 W.	June	7 15.6 E.	Nov.	17 1.5 E.		25 14.5 W.

SATELLITES OF SATURN, 1919.

657

DIFFERENTIAL COORDINATES OF PHOEBE.

FOR GREENWICH MEAN NOON.

Date.	$\alpha_{Ph}-\alpha_{Sat}$	$\delta_{Ph}-\delta_{Sat}$	Date.	$\alpha_{Ph}-\alpha_{Sat}$	$\delta_{Ph}-\delta_{Sat}$	Date.	$\alpha_{Ph}-\alpha_{Sat}$	$\delta_{Ph}-\delta_{Sat}$
	m s	' "		m s	' "		m s	' "
a. 1	-1 11.5	+ 9 11	Apr. 15	-2 24.1	+12 26			
3	1 13.9	9 23	17	2 24.2	12 23			
5	1 16.3	9 34	19	2 24.2	12 20	Sept. 25	+0 20.0	- 3 49
7	1 18.6	9 45	21	2 24.2	12 16	27	0 23.2	4 8
9	1 21.0	9 56	23	2 24.1	12 13	29	0 26.4	4 26
11	-1 23.3	+10 6	25	-2 24.0	+12 9	Oct. 1	+0 29.5	- 4 45
13	1 25.6	10 16	27	2 23.8	12 6	3	0 32.6	5 3
15	1 27.8	10 26	29	2 23.5	12 2	5	0 35.6	5 21
17	1 30.0	10 36	May 1	2 23.2	11 57	7	0 38.6	5 39
19	1 32.2	10 45	3	2 22.8	11 53	9	0 41.6	5 57
21	-1 34.4	+10 54	5	-2 22.4	+11 48	11	+0 44.6	- 6 14
23	1 36.5	11 2	7	2 21.9	11 44	13	0 47.5	6 31
25	1 38.6	11 10	9	2 21.3	11 39	15	0 50.3	6 48
27	1 40.6	11 18	11	2 20.7	11 34	17	0 53.1	7 5
29	1 42.6	11 26	13	2 20.0	11 28	19	0 55.8	7 21
31	-1 44.6	+11 33	15	-2 19.3	+11 23	21	+0 58.5	- 7 36
b. 2	1 46.5	11 39	17	2 18.5	11 17	23	1 1.1	7 52
4	1 48.4	11 46	19	2 17.7	11 11	25	1 3.7	8 7
6	1 50.2	11 52	21	2 16.8	11 5	27	1 6.2	8 21
8	1 52.0	11 57	23	2 15.8	10 58	29	1 8.7	8 35
10	-1 53.7	+12 3	25	-2 14.8	+10 52	31	+1 11.0	- 8 48
12	1 55.4	12 8	27	2 13.7	10 45	Nov. 2	1 13.3	9 1
14	1 57.1	12 12	29	2 12.5	10 38	4	1 15.6	9 14
16	1 58.7	12 17	31	2 11.3	10 31	6	1 17.7	9 26
18	2 0.3	12 21	June 2	2 10.1	10 23	8	1 19.8	9 38
20	-2 1.8	+12 25	4	-2 8.8	+10 16	10	+1 21.8	- 9 49
22	2 3.3	12 28	6	2 7.4	10 8	12	1 23.7	9 59
24	2 4.7	12 31	8	2 5.9	10 0	14	1 25.6	10 9
26	2 6.1	12 34	10	2 4.4	9 51	16	1 27.3	10 18
28	2 7.4	12 36	12	2 2.9	9 42	18	1 29.0	10 27
r. 2	-2 8.7	+12 39	14	-2 1.3	+ 9 33	20	+1 30.6	-10 35
4	2 10.0	12 41	16	1 59.6	9 24	22	1 32.1	10 42
6	2 11.2	12 42	18	1 57.9	9 15	24	1 33.6	10 49
8	2 12.3	12 43	20	1 56.1	9 5	26	1 34.9	10 55
10	2 13.4	12 44	22	1 54.3	8 55	28	1 36.2	11 1
12	-2 14.5	+12 45	24	-1 52.4	+ 8 44	30	+1 37.3	-11 6
14	2 15.5	12 46	26	1 50.5	8 34	Dec. 2	1 38.4	11 10
16	2 16.4	12 46	28	1 48.5	8 23	4	1 39.4	11 14
18	2 17.3	12 46	30	1 46.4	8 12	6	1 40.3	11 17
20	2 18.1	12 46	July 2	1 44.3	8 0	8	1 41.1	11 19
22	-2 18.9	+12 46	4	-1 42.1	+ 7 49	10	+1 41.8	-11 21
24	2 19.6	12 45	6	1 39.9	7 37	12	1 42.4	11 22
26	2 20.3	12 45	8	1 37.6	7 24	14	1 43.0	11 23
28	2 20.9	12 44	10	1 35.3	7 12	16	1 43.5	11 23
30	2 21.5	12 43	12	1 33.0	6 59	18	1 43.8	11 22
r. 1	-2 22.0	+12 41	14	-1 30.6	+ 6 46	20	+1 44.1	-11 21
3	2 22.5	12 40	16	1 28.1	6 32	22	1 44.3	11 19
5	2 22.9	12 38	18	1 25.6	6 18	24	1 44.4	11 16
7	2 23.3	12 36	20	1 23.0	6 4	26	1 44.5	11 13
9	2 23.6	12 34	22	1 20.4	5 50	28	1 44.4	11 9
11	-2 23.8	+12 31	24	-1 17.7	+ 5 35	30	+1 44.3	-11 5
13	-2 24.0	+12 28	26	-1 15.0	+ 5 20	32	+1 44.0	-11 0

Time from Eastern Elongation.	Mimas.		Time from Eastern Elongation.	Enceladus.		Tethys.		Time from Eastern Elongation.	Dione.	
	p^1	F		p^1	F	p^1	F		p^1	F
h	°		d h	°		°		d h	°	
0.0	84.0	1.000	0 0	84.0	1.000	84.0	1.000	0 0	84.0	1.000
0.5	82.2	0.991	0 1	81.7	0.983	82.4	0.991	0 2	81.7	0.983
1.0	80.4	0.964	0 2	79.2	0.931	80.8	0.963	0 4	79.2	0.931
1.5	78.4	0.919	0 3	76.3	0.848	79.0	0.918	0 6	76.3	0.847
2.0	76.2	0.858	0 4	72.6	0.736	77.0	0.856	0 8	72.6	0.736
2.5	73.6	0.781	0 5	67.4	0.602	74.6	0.779	0 10	67.4	0.601
3.0	70.3	0.692	0 6	59.0	0.454	71.7	0.689	0 12	59.0	0.453
3.5	66.0	0.592	0 7	42.5	0.309	67.8	0.588	0 14	42.4	0.307
4.0	59.9	0.486	0 8	5.4	0.214	62.3	0.479	0 16	4.9	0.213
4.5	50.3	0.379	0 9	318.5	0.255	53.3	0.369	0 18	318.0	0.256
5.0	33.7	0.283	0 10	294.7	0.388	37.2	0.267	0 20	294.5	0.389
5.5	5.0	0.225	0 11	283.7	0.538	6.9	0.203	0 22	283.5	0.540
6.0	330.5	0.240	0 12	277.4	0.680	328.7	0.218	1 0	277.3	0.681
6.5	306.8	0.317	0 13	273.2	0.802	304.0	0.300	1 2	273.1	0.804
7.0	293.4	0.419	0 14	270.0	0.898	291.0	0.407	1 4	270.0	0.900
7.5	285.5	0.527	0 15	267.4	0.964	283.5	0.517	1 6	267.4	0.965
8.0	280.2	0.631	0 16	265.0	0.997	278.7	0.624	1 8	265.0	0.997
8.5	276.4	0.728	0 17	262.7	0.994	275.2	0.722	1 10	262.7	0.994
9.0	273.4	0.812	0 18	260.3	0.958	272.5	0.808	1 12	260.3	0.957
9.5	270.9	0.883	0 19	257.6	0.888	270.3	0.880	1 14	257.6	0.886
10.0	268.8	0.938	0 20	254.4	0.789	268.4	0.936	1 16	254.3	0.786
10.5	266.9	0.976	0 21	250.0	0.664	266.6	0.975	1 18	249.9	0.660
11.0	265.1	0.996	0 22	243.4	0.521	265.0	0.996	1 20	243.2	0.516
11.5	263.3	0.999	0 23	231.4	0.371	263.4	0.999	1 22	231.0	0.366
12.0	261.5	0.983	1 0	205.2	0.244	261.9	0.984	2 0	204.1	0.241
12.5	259.7	0.948	1 1	157.0	0.219	260.2	0.950	2 2	155.4	0.221
13.0	257.6	0.897	1 2	122.9	0.324	258.3	0.899	2 4	122.0	0.328
13.5	255.2	0.830	1 3	107.7	0.472	256.2	0.831	2 6	107.3	0.476
14.0	252.4	0.749	1 4	99.8	0.619	253.7	0.750	2 8	99.6	0.624
14.5	248.8	0.655	1 5	94.9	0.751	250.8	0.655	2 10	94.7	0.755
15.0	244.0	0.552	1 6	91.4	0.859	246.2	0.551	2 12	91.2	0.863
15.5	236.8	0.445	1 7	88.5	0.939	239.7	0.441	2 14	88.4	0.941
16.0	225.1	0.339	1 8	86.1	0.986	228.9	0.332	2 16	86.0	0.988
16.5	204.2	0.254	1 9	83.7	1.000	208.6	0.239	2 18	83.6	1.000
17.0	171.4	0.221	1 10	81.4	0.978	173.2	0.198	2 20	81.3	0.977
17.5	139.8	0.264	1 11			138.3	0.242			
18.0	120.8	0.354	1 12			118.6	0.336			
18.5	109.9	0.460	1 13			108.0	0.445			
19.0	103.2	0.568	1 14			101.6	0.555			
19.5	98.6	0.669	1 15			97.3	0.659			
20.0	95.1	0.761	1 16			94.2	0.753			
20.5	92.4	0.841	1 17			91.7	0.834			
21.0	90.1	0.906	1 18			89.6	0.901			
21.5	88.1	0.955	1 19			87.8	0.951			
22.0	86.2	0.986	1 20			86.1	0.984			
22.5	84.4	1.000	1 21			84.5	0.999			
23.0	82.6	0.995	1 22			82.9	0.996			

Position angle of satellite $p = p^1 + (P - P_0)$.Apparent distance of satellite $s = F \frac{\alpha(p)}{p}$.

SATELLITES OF SATURN, 1919.

659

Time from Eastern Elongation.	Rhea.		Time from Eastern Elongation.	Titan.		Hyperion.		Time from Eastern Elongation.	Iapetus.	
	p^1	F		p^1	F	p^1	F		p^1	F
d h	°		d h	°		°		d	°	
0 0	84.0	1.000	0 0	84.0	0.982	84.0	1.084	0	91.5	1.016
0 3	81.8	0.986	0 10	81.9	0.965	82.7	1.078	2	91.5	1.000
0 6	79.5	0.943	0 20	79.7	0.922	81.3	1.060	4	91.4	0.960
0 9	76.9	0.874	1 6	77.2	0.853	79.9	1.030	6	91.3	0.896
0 12	73.8	0.780	1 16	74.2	0.762	78.4	0.989	8	91.3	0.810
0 15	69.7	0.666	2 2	70.2	0.651	76.7	0.936	10	91.2	0.704
0 18	63.7	0.537	2 12	64.5	0.525	74.8	0.872	12	91.0	0.579
0 21	53.7	0.401	2 22	54.9	0.392	72.6	0.799	14	90.8	0.440
1 0	34.1	0.278	3 8	36.0	0.270	69.9	0.717	16	90.4	0.289
1 3	355.6	0.216	3 18	358.0	0.205	66.5	0.628	18	89.1	0.131
1 6	315.9	0.270	4 4	316.9	0.254	61.9	0.534	20	281.7	0.032
1 9	295.2	0.392	4 14	295.7	0.372	55.2	0.437	22	273.1	0.192
1 12	284.8	0.527	5 0	285.2	0.504	44.9	0.344	24	272.4	0.348
1 15	278.7	0.657	5 10	279.0	0.633	27.5	0.264	26	272.1	0.494
1 18	274.5	0.773	5 20	274.8	0.749	0.1	0.221	28	271.9	0.627
1 21	271.3	0.868	6 6	271.8	0.847	329.3	0.239	30	271.8	0.743
2 0	268.6	0.939	6 16	269.2	0.925	307.6	0.305	32	271.7	0.838
2 3	266.3	0.984	7 2	267.1	0.980	294.5	0.393	34	271.6	0.911
2 6	264.2	1.000	7 12	265.1	1.010	286.5	0.488	36	271.6	0.959
2 9	262.0	0.988	7 22	263.2	1.016	281.0	0.580	38	271.5	0.982
2 12	259.7	0.947	8 8	261.2	0.997	277.0	0.667	40	271.5	0.978
2 15	257.1	0.879	8 18	259.2	0.953	273.9	0.744	42	271.4	0.950
2 18	254.0	0.787	9 4	256.8	0.888	271.3	0.806	44	271.3	0.896
2 21	250.0	0.675	9 14	254.1	0.802	269.1	0.859	46	271.3	0.821
3 0	244.2	0.546	10 0	250.6	0.698	267.0	0.896	48	271.2	0.724
3 3	234.6	0.411	10 10	245.7	0.581	265.2	0.913	50	271.1	0.609
3 6	216.0	0.285	10 20	238.2	0.456	263.4	0.915	52	270.9	0.480
3 9	178.8	0.216	11 6	225.2	0.333	261.5	0.900	54	270.6	0.339
3 12	138.0	0.264	11 16	199.4	0.237	259.5	0.868	56	269.8	0.190
3 15	116.3	0.383	12 2	158.7	0.222	257.3	0.820	58	262.2	0.036
3 18	105.4	0.518	12 12	127.8	0.301	254.8	0.758	60	94.3	0.119
3 21	99.0	0.649	12 22	112.1	0.420	251.8	0.682	62	92.7	0.270
4 0	94.9	0.765	13 8	103.5	0.546	248.2	0.596	64	92.2	0.415
4 3	91.5	0.862	13 18	98.1	0.665	242.9	0.504	66	92.0	0.551
4 6	88.8	0.935	14 4	94.3	0.770	235.4	0.408	68	91.9	0.674
4 9	86.5	0.981	14 14	91.3	0.858	223.3	0.316	70	91.8	0.782
4 12	84.3	1.000	15 0	88.8	0.924	202.8	0.244	72	91.7	0.872
4 15	82.1	0.989	15 10	86.7	0.965	171.2	0.218	74	91.6	0.941
			15 20	84.6	0.982	143.0	0.254	76	91.6	0.988
			16 6	82.5	0.973	124.3	0.332	78	91.5	1.013
			16 16			113.3	0.426	80	91.5	1.013
			17 2			106.4	0.524	82	91.4	0.989
			17 12			101.6	0.620			
			17 22			98.1	0.711			
			18 8			95.4	0.794			
			18 18			93.1	0.868			
			19 4			91.2	0.933			
			19 14			89.5	0.986			
			20 0			88.0	1.029			
			20 10			86.6	1.059			
			20 20			85.2	1.078			
			21 6			83.9	1.084			
			21 16			82.6	1.077			

Position angle of satellite $p = p^1 + (P - P_s)$.

Apparent distance of satellite $s = F \frac{p^1(s)}{p}$.

SATELLITES OF SATURN, 1919:

FOR GREENWICH MEAN MIDNIGHT.

Date.	Mimas.		Enceladus.		Tethys.		Dione.	
	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$
	*	"	*	"	*	"	*	"
Jan. 1	+1.2	30.1	-0.4	38.6	-1.3	47.8	-0.4	61.2
6	1.2	30.3	0.4	38.9	1.3	48.1	0.4	61.6
11	1.2	30.5	0.4	39.1	1.3	48.4	0.4	62.0
16	1.2	30.6	0.4	39.3	1.3	48.7	0.5	62.3
21	1.2	30.8	0.5	39.5	1.3	48.9	0.5	62.6
26	+1.1	30.9	-0.5	39.6	-1.3	49.1	-0.5	62.8
31	1.1	31.0	0.5	39.8	1.3	49.2	0.5	63.0
Feb. 5	1.0	31.1	0.5	39.8	1.3	49.3	0.5	63.2
10	1.0	31.1	0.6	39.9	1.4	49.4	0.6	63.2
15	0.9	31.1	0.6	39.9	1.4	49.4	0.6	63.2
20	+0.8	31.1	-0.6	39.9	-1.4	49.4	-0.6	63.2
25	0.7	31.0	0.6	39.8	1.4	49.3	0.6	63.1
Mar. 2	0.6	30.9	0.6	39.7	1.4	49.2	0.6	62.9
7	0.5	30.8	0.6	39.5	1.4	49.0	0.6	62.7
12	0.4	30.7	0.7	39.4	1.4	48.7	0.7	62.4
17	+0.3	30.5	-0.7	39.2	-1.4	48.5	-0.7	62.1
22	+0.1	30.4	0.7	38.9	1.4	48.2	0.7	61.7
27	0.0	30.2	0.7	38.7	1.4	47.9	0.7	61.3
Apr. 1	-0.1	29.9	0.7	38.4	1.4	47.6	0.7	60.9
6	0.3	29.7	0.7	38.1	1.4	47.2	0.7	60.4
11	-0.4	29.5	-0.7	37.8	-1.4	46.8	-0.7	59.9
16	0.6	29.2	0.7	37.5	1.4	46.4	0.7	59.4
21	0.7	29.0	0.7	37.2	1.4	46.0	0.7	58.9
26	0.8	28.7	0.7	36.8	1.4	45.6	0.7	58.4
May 1	1.0	28.5	0.7	36.5	1.4	45.2	0.7	57.9
6	-1.1	28.2	-0.7	36.2	-1.3	44.8	-0.7	57.3
11	1.3	27.9	0.7	35.8	1.3	44.4	0.7	56.8
16	1.4	27.7	0.7	35.5	1.3	44.0	0.7	56.3
21	1.5	27.4	0.7	35.2	1.2	43.6	0.7	55.8
26	1.6	27.2	0.7	34.9	1.2	43.2	0.7	55.3
31	-1.7	27.0	-0.7	34.6	-1.2	42.8	-0.7	54.8
June 5	1.8	26.8	0.6	34.3	1.1	42.5	0.7	54.4
10	-1.9	26.5	-0.6	34.0	-1.1	42.2	-0.6	54.0
Nov. 7	+1.3	26.5	+0.4	34.0	+0.7	42.0	+0.4	53.8
12	+1.4	26.7	+0.4	34.2	+0.8	42.4	+0.4	54.3
17	1.6	26.9	0.4	34.5	0.8	42.7	0.4	54.7
22	1.7	27.1	0.4	34.8	0.9	43.1	0.5	55.2
27	1.8	27.4	0.5	35.1	0.9	43.5	0.5	55.7
Dec. 2	1.9	27.6	0.5	35.4	0.9	43.8	0.5	56.2
7	+2.0	27.9	+0.5	35.7	+1.0	44.2	+0.5	56.7
12	2.0	28.1	0.5	36.1	1.0	44.6	0.5	57.2
17	2.1	28.4	0.5	36.4	1.0	45.0	0.5	57.7
22	2.1	28.6	0.5	36.7	1.0	45.5	0.5	58.2
27	2.1	28.9	0.5	37.0	1.0	45.8	0.5	58.7
32	+2.1	29.1	+0.5	37.3	+1.0	46.2	+0.5	59.2

SATELLITES OF SATURN, 1919.

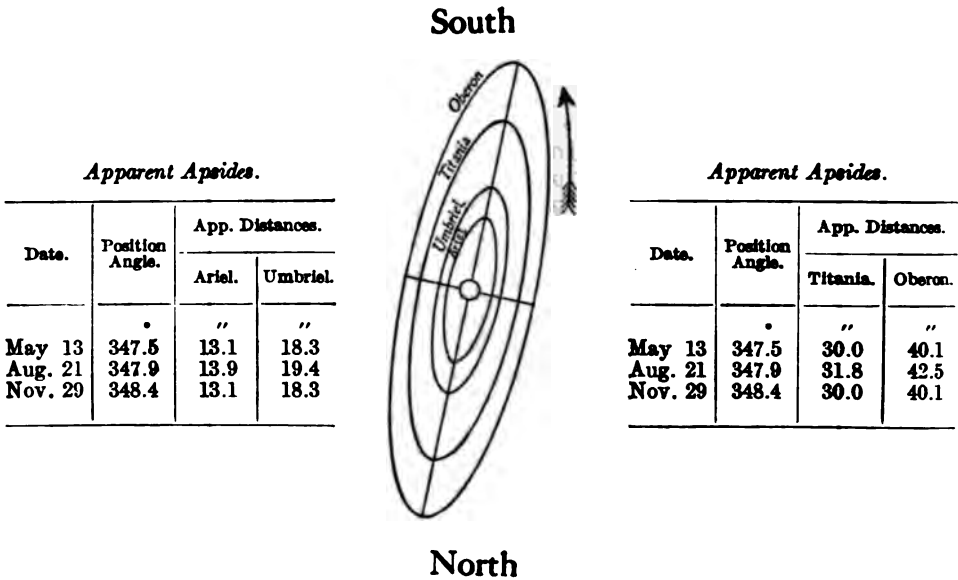
661

FOR GREENWICH MEAN MIDNIGHT.

Date.	Rhea.		Titan.		Hyperion.		Iapetus.	
	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$
Jan. 1	-0.5	85.4	0.0	198	0.0	240	+0.7	577
6	0.5	86.0	0.0	199	0.0	242	0.7	581
11	0.5	86.5	0.0	201	0.0	243	0.6	585
16	0.6	87.0	0.0	202	0.0	244	0.5	588
21	0.6	87.4	0.0	203	0.0	246	0.4	591
26	-0.6	87.8	-0.1	203	-0.1	247	+0.4	593
31	0.6	88.0	0.1	204	0.1	247	0.3	595
Feb. 5	0.6	88.2	0.1	204	0.1	248	0.2	596
10	0.7	88.3	0.1	205	0.1	248	+0.1	597
15	0.7	88.3	0.2	205	0.1	248	0.0	597
20	-0.7	88.3	-0.2	205	-0.2	248	-0.1	596
25	0.7	88.1	0.2	204	0.2	248	0.2	595
Mar. 2	0.7	87.9	0.2	204	0.2	247	0.3	594
7	0.7	87.6	0.2	203	0.2	246	0.4	592
12	0.8	87.2	0.2	202	0.2	245	0.5	589
17	-0.8	86.7	-0.3	201	-0.2	244	-0.5	586
22	0.8	86.2	0.3	200	0.2	242	0.6	582
27	0.8	85.7	0.3	199	0.2	241	0.7	579
Apr. 1	0.8	85.1	0.3	197	0.3	239	0.7	575
6	0.8	84.4	0.3	196	0.3	237	0.8	570
11	-0.8	83.7	-0.3	194	-0.3	235	-0.8	566
16	0.8	83.0	0.3	192	0.3	233	0.8	561
21	0.8	82.3	0.3	191	0.3	231	0.8	556
26	0.8	81.6	0.3	189	0.3	229	0.8	551
May 1	0.8	80.8	0.3	187	0.3	227	0.8	546
6	-0.8	80.1	-0.3	186	-0.3	225	-0.8	541
11	0.8	79.4	0.3	184	0.3	223	0.8	536
16	0.8	78.6	0.3	182	0.3	221	0.7	531
21	0.8	78.0	0.3	181	0.2	219	0.7	527
26	0.8	77.3	0.3	179	0.2	217	0.6	522
31	-0.8	76.6	-0.3	178	-0.2	215	-0.5	518
June 5	0.8	76.0	0.2	176	0.2	213	0.4	513
10	-0.8	75.4	-0.2	175	-0.2	212	-0.4	509
Nov. 7	+0.2	75.2	+0.8	174	+0.6	211	+3.5	508
12	+0.2	75.8	+0.8	176	+0.6	213	+3.6	512
17	0.2	76.4	0.8	177	0.7	215	3.7	516
22	0.2	77.1	0.8	179	0.7	216	3.7	521
27	0.2	77.8	0.8	180	0.7	218	3.8	525
Dec. 2	0.2	78.4	0.9	182	0.7	220	3.8	530
7	+0.3	79.1	+0.9	183	+0.7	222	+3.9	535
12	0.3	79.9	0.9	185	0.7	224	3.9	540
17	0.3	80.6	0.9	187	0.7	226	3.9	544
22	0.3	81.3	0.9	188	0.7	228	3.9	549
27	0.3	82.0	0.9	190	0.7	230	3.9	554
32	+0.3	82.7	+0.9	192	+0.7	232	+3.9	559

662 SATELLITES OF URANUS, 1919.

APPARENT ORBITS OF THE SATELLITES OF URANUS AT DATE OF OPPOSITION,
AUGUST 23, 1919, AS SEEN IN AN INVERTING TELESCOPE.



GREENWICH MEAN TIME OF GREATEST ELONGATION.

ARIEL.		UMBRIEL.		TITANIA.		OBERON.
North.	South.	North.	South.	North.	South.	North and South.
d h	d h	d h	d h	d h	d h	d h
May 29 21.5	June 2 16.2	May 15 20.3	May 17 22.0	May 9 17.2	May 14 1.6	June 8 9.9 N.
June 6 10.9	10 5.6	24 3.2	26 4.9	18 10.1	22 18.6	15 3.4 S.
14 0.4	17 19.1	June 1 10.1	June 3 11.8	27 3.0	31 11.5	21 21.0 N.
21 13.8	25 8.5	9 17.0	11 18.7	June 4 19.9	June 9 4.4	28 14.5 S.
29 3.3	July 2 22.0	17 23.9	20 1.6	13 12.8	17 21.3	July 5 8.1 N.
July 6 16.7	10 11.5	26 6.8	28 8.6	22 5.8	26 14.3	12 1.7 S.
14 6.2	18 0.9	July 4 13.8	July 6 15.5	30 22.7	July 5 7.2	18 19.2 N.
21 19.7	25 14.4	12 20.7	14 22.4	July 9 15.7	14 0.2	25 12.8 S.
29 9.1	Aug. 2 3.8	21 3.6	23 5.3	18 8.6	22 17.1	Aug. 1 6.4 N.
Aug. 5 22.6	9 17.3	29 10.5	31 12.2	27 1.6	31 10.0	8 0.0 S.
13 12.1	17 6.8	Aug. 6 17.4	Aug. 8 19.2	Aug. 4 18.5	Aug. 9 3.0	14 17.6 N.
21 1.5	24 20.3	15 0.4	17 2.1	13 11.5	17 20.0	21 11.2 S.
28 15.0	Sept. 1 9.7	23 7.3	25 9.0	22 4.5	26 13.0	28 4.8 N.
Sept. 5 4.5	8 23.2	31 14.2	Sept. 2 16.0	30 21.4	Sept. 4 5.9	Sept. 3 22.4 S.
12 18.0	16 12.7	Sept. 8 21.2	10 22.9	Sept. 8 14.4	12 22.9	10 16.0 N.
20 7.4	24 2.2	17 4.1	19 5.8	17 7.4	21 15.9	17 9.6 S.
27 20.9	Oct. 1 15.7	25 11.0	27 12.8	26 0.4	30 8.8	24 3.2 N.
Oct. 5 10.4	9 5.1	Oct. 3 18.0	Oct. 5 19.7	Oct. 4 17.4	Oct. 9 1.8	30 20.8 S.
12 23.9	16 18.6	12 0.9	14 2.7	13 10.3	17 18.8	Oct. 7 14.4 N.
20 13.4	24 8.1	20 7.9	22 9.6	22 3.3	26 11.8	14 8.0 S.
28 2.9	31 21.6	28 14.8	30 16.5	30 20.3	Nov. 4 4.7	21 1.6 N.
Nov. 4 16.4	Nov. 8 11.1	Nov. 5 21.7	Nov. 7 23.5	Nov. 8 13.2	12 21.7	27 19.1 S.
12 5.8	16 0.6	14 4.7	16 6.4	17 6.2	21 14.6	Nov. 3 12.7 N.
19 19.3	23 14.0	22 11.6	24 13.4	25 23.1	30 7.6	10 6.3 S.
27 8.8	Dec. 1 3.5	30 18.6	Dec. 2 20.3	Dec. 4 16.1	Dec. 9 0.5	16 23.8 N.

In the above diagram the central circle represents the planet.
For Ariel every third greatest elongation is given, and for Umbriel every alternate one; the intermediate ones may be found by adding multiples of the period of the satellite.
Sidereal period of Ariel, 2^d 12^h.489; of Umbriel, 4^d 3^h.460; of Titania, 8^d 16^h.941; of Oberon, 13^d 11^h.118.

SATELLITES OF URANUS, 1919.

663

Time from Northern Elongation.	Ariel.		Umbriel.		Time from Northern Elongation.	Titania.		Time from Northern Elongation.	Oberon.	
	p^1	F	p^1	F		p^1	F		p^1	F
d h	*		*		d h	*		d h	*	
0 0	348.0	1.000	348.0	1.000	0 0	348.0	1.000	0 0	348.0	1.000
0 2	351.5	0.981	350.1	0.993	0 5	350.5	0.990	0 8	350.6	0.989
0 4	355.2	0.922	352.2	0.971	0 10	353.1	0.959	0 16	353.3	0.956
0 6	359.6	0.829	354.5	0.935	0 15	355.9	0.909	1 0	356.2	0.902
0 8	5.4	0.707	357.0	0.886	0 20	359.1	0.840	1 8	359.6	0.829
0 10	14.0	0.564	359.8	0.825	1 1	3.0	0.756	1 16	3.8	0.740
0 12	28.5	0.419	3.2	0.753	1 6	7.9	0.659	2 0	9.2	0.638
0 14	55.8	0.308	7.3	0.671	1 11	14.7	0.555	2 8	16.7	0.528
0 16	95.7	0.299	12.6	0.584	1 16	24.6	0.448	2 16	28.3	0.420
0 18	125.1	0.402	19.8	0.494	1 21	40.4	0.354	3 0	47.0	0.330
0 20	140.7	0.546	30.1	0.408	2 2	64.8	0.294	3 8	75.0	0.287
0 22	149.7	0.690	45.5	0.335	2 7	94.2	0.297	3 16	104.2	0.316
1 0	155.7	0.815	67.2	0.291	2 12	117.7	0.363	4 0	124.8	0.400
1 2	160.3	0.913	92.0	0.294	2 17	132.6	0.459	4 8	137.4	0.507
1 4	164.1	0.975	113.0	0.343	2 22	142.1	0.566	4 16	145.6	0.617
1 6	167.6	1.000	127.5	0.419	3 3	148.6	0.670	5 0	151.3	0.721
1 8	171.0	0.985	137.3	0.506	3 8	153.4	0.766	5 8	155.6	0.813
1 10	174.7	0.931	144.2	0.596	3 13	157.2	0.848	5 16	159.2	0.890
1 12	179.0	0.842	149.3	0.683	3 18	160.4	0.915	6 0	162.2	0.947
1 14	184.6	0.723	153.3	0.763	3 23	163.2	0.963	6 8	164.9	0.984
1 16	192.7	0.582	156.6	0.834	4 4	165.8	0.992	6 16	167.5	1.000
1 18	206.2	0.435	159.3	0.893	4 9	168.3	1.000	7 0	170.1	0.993
1 20	231.5	0.317	161.8	0.941	4 14	170.8	0.987	7 8	172.7	0.964
1 22	270.9	0.293	164.1	0.974	4 19	173.4	0.954	7 16	175.6	0.914
2 0	302.4	0.386	166.2	0.994	5 0	176.2	0.902	8 0	178.9	0.845
2 2	319.2	0.528	168.3	1.000	5 5	179.5	0.832	8 8	182.9	0.759
2 4	328.8	0.673	170.4	0.991	5 10	183.5	0.746	8 16	188.0	0.659
2 6	335.1	0.802	172.5	0.967	5 15	188.6	0.649	9 0	195.0	0.550
2 8	339.8	0.902	174.8	0.929	5 20	195.6	0.543	9 8	205.6	0.440
2 10	343.7	0.970	177.4	0.878	6 1	206.0	0.437	9 16	222.6	0.344
2 12	347.2	0.999	180.3	0.815	6 6	222.5	0.345	10 0	248.9	0.290
2 14	350.6	0.989	183.7	0.742	6 11	247.9	0.291	10 8	279.1	0.305
2 16			187.9	0.660	6 16	277.1	0.302	10 16	301.5	0.381
2 18			193.4	0.572	6 21	299.6	0.372	11 0	315.4	0.485
2 20			200.9	0.482	7 2	313.9	0.470	11 8	324.2	0.596
2 22			211.8	0.397	7 7	322.9	0.577	11 16	330.3	0.702
3 0			228.0	0.326	7 12	329.2	0.681	12 0	334.9	0.796
3 2			250.5	0.289	7 17	333.9	0.775	12 8	338.5	0.876
3 4			275.2	0.299	7 22	337.6	0.856	12 16	341.6	0.938
3 6			295.3	0.352	8 3	340.7	0.921	13 0	344.4	0.979
3 8			309.1	0.430	8 8	343.5	0.967	13 8	347.0	0.998
3 10			318.4	0.519	8 13	346.0	0.994	13 16	349.6	0.996
3 12			325.0	0.608	8 18	348.5	1.000			
3 14			329.9	0.694						
3 16			333.8	0.773						
3 18			337.0	0.842						
3 20			339.7	0.901						
3 22			342.1	0.946						
4 0			344.4	0.978						
4 2			346.5	0.996						
4 4			348.5	1.000						

Position angle of satellite $p = p^1 + (P - P_0)$.

Apparent distance of satellite $s = F \frac{\alpha(p)}{p}$.

SATELLITES OF URANUS, 1919.

FOR GREENWICH MEAN NOON.

Date.	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$				Date.	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$			
		Ariel.	Umbriel.	Titania.	Oberon.			Ariel.	Umbriel.	Titania.	Oberon.
Apr. 28	-0.4	13.0	18.0	29.6	39.6	Aug. 26	0.0	13.9	19.4	31.8	42.5
May 3	0.4	13.0	18.1	29.7	39.8	31	0.0	13.9	19.4	31.8	42.5
8	0.5	13.1	18.2	29.8	39.9	Sept. 5	+0.1	13.9	19.3	31.7	42.4
13	0.5	13.1	18.3	30.0	40.1	10	0.1	13.9	19.3	31.7	42.4
18	0.5	13.2	18.3	30.1	40.2	15	0.2	13.8	19.3	31.6	42.3
23	-0.5	13.2	18.4	30.2	40.4	20	+0.2	13.8	19.2	31.6	42.2
28	0.5	13.3	18.5	30.3	40.6	25	0.2	13.8	19.2	31.5	42.1
June 2	0.6	13.3	18.6	30.5	40.7	30	0.3	13.7	19.2	31.4	42.0
7	0.6	13.4	18.6	30.6	40.9	Oct. 5	0.3	13.7	19.1	31.3	41.9
12	0.6	13.4	18.7	30.7	41.1	10	0.3	13.7	19.0	31.2	41.8
17	-0.5	13.5	18.8	30.8	41.2	15	+0.4	13.6	19.0	31.1	41.6
22	0.5	13.5	18.9	31.0	41.4	20	0.4	13.6	18.9	31.0	41.5
27	0.5	13.6	18.9	31.1	41.6	25	0.4	13.5	18.8	30.9	41.3
July 2	0.5	13.6	19.0	31.2	41.7	30	0.4	13.5	18.8	30.8	41.1
7	0.5	13.7	19.1	31.3	41.8	Nov. 4	0.4	13.4	18.7	30.6	41.0
12	-0.4	13.7	19.1	31.4	42.0	9	+0.4	13.3	18.6	30.5	40.8
17	0.4	13.8	19.2	31.5	42.1	14	0.4	13.3	18.5	30.4	40.6
22	0.4	13.8	19.2	31.5	42.2	19	0.4	13.2	18.4	30.2	40.4
27	0.3	13.8	19.3	31.6	42.3	24	0.4	13.2	18.4	30.1	40.3
Aug. 1	0.3	13.9	19.3	31.7	42.3	29	0.4	13.1	18.3	30.0	40.1
6	-0.2	13.9	19.3	31.7	42.4	Dec. 4	+0.4	13.1	18.2	29.9	39.9
11	0.2	13.9	19.3	31.7	42.4	9	0.3	13.0	18.1	29.7	39.8
16	0.1	13.9	19.4	31.8	42.5	14	0.3	13.0	18.1	29.6	39.6
21	-0.1	13.9	19.4	31.8	42.5	19	+0.2	12.9	18.0	29.5	39.5

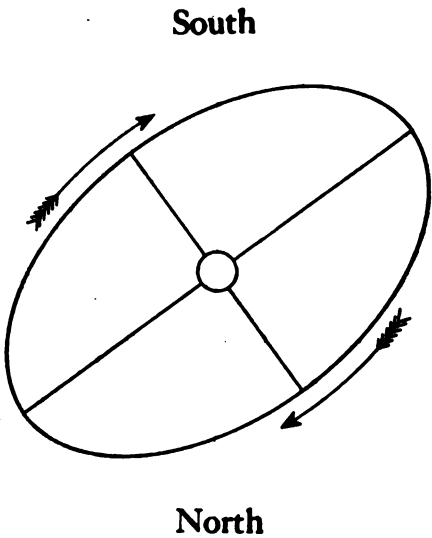
SATELLITE OF NEPTUNE, 1919.

Time from Eastern Elongation.	p^1	F	Time from Eastern Elongation.	p^1	F	Date.	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$	Date.	$P-P_0$	$\frac{\alpha(\rho)}{\rho}$
d h	°		d h	°		Jan. 1	+0.8	16.7	May 1	-1.4	16.2
0 0	124.8	1.000	3 0	302.5	0.999	6	0.7	16.7	6	1.4	16.2
0 3	120.1	0.994	3 3	297.7	0.988	11	0.5	16.8	11	1.3	16.1
0 6	115.2	0.978	3 6	292.7	0.966	16	0.4	16.8	16	1.2	16.1
0 9	110.1	0.952	3 9	287.5	0.935	21	0.3	16.8	21	-1.2	16.0
0 12	104.7	0.916	3 12	281.8	0.896	26	+0.1	16.8	Oct. 3	+3.2	16.0
0 15	98.8	0.874	3 15	275.6	0.850	31	0.0	16.8	8	3.3	16.0
0 18	92.2	0.825	3 18	268.7	0.801	Feb. 5	-0.2	16.8	13	3.4	16.0
0 21	84.8	0.775	3 21	260.8	0.750	10	0.3	16.8	18	3.5	16.1
1 0	76.4	0.725	4 0	251.8	0.702	15	0.5	16.8	23	3.6	16.1
1 3	66.7	0.680	4 3	241.6	0.661	20	-0.6	16.7	28	+3.6	16.2
1 6	55.9	0.645	4 6	230.2	0.632	25	0.7	16.7	Nov. 2	3.7	16.2
1 9	44.1	0.623	4 9	218.0	0.619	Mar. 2	0.9	16.7	7	3.7	16.3
1 12	31.8	0.619	4 12	205.7	0.623	7	1.0	16.7	12	3.7	16.3
1 15	19.6	0.632	4 15	193.9	0.644	12	1.1	16.6	17	3.7	16.4
1 18	8.2	0.661	4 18	183.0	0.680	17	-1.2	16.6	22	+3.7	16.4
1 21	358.0	0.701	4 21	173.4	0.724	22	1.3	16.6	27	3.7	16.4
2 0	348.9	0.749	5 0	164.9	0.774	27	1.3	16.5	Dec. 2	3.6	16.5
2 3	341.0	0.800	5 3	157.5	0.825	Apr. 1	1.4	16.5	7	3.6	16.5
2 6	334.1	0.850	5 6	150.9	0.873	6	1.4	16.4	12	3.5	16.6
2 9	327.8	0.895	5 9	145.0	0.916	11	-1.5	16.4	17	+3.4	16.6
2 12	322.2	0.935	5 12	139.6	0.951	16	1.5	16.3	22	3.3	16.6
2 15	317.0	0.966	5 15	134.5	0.978	21	1.5	16.3	27	3.2	16.7
2 18	312.0	0.988	5 18	129.6	0.994	26	-1.5	16.3	32	+3.1	16.7
2 21	307.2	0.999	5 21	124.9	1.000						

Position angle of satellite $p = p^1 + (P - P_0)$.Apparent distance of satellite $s = F \frac{\alpha(\rho)}{\rho}$.

SATELLITE OF NEPTUNE, 1919.665

APPARENT ORBIT OF THE SATELLITE OF NEPTUNE AT DATE OF OPPOSITION,
JANUARY 28, 1919, AS SEEN IN AN INVERTING TELESCOPE.



Date.	Position Angle of Apsis.	Apparent Distance at Apsis.
Jan. 21	125.1	16.8
May 1	123.4	16.2
Oct. 12	128.2	16.0
Dec. 31	128.0	16.7

GREENWICH MEAN TIME OF GREATEST ELONGATION.

East.	West.	East.	West.	East.	West.
Jan. d h 6 12.7 12 9.8 18 6.9 24 4.0 30 1.2	Jan. d h 9 11.2 15 8.3 21 5.5 27 2.6 Feb. 1 23.7	Mar. d h 29 20.3 Apr. 4 17.4 10 14.4 16 11.5 22 8.6	Apr. d h 1 18.8 7 15.9 13 13.0 19 10.0 25 7.1	Oct. d h 15 13.8 21 10.7 27 7.7 Nov. 2 4.8 8 1.8	Oct. d h 18 12.2 24 9.2 30 6.2 Nov. 5 3.3 11 0.3
Feb. d h 4 22.3 10 19.4 16 16.5 22 13.6 28 10.8	Feb. d h 7 20.8 13 17.9 19 15.1 25 12.2 Mar. 3 9.3	Mar. d h 28 5.6 May 4 2.7 9 23.7 15 20.7 21 17.7	May d h 1 4.1 7 1.2 12 22.2 18 19.2 24 16.2	Dec. d h 13 22.8 19 19.8 25 16.9 Dec. 1 13.9 7 11.0	Dec. d h 16 21.3 22 18.3 28 15.4 Dec. 4 12.4 10 9.5
Mar. d h 6 7.9 12 5.0 18 2.1 23 23.2	Mar. d h 9 6.4 15 3.5 21 0.6 26 21.7	June d h 27 14.7 June 2 11.7 Oct. 9 16.8	June d h 30 13.2 June 5 10.2 Oct. 12 15.3	Oct. d h 13 8.0 19 5.1 25 2.2 30 23.3	Oct. d h 16 6.6 22 3.7 28 0.8 33 21.9

In the above diagram the central circle represents the planet.
The sidereal period of the satellite of Neptune is 5^d 21^h.044.

PHENOMENA, 1919.

GREENWICH MEAN TIME.

PLANETARY CONFIGURATIONS.

	d	h	m							
Jan.	1	17	-	♂ ♃ ☉						
	2	17	4	♂ ♃ ☉		♀	- 4	28		
	2	21	-	♂ ☉	in Perihelion.					
	4	7	54	♂ ♃ ☉		♂	- 5	57		
	5	7	51	♂ ☉		♂	- 6	6		
	6	6	-	♀	in Aphelion.					
	7	15	-	♂	Greatest elong. W.	23	13			
	8	0	-	♂	in Perihelion.					
	14	16	50	♂ ♃ ☉		♂	+ 2	24		
	16	22	6	♂ ♃ ☉		♂	+ 4	22		
	18	10	27	♂ ♃ ☉		♂	+ 6	50		
	19	8	-	♂ in ☿						
	22	1	-	♂ ♃ ☉		♂	- 0	22		
	28	9	-	♂ ♃ ☉						
	28	20	-	♀	Greatest Hel. Lat. S.					
	29	14	-	♂	in Aphelion.					
	30	6	4	♂ ♃ ☉		♂	- 4	48		
	30	14	-	♂ ♃ ☉		♀	- 0	52		
	Feb.	1	17	44	♂ ♃ ☉		♂	- 6	1	
	1	22	41	♂ ♃ ☉		♀	- 6	58		
	2	8	9	♂ ♃ ☉		♂	- 6	28		
	10	19	14	♂ ♃ ☉		♂	+ 2	20		
	13	2	-	♂ ♃ ☉		♀	- 0	35		
	13	4	57	♂ ♃ ☉		♂	+ 4	20		
	14	2	-	♂ ♃ ☉						
	14	15	2	♂ ♃ ☉		♂	+ 6	45		
	16	22	-	♂ ☉						
	18	22	-	♂	Greatest Hel. Lat. S.					
	19	15	-	♂ ♃ ☉		♂	- 1	26		
	23	9	-	♂ ♃ ☉	Superior.					
Mar.	1	6	5	♂ ☉		♂	- 6	3		
	2	4	-	♂	Stationary.					
	2	15	4	♂ ♃ ☉		♂	- 6	37		
	3	6	28	♂ ♃ ☉		♂	- 5	51		
	3	20	46	♂ ♃ ☉		♀	- 5	43		
	9	23	-	♂	in ☿					
	9	23	46	♂ ♃ ☉		♂	+ 2	35		
	11	7	-	♂ ♃ ☉		♂	+ 0	59		
	12	10	5	♂ ♃ ☉		♂	+ 4	27		
	13	17	54	♂ ♃ ☉		♂	+ 6	47		
	14	13	-	♂	in Perihelion.					
	21	2	-	♂	Greatest elong. E.	18	35			
	21	4	19	☉	enters ♄, Spring com.					
	24	20	-	♂	Greatest Hel. Lat. N.					
	26	3	-	♀	in ☿					
	28	2	-	☉	Stationary.					
	28	17	-	♂						
	28	19	13	♂ ☉		♂	- 6	11		
	1	3	3	♂ ♃ ☉		♂	- 4	17		
	1	3	24	♂ ♃ ☉		♂	- 0	13		
Apr.	1	8	-	♂ ♃ ☉		♂	+ 4	2		
	2	14	3	♂ ♃ ☉		♀	- 1	36		
	6	9	5	♂ ♃ ☉						
	7	19	-	♂ ♃ ☉	Inferior.					
	8	15	2	♂ ♃ ☉		♂	+ 4	39		
	9	21	11	♂ ♃ ☉		♂	+ 6	54		
	17	7	-	♂	in ☿					
	17	11	-	♂	Stationary.					
	20	5	-	♂	Stationary.					
	23	15	-	♂	Stationary.					
	25	6	57	♂ ☉		♂	- 6	23		
	27	9	-	☉						
	27	13	-	♂	in Aphelion.					
	28	4	0	♂ ♃ ☉		♂	- 6	47		
	28	14	-	♂ ♃ ☉	in Perihelion.					
May	29	22	25	♂ ♃ ☉		♂	- 2	12		
	2	8	16	♂ ♃ ☉		♀	+ 3	5		
	3	23	42	♂ ♃ ☉		♂	+ 3	29		
	5	19	-	♂ ♃ ☉	Greatest elong. W.	26	36			
	5	21	44	♂ ♃ ☉		♂	+ 4	49		
	7	3	16	♂ ♃ ☉		♂	+ 7	0		
	9	7	-	♂ ♃ ☉						
	10	20	-	♂	in ☿					
	13	1	-	☉						
	17	22	-	♂	Greatest Hel. Lat. S.					
	20	15	-	♀	Greatest Hel. Lat. N.					
	22	15	45	♂ ☉		♂	- 6	28		
	23	8	-	☉						
	25	11	-	♂ ♃ ☉		♀	+ 2	7		
	27	23	36	♂ ♃ ☉		♂	- 2	50		
June	28	17	3	♂ ♃ ☉		♂	+ 0	1		
	29	-	-	☉	Tot. ecl. invis. at Wash.					
	31	18	16	♂ ♃ ☉		♂	+ 3	55		
	1	5	38	♂ ♃ ☉		♀	+ 6	32		
	2	7	0	♂ ♃ ☉		♂	+ 4	52		
	3	13	17	♂ ♃ ☉		♂	+ 7	2		
	5	13	-	♂ ♃ ☉		♂	- 0	21		
	5	22	-	♂	in ☿					
	6	16	-	♂	Stationary.					
	10	13	-	♂	in Perihelion.					
	11	2	-	♂ ☉	Superior.					
	14	6	-	♂ ♃ ☉		♀	+ 2	19		
	18	21	39	♂ ☉		♂	- 6	26		
	20	19	-	☉	Greatest Hel. Lat. N.					
	21	23	54	☉	enters ♄, Summer com.					
	26	11	14	♂ ♃ ☉		♂	+ 2	7		
	26	19	-	♂ ♃ ☉		♂	+ 1	38		
	28	14	44	♂ ♃ ☉		♂	+ 4	20		
	28	20	32	♂ ♃ ☉		♂	+ 6	6		
	29	18	3	♂ ♃ ☉		♂	+ 4	51		
July	1	0	25	♂ ♃ ☉		♀	+ 6	53		
	1	2	35	♂ ♃ ☉		♂	+ 6	58		
	2	9	-	♂ ♃ ☉		♀	- 0	10		
	2	22	-	☉	in Aphelion.					

667

PLANETARY CONFIGURATIONS.

[illegible]

No.	Place.	Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Fathoms opposite).	Longitude from Greenwich.	Reduction from Greenwich to Local S.T.M.N.
		" ' "	" ' "			h m s	"
1	Abbadia, France	+43 22 52.2	-11 34.4	69	9.999317	+ 0 7 0.1	+ 1.15
2	Adelaide, S. Australia	-34 55 38.0 ^a	+10 52.4	41 ^b	9.999396	- 9 14 20.07 ^c	- 91.06
3	Adelaide, S. Australia	-34 55 37.4 ^c	+10 52.4	...	9.999323	- 9 14 20.17 ^c	- 91.06
4	Albany, N. Y.	+42 39 12.7 ^a	-11 33.1	70 ^a	9.999336	+ 4 55 7.12 ^a	+ 48.48
5	Albany, N. Y.	+42 39 49.5 ^a	-11 33.1	52	9.999336	+ 4 54 59.97 ^a	+ 48.46
6	Algiers, Algeria	+36 47 50	-11 6.7	342	9.999501	- 0 12 8.38 ^d	- 1.99
7	Allegheny, Pa.	+40 28 58.1 ^d	-11 26.7	370 ^d	9.999411	+ 5 20 5.26 ^d	+ 52.58
8	Allegheny, Pa.	+40 27 41.6	-11 26.6	...	9.999357	+ 5 20 2.93 ^d	+ 52.58
9	Amherst, Mass.	+42 21 56.5 ^e	-11 32.5	110 ^e	9.999348	+ 4 50 5.93 ^e	+ 47.66
10	Amherst, Mass.	+42 22 17.1 ^f	-11 32.5	...	9.999338	+ 4 50 4.67 ^f	+ 47.65
11	Ann Arbor, Mich.	+42 16 48.7 ^a	-11 32.3	283 ^a	9.999360	+ 5 24 55.27 ^a	+ 55.02
12	Appleton, Wis.	+44 15 39.2 ^g	-11 35.4	242	9.999307	+ 5 53 35.92 ^g	+ 58.09
13	Arcetri, Italy	+43 45 14.4	-11 34.9	184	9.999316	- 0 45 1.30	- 7.40
14	Arequipa, Peru	-16 22 28.0 ^h	+ 6 15.2	2451 ^h	0.000052	+ 4 46 11.73 ^h	+ 47.02
15	Armagh, Ireland	+54 21 12.7 ^c	-10 59.6	61 ^c	9.999040	+ 0 26 35.4 ^c	+ 4.37
16	Athens, Greece	+37 58 19.7 ⁱ	-11 14.3	107 ⁱ	9.999456	- 1 34 53 ⁱ	- 15.59
17	Baltimore, Md.	+39 17 52.0 ^j	-11 21.5	96 ^j	9.999418	+ 5 6 29.1 ^j	+ 50.35
18	Bamberg, Bavaria	+49 53 6.0 ^c	-11 26.0	290 ^c	9.999167	- 0 43 33.57 ^c	- 7.16
19	Barcelona, Spain	+41 25 18	-11 30.0	420	9.999391	- 0 8 23.0	- 1.39
20	Beloit, Wis.	+42 30 8.4	-11 32.8	...	9.999335	+ 5 56 7.4	+ 58.50
21	Bergedorf, Germany	+53 28 46.2	-11 6.1	35	9.999080	- 0 40 57.74	- 6.73
22	Berkeley, Cal.	+37 52 23.6	-11 13.7	97	9.999458	+ 8 9 2.72	+ 30.34
23	Berlin, Prussia	+52 30 16.7 ^k	-11 12.5	47 ^k	9.999085	- 0 58 24.89 ^k	- 8.80
24	Berlin, Prussia	+52 31 13.1	-11 12.4	...	9.999081	- 0 58 24.41	- 8.80
25	Berlin, Prussia	+52 31 30.7	-11 12.4	...	9.999081	- 0 58 27.40	- 8.78
26	Berlin, Prussia	+52 29 7	-11 12.6	38	9.999064	- 0 53 54.2	- 8.86
27	Berne, Switzerland	+46 57 8.7	-11 34.2	573	9.999260	- 0 29 45.70 ^a	- 4.89
28	Besançon, France	+47 14 59.0	-11 33.7	312	9.999235	- 0 23 57.13	- 3.93
29	Birr Castle, Ireland	+53 5 47	-11 8.7	56	9.999071	+ 0 31 40.9	+ 5.20
30	Bloomington, Ind.	+39 9 56 ^d	-11 20.8	238 ^d	9.999435	+ 5 46 5 ^d	+ 56.85
31	Bogota, Colombia	+ 4 35 55.2 ^c	- 1 50.8	2634	0.000170	+ 4 56 23.5	+ 48.69
32	Bombay (Colaba), India	+18 53 36.2 ^c	- 7 5.1	14 ^c	9.999849	- 4 51 15.72 ^c	- 47.85
33	Bonn, Prussia	+50 43 45.0 ^k	-11 22.3	62 ^k	9.999130	- 0 28 23.17 ^k	- 4.66
34	Bordeaux (Floirac), France	+44 50 7.2 ^a	-11 35.6	73	9.999281	+ 0 2 5.51 ^a	+ 0.34
35	Boston, Mass.	+42 20 58 ^m	-11 32.5	31 ^m	9.999341	+ 4 44 19.1 ^m	+ 46.71
36	Boston, Mass.	+42 21 32.5	-11 32.5	48	9.999342	+ 4 44 15.0	+ 46.70
37	Bothkamp, Prussia	+54 12 9.6 ⁿ	-11 0.8	32 ⁿ	9.999042	- 0 40 31.02 ⁿ	- 6.66
38	Bremen, Germany	+53 4 36	-11 8.8	...	9.999067	- 0 35 15	- 5.79
39	Breslau, Prussia	+51 6 55.8 ^k	-11 20.4	147 ^k	9.999126	- 1 8 8.72 ^k	- 11.20
40	Brisbane, Queensland	-27 28 0.0	+ 9 28.3	...	9.999691	-10 12 6.17	-100.55
41	Brussels (Uccle), Belgium	+50 47 55.5 ^a	-11 21.9	105 ^a	9.999131	- 0 17 26.05 ^a	- 2.86
42	Brussels, Belgium	+50 51 10.6 ^c	-11 21.7	...	9.999123	- 0 17 28.02 ^c	- 2.87
43	Budapest, Hungary	+47 29 34.7 ^c	-11 33.2	131 ^c	9.999217	- 1 16 15.3 ^c	- 12.53
44	Cambridge, England	+52 12 51.6	-11 14.3	28	9.999091	- 0 0 22.75	- 0.06
45	Cambridge, Mass.	+42 22 47.6 ^o	-11 32.6	24	9.999340	+ 4 44 31.05 ^o	+ 46.74
46	Cape of Good Hope	-33 56 3.5 ^p	+10 43.6	13 ^p	9.999548	- 1 13 54.76 ^p	- 12.14
47	Carloforte, Sardinia	+39 8 8.9 ^q	-11 20.7	18 ^q	9.999421	- 0 33 14.9 ^q	- 5.46
48	Catania, Sicily	+37 30 13.2 ^c	-11 11.4	49 ^c	9.999464	- 1 0 20.70 ^c	- 9.91
49	Charkow, Russia	+50 0 9.9 ^a	-11 25.5	138 ^r	9.999153	- 2 24 55.75 ^a	- 23.81
50	Charlottesville, Va.	+38 2 1.2 ^e	-11 14.6	259 ^e	9.999465	+ 5 14 5.83 ^e	+ 51.60

^a Meridian circle.^b Standard barometer.^c Transit instrument.^d Transit instrument pier.^e Center of large dome.^f Center of dome tower.^g Center of dome.^h Transit pier.ⁱ Cercle Syngros.^j Center of instrument house.^k Center of observatory.^l Floor of meridian room.^m Foot of pillar of 7-in. equatorial.ⁿ Cube of equatorial.^o Dome of 15-in. equatorial.^p 8-in. meridian circle.^q Zenith telescope.^r Barometer in meridian room.

No.	Authority for—		Description.
	Latitude.	Longitude.	
1	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Obs. Paris Acad. of Sci., Hendaye.
2	Letter from Govt. Astronomer, 1913.	Letter from Govt. Astronomer, 1913.	Govt. Obs., since 1884.
3	Letter from Govt. Astronomer, 1913.	Letter from Govt. Astronomer, 1913.	Govt. Obs., before 1884.
4	Letter from Director, 1913.	Letter from Director, 1913.	Dudley Obs., since 1893.
5	Letter from Director, 1913.	Letter from Director, 1913.	Dudley Obs., before 1893.
6	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	At Bouzaréah. Old Obs. S. S. S., S. E.
7	<i>Publications of Obs.</i> , 1909.	<i>Publications of Obs.</i> , 1909.	* Obs. Western Univ. of Pa., since 1906.
8	Letter from Director, 1897.	Letter from Director, 1897.	Obs. Western Univ. of Pa., before 1906.
9	Letter from Director, 1913.	Letter from Director, 1913.	Amherst College Obs., since 1903.
10	Letter from Director, 1913.	Letter from Director, 1913.	Lawrence Obs., before 1903. (
11	<i>Publications of Obs.</i> , 1915.	<i>Publications of Obs.</i> , 1915.	Detroit Obs., Univ. of Mich.
12	See footnote (b).	See footnote (b).	Underwood Obs., Lawrence College.
13	<i>Pubbl. dell'Osserv.</i> , 1900.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal Observatory.
14	<i>Harvard Annals</i> , 1903.	<i>Harvard Annals</i> , 1903.	Branch of Harvard Coll. Obs.
15	<i>Armagh Catalogue of Stars</i> , 1840.	<i>Armagh Catalogue of Stars</i> , 1840.	Armagh Observatory.
16	<i>Annales de l'Obs.</i> , 1910.	Letter from Director, 1913.	c National Observatory.
17	Letter from Director, 1913.	Letter from Director, 1913.	Johns Hopkins Univ. Obs.
18	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Remeis Observatory.
19	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Fabra Obs., Acad. of Sci. and Arts.
20	Letter from Director, 1897.	Letter from Director, 1897.	Smith Obs., Beloit College.
21	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Hamburg Obs., since 1909.
22	Letter from Director, 1897.	Letter from Director, 1897.	Students' Obs., Univ. of Cal.
23	<i>Astron. Nach.</i> , Nr. 3545, 1898.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal Obs., since 1835.
24	Letter from Director, 1913.	Letter from Director, 1913.	Royal Obs., before 1835.
25	<i>Astron. Nach.</i> , Nr. 3170, 1893.	<i>Astron. Nach.</i> , Nr. 3170, 1893.	Urania Observatory.
26	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Treptow Observatory.
27	<i>Berliner Jahrbuch</i> .	<i>Astron. Nach.</i> , Nr. 3202, 1893.	Observatory, Cantonal Univ.
28	<i>Astron. Nach.</i> , Nr. 2805, 1887.	<i>Astron. Nach.</i> , Nr. 2805, 1887.	National Observatory.
29	<i>British Nautical Almanac</i> .	<i>British Nautical Almanac</i> .	Private Obs. of Earl of Rosse.
30	Letter from Director, 1913.	Letter from Director, 1913.	Kirkwood Obs., Univ. of Ind.
31	Letter from Director, 1913.	Letter from Director, 1913.	National Observatory.
32	Letter from Director, 1913.	Letter from Director, 1913.	Government Observatory.
33	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal Observatory.
34	Letter from Director, 1897.	<i>Annales de l'Obs.</i> , 1885.	Obs., Univ. of Bordeaux.
35	Letter from Director, 1909.	Letter from Director, 1909.	Boston Univ. Obs., since 1908.
36	Letter from Director, 1895.	Letter from Director, 1895.	Boston Univ. Obs., before 1908.
37	<i>Beob. zu Bothkamp</i> , 1872.	Letter from Director, 1913.	Obs. of Herr von Bülow.
38	<i>Astron. Nach.</i> , Nr. 15, 1822.	<i>Astron. Nach.</i> , Nr. 15, 1822.	Formerly Olber's Obs.
39	Letter from Director, 1897.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal University Obs.
40	<i>British Nautical Almanac</i> .	* <i>British Nautical Almanac</i> .	Brisbane Observatory.
41	Letter from Director, 1913.	Letter from Director, 1913.	Royal Obs., since 1891.
42	<i>Annales de l'Obs.</i> , 1857.	Letter from Director, 1913.	Royal Obs., before 1891.
43	<i>Astron. Nach.</i> , Nr. 2752, 1886.	<i>Astron. Nach.</i> , Nr. 2752, 1886.	University Observatory.
44	Letter from Director, 1879.	Letter from Director, 1879.	University Observatory.
45	<i>Harvard Annals</i> , 1887.	<i>U. S. C. and G. S. Report</i> , 1897.	Harvard College Obs.
46	<i>Cape Gen. Catalogue of Stars</i> , 1888.	<i>Monthly Notices, R. A. S.</i> , Nov. 1908.	Royal Observatory.
47	See footnote (d).	Letter from Director, 1913.	International Lat. Obs.
48	Letter from Director, 1913.	Letter from Director, 1913.	Royal Obs. of Catania and Etna.
49	<i>Annales de l'Obs.</i> , 1904.	<i>Annales de l'Obs.</i> , 1904.	University Observatory.
50	Letter from Director, 1913.	Letter from Director, 1913.	Leander McCormick Obs., Univ. Va.

* Name of Western Univ. of Pa. changed in 1908; now the Univ. of Pittsburgh.

b *Professional Papers, Corps of Engineers, U. S. A.*, 1882.

c Old meridian circle 0° 48', 0° 1' W. of Carolé Synagos.

d *Resultats des Internationalen Breitenmessungen*, 1900-1908.

e With the new value of the longitude of Sydney.

No.	Place.	Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log p (Including altitude).	Longitude from Greenwich.	Reduction from Greenwich to Local S.T.M.N.
		° ' "	' "			h m s	s
51	Chicago, Ill.	+41 50 1.0	-11 31.2	...	9.999352	+5 50 26.84	+57.57
52	Christiania, Norway . .	+59 54 44.0 ^a	-10 4.6	25 ^a	9.998908	-0 42 53.50 ^a	- 7.05
53	Cincinnati, Ohio . . .	+39 8 19.8 ^b	-11 20.7	247 ^b	9.999437	+5 37 41.40 ^b	+55.48
54	Cincinnati, Ohio . . .	+39 6 26.5	-11 20.5	...	9.999421	+5 37 59.00	+55.52
55	Cleveland, Ohio . . .	+41 30 14.5 ^c	-11 30.2	215 ^c	9.999375	+5 28 25.86 ^c	+53.62
56	Clinton, N. Y.	+43 3 17.0	-11 33.9	276	9.999340	+5 1 37.45	+49.55
57	Coimbra, Portugal . . .	+40 12 24.5	-11 25.6	99	9.999400	+0 33 43.1	+ 5.54
58	Columbia, Mo.	+38 56 51.7 ^d	-11 19.7	225 ^e	9.999440	+6 9 18.33 ^d	+60.67
59	Columbus, Ohio	+39 59 50.4 ^d	-11 24.7	233 ^d	9.999414	+5 32 2.60 ^d	+54.55
60	Copenhagen, Denmark .	+55 41 12.6	-10 48.6	14	9.999005	-0 50 18.69 ^f	- 8.26
61	Cordova, Arg. Rep. . .	-31 25 15.5 ^g	+10 18.0	434 ^g	9.999634	+4 16 48.22 ^g	+42.19
62	Cracow, Austria	+50 3 52.0 ^a	-11 25.2	221 ^a	9.999157	-1 19 50.27 ^a	-13.12
63	Danzig, Prussia	+54 21 18.0	-10 59.6	3	9.999036	-1 14 39.6	-12.26
64	Dehra Dun, India . . .	+30 18 51.8 ^h	-10 5.3	681 ^h	9.999676	-5 12 11.76 ^h	-51.29
65	Denver, Colo.	+39 40 36.4 ^a	-11 23.3	1644 ⁱ	9.999518	+6 59 47.72 ^a	+68.96
66	Des Moines, Iowa . . .	+41 36 0	-11 30.5	296	9.999378	+6 14 30.56	+61.52
67	Dorpat (Jurjew), Russia	+58 22 47.2 ^a	-10 22.1	67 ^a	9.998945	-1 46 53.22 ^a	-17.56
68	Dresden, Saxony	+51 2 16.8	-11 20.8	121	9.999126	-0 54 54.74	- 9.02
69	Dublin, Ireland	+53 23 13.1 ^a	-11 6.7	86 ^a	9.999066	+0 25 21.1 ^a	+ 4.16
70	Dun Echt, Scotland . .	+57 9 36	-10 34.8	141	9.998979	+0 9 40.0	+ 1.59
71	Durham England	+54 46 6.2 ^j	-10 56.4	107 ^k	9.999033	+0 6 19.75 ^j	+ 1.04
72	Düsseldorf, Prussia . .	+51 12 25.0 ^l	-11 19.9	46 ^l	9.999117	-0 27 2.69 ^l	- 4.44
73	Edinburgh, Scotland . .	+55 55 30.0 ^a	-10 46.5	134 ^m	9.999007	+0 12 44.22 ^a	+ 2.09
74	Edinburgh, Scotland . .	+55 57 23.2 ⁿ	-10 46.2	106 ^o	9.998995	+0 12 43.05 ⁿ	+ 2.09
75	Elmira, N. Y.	+42 6 25	-11 31.9	...	9.999345	+5 7 13.90	+50.47
76	Evanston, Ill.	+42 3 33.4	-11 31.8	175	9.999358	+5 50 42.3	+57.61
77	Flagstaff, Ariz.	+35 12 30.5	-10 54.7	2210	9.999667	+7 26 44.58	+73.39
78	Gaithersburg, Md. . . .	+39 8 13.2 ^r	-11 20.7	165	9.999431	+5 8 47.73	+50.73
79	Geneva, N. Y.	+42 52 46.2	-11 33.6	152	9.999336	+5 8 1.00	+50.60
80	Geneva, Switzerland . .	+46 11 59.3 ^a	-11 35.2	407 ^a	9.999268	-0 24 36.61 ^a	- 4.04
81	Genoa, Italy	+44 25 9.3 ^a	-11 35.5	105	9.999293	-0 35 41.28 ^a	- 5.86
82	Georgetown, D. C. . . .	+38 54 26.7 ^b	-11 19.5	47	9.999429	+5 8 18.26 ^b	+50.65
83	Glasgow, Mo.	+39 13 45.6	-11 21.1	227	9.999433	+6 11 18.08	+61.00
84	Glasgow, Scotland . . .	+55 52 42.8 ^a	-10 46.9	55 ^p	9.999003	+0 17 10.55 ^a	+ 2.82
85	Gotha, Germany	+50 56 37.9 ^l	-11 21.2	322 ^a	9.999142	-0 42 50.51 ^l	- 7.04
86	Gotha, Germany	+50 56 4.4 ^j	-11 21.2	360 ^j	9.999145	-0 42 55.09 ^j	- 7.05
87	Göttingen, Prussia . . .	+51 31 48.1 ^q	-11 18.2	161 ^q	9.999116	-0 39 46.22 ^q	- 6.53
88	Greencastle, Ind. . . .	+39 38 46.6 ^a	-11 23.1	262 ^a	9.999425	+5 47 24.36 ^a	+57.07
89	Greenwich, England . .	+51 28 38.2 ^a	-11 18.5	49 ^a	9.999110	0 0 0.00 ^a	0.00
90	Hamburg, Germany . . .	+53 33 6.0	-11 5.6	25	9.999057	-0 39 53.60 ^a	- 6.55
91	Hamburg, Germany . . .	+53 32 51.3 ^d	-11 5.6	30 ^d	9.999058	-0 39 53.46 ^d	- 6.55
92	Hanover, N. H.	+43 42 15.3	-11 34.8	183	9.999317	+4 49 8.02	+47.50
93	Haverford Pa.	+40 0 40.1 ^r	-11 24.8	...	9.999398	+5 1 12.70 ^r	+49.48
94	Heidelberg, Baden . . .	+49 23 55.2 ^s	-11 27.8	567 ^s	9.999198	-0 34 53.13 ^s	- 5.73
95	Heidelberg, Baden . . .	+49 23 55.7 ^t	-11 27.8	570 ^t	9.999198	-0 34 52.96 ^t	- 5.73
96	Heidelberg, Baden . . .	+49 24 34.3 ^l	-11 27.8	126 ^l	9.999168	-0 34 46.80 ^l	- 5.71
97	Helsingfors, Finland . .	+60 9 42.3 ^a	-10 1.5	33 ^a	9.998903	-1 39 49.10 ^a	-16.40
98	Herény, Hungary	+47 15 47.4	-11 33.7	229	9.999229	-1 6 24.7	-10.91
99	Hong Kong, China . . .	+22 18 13.2 ^j	- 8 7.4	33 ^j	9.999793	-7 36 41.86 ^j	-75.01
100	Iowa City, Iowa	+41 40 0	-11 30.7	183	9.999369	+6 6 6	+60.14

^a Meridian circle.^b Center of dome.^c Zenith telescope pier.^d Transit pier.^e Observatory bench mark.^f Center of observatory.^g Old meridian circle.^h Floor-level of zenith sector pillar.ⁱ Main floor.^j Transit instrument.^k Barometer in transit room.^l Equatorial.^m Standard barometer.ⁿ Point midway between transit instrument and mural circle.^o Floor of main building.^p Floor of meridian circle room.^q Position of meridian circle before 1888.^r Zenith telescope.^s Repsold meridian circle.^t Bruce telescope.

OBSERVATORIES, 1919.

671

No.	Authority for—		Description.
	Latitude.	Longitude.	
51	U. S. Lake Survey, 1864.	Smithsonian Report, 1886.	^a Dearborn Observatory.
52	<i>Astron. Nach.</i> , Nr. 3193, 1893.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	University Observatory.
53	<i>Publications of the Obs.</i> , 1908.	<i>Astronomical Journal</i> , 1897.	Cincinnati Obs., since 1873.
54	Letter from Director, 1897.	<i>Astronomical Journal</i> , 1854.	Cincinnati Obs., before 1873.
55	Letter from Director, 1913.	Letter from Director, 1913.	Case Obs., Case School of Appl'd Sci.
56	<i>Astron. Nach.</i> , Nr. 2553, 1883.	<i>Astron. Nach.</i> , Nr. 2553, 1883.	Litchfield Obs., Hamilton College.
57	<i>Eph. Astron. de Coimbra</i> , 1889.	<i>Eph. Astron. de Coimbra</i> , 1889.	University Observatory.
58	<i>Trans. Acad. of Sci. of St. Louis</i> , 1894.	<i>Trans. Acad. of Sci. of St. Louis</i> , 1894.	Laws Obs., Univ. of Mo.
59	Letter from Director, 1913.	Letter from Director, 1899.	McMillin Obs., State Univ.
60	British Nautical Almanac.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	University Observatory.
61	<i>Resultados del Obs.</i> , 1887.	<i>Resultados del Obs.</i> , 1887.	National Observatory.
62	Letter from Director, 1913.	Letter from Director, 1913.	Imperial and Royal Obs.
63	Letter from Director, 1897.	Letter from Director, 1897.	Obs. of the School of Navigation.
64	<i>Great Trip. Survey of India</i> , 1908.	Letter from Supt. of Survey, 1913.	Haig Obs., Trig. Survey of India.
65	Letter from Director, 1913.	Letter from Director, 1913.	Chamberlin Obs., Univ. of Denver.
66	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Drake Univ. Obs.
67	<i>Publikationen der Sterne.</i> , 1911.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Imperial University Obs.
68	<i>Berliner Jahrbuch.</i>	<i>Berliner Jahrbuch.</i>	^b Baron Engelhardt's Obs.
69	<i>Trans. Royal Dublin Soc.</i> , 1889.	<i>Trans. Royal Irish Acad.</i> , 1838.	Dunsink Obs., Trinity College.
70	Letter from Royal Astronomer, 1897.	Letter from Royal Astronomer, 1897.	^c Lord Crawford's Obs.
71	Letter from Director, 1913.	Letter from Director, 1913.	University Observatory.
72	<i>Astron. Nach.</i> , Nr. 643, 1848.	Letter from Director, 1913.	Municipal Obs., Bilk.
73	<i>Monthly Notices, R. A. S.</i> , 1907.	Letter from Director, 1913.	Royal Obs. since 1895; Blackford Hill.
74	<i>Monthly Notices, R. A. S.</i> , 1886.	<i>Edinburgh Observations</i> , 1858.	^d Royal Obs. before 1895; Calton Hill.
75	Letter from Director, 1912.	Letter from Director, 1912.	Elmira College Obs.
76	Letter from Director, 1893.	Letter from Director, 1893.	Dearborn Obs., North Western Univ.
77	British Nautical Almanac.	British Nautical Almanac.	Lowell Observatory.
78	See footnote (^f).	See footnote (^h).	International Lat. Obs.
79	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Smith Observatory.
80	<i>Memoire par J. Pidoux</i> , 1900.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Municipal Observatory.
81	Letter from Director, 1897.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Hydrographic Institute.
82	See footnote (^e).	See footnote (^e).	Georgetown College Obs.
83	<i>Astron. Nach.</i> , Nr. 2625, 1884.	<i>Washington Observations</i> , 1877.	Morrison Observatory.
84	<i>First Glasgow Catalogue</i> , 1870.	<i>Monthly Notices, R. A. S.</i> , 1865.	University Observatory.
85	Letter from Director, 1913.	Letter from Director, 1913.	Ducal Obs. since 1857.
86	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	Ducal Obs. before 1857.
87	<i>Astron. Nach.</i> , Nr. 4428, 1910.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal University Obs.
88	Letter from Director, 1912.	Letter from Director, 1912.	McKim Obs., De Pauw Univ.
89	<i>Greenwich Observations</i> , 1910.	<i>Greenwich Observations</i> , 1910.	^f Royal Observatory.
90	Letter, Director new Obs., 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	^g Hamburg Observatory before 1909.
91	Letter from Director, 1913.	Letter from Director, 1913.	^h Imperial Marine Obs.
92	Letter from Director, 1894.	Letter from Director, 1894.	Shattuck Obs., Dartmouth College.
93	<i>Proc. Amer. Ph. Soc.</i> , 1883.	<i>Proc. Amer. Ph. Soc.</i> , 1883.	Haverford College Obs.
94	Letter from Director, 1913.	Letter from Director, 1913.	Astron. Institute, Königstuhl Obs.
95	<i>Publik. des Obs., Königstuhl</i> , 1902.	<i>Publik. des Obs., Königstuhl</i> , 1902.	Astrophys. Inst., Königstuhl Obs.
96	<i>Publik. des Obs., Königstuhl</i> , 1902.	<i>Publik. des Obs., Königstuhl</i> , 1902.	ⁱ Dr. Wolf's Obs. before 1898.
97	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Imperial Univ. Obs.
98	<i>Astron. Nach.</i> , Nr. 2633, 1884.	British Nautical Almanac.	Astrophysical Observatory.
99	<i>Hong Kong Observations</i> , 1897.	Letter from Director, 1897.	Colonial Observatory.
100	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Obs., Univ. of Iowa.

^a Transferred to Evanston, Ill., in 1887.^b Instruments transferred to Univ. of Kasan in 1897.^c Instruments transferred to Royal Obs. at Edinburgh in 1896.^d City Obs. since 1896.^e Based upon data from the U. S. C. and G. Survey.^f Point of reference before 1851, 7½ ft. N., 19 ft. W.^g At Bergedorf since 1908.^h Transit instrument before 1908, 0° 5' N., 0° 04' W.ⁱ Instruments transferred to the Astrophysical Institute of the Königstuhl Obs. in 1898.^j *Resultats des Internationales Breitenmessungen*, 1900-1908.^k *Resultats des Internationales Breitenmessungen*, Band I, 1908.

No.	Place.	Latitude.	Reduction to Geocen- tric Latitude.	Altitude (Meters).	Log ρ (Excluding altitude).	Longitude from Greenwich.	Reduction from Green- wich to Local S.T.M.N.
		" ' "	" ' "			h m s	s
101	Ithaca, N. Y.	+42 26 47.3 ^a	-11 32.6	256 ^a	9.999354	+5 5 55.99 ^a	+50.26
102	Ithaca, N. Y.	+42 26 51.4	-11 32.6	...	9.999337	+5 5 56.47	+50.26
103	Jamaica, West Indies . .	+18 24 51 ^b	- 6 55.9	540 ^b	9.999892	+5 11 29.48 ^b	+51.17
104	Jena, Saxe-Weimar . . .	+50 55 34.9 ^c	-11 21.3	165 ^c	9.999132	-0 46 20.22 ^c	- 7.61
105	Jena, Saxe-Weimar . . .	+50 55 35.8	-11 21.3	155	9.999131	-0 46 20.31	- 7.61
106	Jena, Saxe-Weimar . . .	+50 56 11.0	-11 21.3	174	9.999132	-0 46 20.73	- 7.61
107	Johannesburg, Transvaal	-28 10 54.6 ^d	+ 9 9.8	1804 ^d	9.999840	-1 52 18.0 ^d	-18.45
108	Kalocsa, Hungary . . .	+46 31 41.7 ^b	-11 34.8	117 ^e	9.999240	-1 15 54.12 ^b	-12.47
109	Kasan, Russia	+55 50 20.0 ^f	-10 47.3	98 ^f	9.999007	-3 15 15.61 ^f	-32.08
110	Kasan, Russia	+55 47 23.9 ^g	-10 47.7	79 ^g	9.999007	-3 16 29.00 ^g	-32.28
111	Kew, England	+51 28 6	-11 18.5	10	9.999108	+0 1 15.1	+ 0.21
112	Kief, Russia	+50 27 10.0 ^h	-11 23.5	179 ^f	9.999145	-2 2 0.56 ^f	-20.04
113	Kiel, Prussia	+54 20 27.6 ^f	-10 59.7	52 ^f	9.999040	-0 40 35.45 ^f	- 6.67
114	Kis-Kartal, Hungary . .	+47 41 54.8	-11 32.8	...	9.999202	-1 18 11.7	-12.95
115	Konigsberg, Prussia . .	+54 42 50.5 ^f	-10 56.8	24 ^f	9.999029	-1 21 58.97 ^f	-13.47
116	Kremsmunster, Austria .	+48 3 23.1 ^f	-11 32.0	384 ^f	9.999220	-0 56 31.58 ^f	- 9.29
117	La Plata, Arg. Rep. . .	-34 54 31.8 ^h	+10 52.2	18 ^h	9.999525	+3 51 44.8 ^h	+38.07
118	Leiden, Netherlands . .	+52 9 19.8 ^f	-11 14.6	6 ^f	9.999090	-0 17 56.15 ^f	- 2.95
119	Leipzig, Saxony	+51 20 5.9 ⁱ	-11 19.2	119 ⁱ	9.999118	-0 49 33.92 ⁱ	- 8.14
120	Leipzig, Saxony	+51 20 20.1	-11 19.2	...	9.999110	-0 49 29.92	- 8.13
121	Liege, Belgium	+50 37 6	-11 22.8	127	9.999137	-0 22 15.44	- 3.66
122	Lisbon(Tapada), Portugal	+38 42 30.5 ^f	-11 18.5	95 ^f	9.999437	+0 36 44.68 ^f	+ 6.04
123	Liverpool, England . . .	+53 24 4.8	-11 6.6	61	9.999064	+0 12 17.33	+ 2.02
124	Liverpool, England . . .	+53 24 47.8	-11 6.5	...	9.999059	+0 12 0.11	+ 1.97
125	Lund, Sweden	+55 41 51.6 ⁱ	-10 48.5	38	9.999006	-0 52 44.97 ⁱ	- 8.67
126	Lund, Sweden	+55 52 12.0	-10 47.0	...	9.999000	-0 52 47.50	- 8.67
127	Lussinpiccolo, Austria .	+44 32 11.0	-11 35.5	42	9.999286	-0 57 52.41	- 9.51
128	Lyons, France	+45 41 41.0	-11 35.5	299	9.999274	-0 19 8.52 ^k	- 3.14
129	Madison, Wis.	+43 4 36.8 ^f	-11 33.9	292 ^l	9.999340	+5 17 37.90 ^f	+58.75
130	Madras, India	+13 4 8.0 ^f	- 5 5.5	7	9.999926	-5 20 59.14	-52.73
131	Madrid, Spain	+40 24 30.0 ^m	-11 26.4	655 ^m	9.999433	+0 14 45.09 ^m	+ 2.42
132	Manila, P. I.	+14 34 41	- 5 38.2	3	9.999908	-8 3 54.2	-79.48
133	Mare Island, Cal. . . .	+38 5 55.8 ⁿ	-11 15.0	18 ⁿ	9.999447	+8 9 5.63 ⁿ	+80.35
134	Markree, Ireland	+54 10 31.8	-11 1.0	45	9.999044	+0 33 48.4	+ 5.55
135	Marseilles, France . . .	+43 18 19 ^f	-11 34.3	75 ^o	9.999320	-0 21 34.55 ^f	- 3.54
136	Marseilles, France . . .	+43 17 52	-11 34.3	27	9.999317	-0 21 28.1	- 3.53
137	Mauritius (Port Louis) .	-20 5 39	+ 7 27.7	54	9.999832	-3 50 12.6	-37.82
138	Melbourne, Victoria . .	-37 49 53.2 ^p	+11 13.4	28 ^q	9.999454	-9 39 53.92 ^p	-95.26
139	Meudon, France	+48 48 18	-11 29.8	162	9.999185	-0 8 55.6	- 1.47
140	Middletown, Conn. . . .	+41 33 16.0	-11 30.4	...	9.999359	+4 50 37.18	+47.74
141	Milan, Italy	+45 27 59.3	-11 35.6	120	9.999268	-0 36 45.88 ^g	- 6.04
142	Minneapolis, Minn. . . .	+44 58 40.0 ^r	-11 35.7	260 ^r	9.999290	+6 12 57.04 ^r	+61.27
143	Mizusawa, Japan	+39 8 3.6 ^x	-11 20.7	62	9.999424	-9 24 30.75	-92.74
144	Modena, Italy	+44 38 51.4	-11 35.6	64	9.999285	-0 43 43.40	- 7.18
145	Montreal, Canada	+45 30 20 ^s	-11 35.6	57 ^s	9.999262	+4 54 18.63 ^s	+48.35
146	Moscow (Presnia), Russia	+55 45 19.5	-10 48.0	150 ^f	9.999012	-2 30 17.03 ^f	-24.69
147	Mount Hamilton, Cal. . .	+37 20 25.6 ^r	-11 10.4	1284 ^r	9.999552	+8 6 34.89 ^r	+79.93
148	Mount Wilson, Cal. . . .	+34 12 59.5 ^t	-10 46.2	1799 ^t	9.999663	+7 52 14.33 ^t	+77.58
149	Mount Wilson, Cal. . . .	+34 12 55	-10 46.1	1727 ^u	9.999658	+7 52 14.3	+77.59
150	Munich, Bavaria	+48 8 45.5 ^v	-11 31.7	529 ^v	9.999227	-0 46 26.02 ^r	- 7.63

^a Top of east pier in transit room.
^b Transit instrument pier.
^c Bamberg equatorial.
^d International latitude hut.
^e Seven-inch equatorial.
^f Meridian circle.
^g Center of great dome.
^h Gautier meridian circle.
ⁱ Center of observatory.

^j Center of dome.
^k Pier of small meridian circle.
^l Main floor.
^m Center of rotunda.
ⁿ East transit instrument.
^o Barometer.
^p Old meridian circle.
^q Floor of meridian room.

^r Transit instrument.
^s East transit pier.
^t Snow telescope pier.
^u Floor.
^v West dome.
^w Photographic equatorial, 41 feet south
of prime vertical transit.
^x Zenith telescope.

OBSERVATORIES, 1919.

678

No.	Authority for—		Description.
	Latitude.	Longitude.	
101	Letter from the Dean, 1913.	Letter from the Dean, 1913.	^a Fuertes Obs., Cornell Univ.
102	Letter from the Dean, 1913.	Letter from the Dean, 1913.	^b Fuertes Obs., Cornell Univ.
103	<i>Memoirs, R. A. S.</i> , 1879.	See footnote (^c).	Mr. Hall's Obs., Montego Bay.
104	Letter from Director, 1913.	Letter from Director, 1913.	Univ. Obs., since 1888.
105	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	Univ. Obs., before 1888.
106	<i>V. J. S. Astron. Gesell.</i> , 1910.	<i>V. J. S. Astron. Gesell.</i> , 1910.	The late Dr. Winkler's Obs.
107	Transvaal Obs. <i>Circular</i> , 1910.	Transvaal Obs. <i>Circular</i> , 1910.	Union Obs., formerly Transvaal Obs.
108	Letter from Director, 1913.	Letter from Director, 1913.	Archiepiscopal Haynald Obs.
109	Letter from Director, 1913.	Publications of the Obs., 1911.	Englehardt Obs., Univ. of Kasan.
110	Publications of the Obs., 1911.	Letter from Director, 1913.	University Observatory.
111	Letter from Director, 1897.	Letter from Director, 1897.	Meteorological Obs., London.
112	<i>Annales de l'Obs.</i> , Vol. IV, 1893.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Imperial Univ. Obs.
113	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	^d Royal University Obs.
114	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Near Aszöd, Hungary.
115	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal University Obs.
116	Letter from Director, 1897.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Obs. of the Benedictines.
117	Letter from Director, 1913.	Letter from Director, 1913.	National Univ. Obs.
118	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	University Observatory.
119	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	University Obs., since 1861.
120	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	University Obs., before 1861.
121	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	University Obs., Cointe.
122	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3202, 1893.	Obs. of Lisbon.
123	<i>Monthly Notices, R. A. S.</i> , 1894.	<i>Monthly Notices, R. A. S.</i> , 1894.	Bidston, Birkenhead, since 1867.
124	<i>British Nautical Almanac</i> , 1872.	<i>British Nautical Almanac</i> , 1872.	Liverpool Obs., before 1867.
125	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal Univ. Obs., since 1867.
126	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	Royal Univ. Obs., before 1867.
127	Letter from Director, 1897.	Letter from Director, 1897.	Manora Observatory.
128	Letter from Director, 1897.	<i>Astron. Nach.</i> , Nr. 3202, 1893.	Obs. of the Univ., St. Gatis Laval.
129	Publications of the Obs., 1892.	Letter from Director, 1912.	Washburn Obs., Univ. of Wis.
130	<i>Great Trig. Survey of India</i> , 1906.	<i>Great Trig. Survey of India</i> , 1901.	Obs. founded by East India Co.
131	<i>Annuario del Obs.</i> , 1912.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Astron. and Meteorolog. Obs.
132	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Meteorological Observatory.
133	Letter from Director, 1913.	<i>Lick Obs. Bulletin</i> , 1908.	Chronom. and Time Sta., Navy Yd.
134	<i>Astron. Nach.</i> , Nr. 758, 1851.	<i>British Nautical Almanac</i> , 1901.	Col. Cooper's Observatory.
135	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	See footnote (^e).
136	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	See footnote (^f).
137	<i>Mag. and Meteor. Results</i> , 1908.	<i>Mag. and Meteor. Results</i> , 1908.	Royal Alfred Obs.
138	<i>Astron. Results</i> , 1881-84.	^g <i>Astron. Results</i> , 1881-84.	^h Government Observatory.
139	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Seine-et-Oise, near Paris.
140	Letter from Director, 1894.	Letter from Director, 1894.	Wesleyan University Obs.
141	<i>Pubbl. del R. Osserv.</i> , 1914.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal Observatory, Brera.
142	Letter from Director, 1915.	Letter from Director, 1915.	Obs. Univ. of Minn.
143	See footnote (^h).	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	International Lat. Obs.
144	Letter from Director, 1913.	Letter from Director, 1913.	Royal Univ. Geophysical Obs.
145	Letter from Director, 1912.	<i>U. S. C. and G. S. Report</i> , 1897.	McGill University Obs.
146	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Obs. of the Imperial Univ.
147	Publications of the Obs., 1900.	<i>U. S. C. and G. S. Report</i> , 1897.	Lick Obs., Univ. of Cal.
148	<i>Astrophysical Journal</i> , 1906.	<i>Astrophysical Journal</i> , 1906.	Solar Obs., Carnegie Inst.
149	Letter from C. G. Abbot, 1912.	Letter from C. G. Abbot, 1912.	Branch of Smithsonian Astrophys. Obs.
150	Letter from Director, 1897.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal Observatory.

^a Since 1902.^b Before 1902.^c *British Report on Transit of Venus*, 1882.^d Old position of meridian circle, 0° 9' N., 0° 12' E.^e National Obs., Univ. of Aix-Marseille, since 1864-66.^f National Obs., at Accoules, before 1864-66.^g Transferred from Williamstown in 1861.^h *Resultats des Internationalen Breitenmessungen*, 1900-1908.ⁱ With the new values of the longitudes of Adelaide and Sydney.

No.	Place.	Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log p (Including altitude).	Longitude from Greenwich.	Reduction from Greenwich to Local S.T.M.N.
		° ' "	' "			h m s	s
151	Naples, Italy . . .	+40 51 46.3	-11 28.1	164	9.999388	-0 57 1.70 ^a	- 9.37
152	Nashville, Tenn. . .	+36 8 54.4 ^b	-11 2.0	172 ^c	9.999505	+5 47 12.2	+57.04
153	Neuchâtel, Switzerland	+46 59 50.6	-11 34.1	488	9.999254	-0 27 49.90 ^d	- 4.57
154	New Brunswick, N. J. .	+40 30 1.4 ^b	-11 26.7	21 ^b	9.999387	+4 57 47.45 ^b	+48.92
155	New Haven, Conn. . .	+41 19 22.3	-11 29.6	40	9.999368	+4 51 40.58	+47.92
156	New Haven, Conn. . .	+41 18 36.5	-11 29.6	. . .	9.999365	+4 51 42.16	+47.92
157	New York, N. Y. . .	+40 48 34.6	-11 27.9	25	9.999380	+4 55 50	+48.60
158	New York, N. Y. . .	+40 45 23.1	-11 27.7	. . .	9.999379	+4 55 53.64	+48.61
159	Nice, France . . .	+43 43 16.9 ^e	-11 34.9	378	9.999330	-0 29 12.15 ^e	- 4.80
160	Nikolaieff, Russia . .	+46 58 22.1	-11 34.2	55	9.999225	-2 7 53.78 ^a	-21.01
161	Northampton, Mass. .	+42 19 1.9 ^b	-11 32.4	70 ^b	9.999345	+4 50 33.10 ^b	+47.73
162	Northfield, Minn. . .	+44 27 41.6 ^f	-11 35.5	290 ^f	9.999305	+6 12 35.92 ^f	+61.21
163	Oakland, Cal. . .	+37 48 5 ^d	-11 13.2	11 ^d	9.999454	+8 9 6.55 ^d	+80.35
164	Odessa, Russia . . .	+46 28 37.5	-11 34.9	. . .	9.999234	-2 3 2.18 ^b	-20.21
165	Odessa, Russia . . .	+46 28 36.7 ^d	-11 34.9	55 ^d	9.999237	-2 3 2.04 ^d	-20.21
166	O-Gyalla, Hungary . .	+47 52 27.3	-11 32.4	113	9.999206	-1 12 45.49	-11.95
167	Omaha, Nebr. . .	+41 16 5.6 ^b	-11 29.5	344 ^b	9.999390	+6 23 46.96 ^b	+63.05
168	Orono, Me. . .	+44 54 0	-11 35.6	38	9.999277	+4 34 40.3	+45.12
169	Ottawa, Canada . . .	+45 23 39.1 ^d	-11 35.6	85 ^g	9.999267	+5 2 51.98 ^d	+49.75
170	Oxford, Miss. . .	+34 22 12.6	-10 47.5	. . .	9.999536	+5 58 7.18	+58.83
171	Oxford, England . . .	+51 45 35.6 ^d	-11 16.9	65 ^h	9.999104	+0 5 2.6	+ 0.83
172	Oxford, England . . .	+51 45 34.2	-11 16.9	64	9.999104	+0 5 0.40	+ 0.82
173	Padua, Italy . . .	+45 24 1.0 ⁱ	-11 35.6	31 ^j	9.999263	-0 47 29.13 ⁱ	- 7.80
174	Palermo, Sicily . . .	+38 6 44.0 ^k	-11 15.1	76 ^d	9.999451	-0 53 25.87	- 8.78
175	Paris, France . . .	+48 50 11.2 ^l	-11 29.8	67 ^m	9.999178	-0 9 20.93 ⁿ	- 1.53
176	Perth, West Australia .	-31 57 8.9 ^d	+10 23.8	60	9.999597	-7 43 21.51 ^d	-76.12
177	Philadelphia, Pa. . .	+39 58 2.1 ^o	-11 24.6	74 ^o	9.999404	+5 1 6.81 ^o	+49.46
178	Pola, Austria . . .	+44 51 48.6 ^d	-11 35.6	32 ^d	9.999277	-0 55 23.07 ^d	- 9.10
179	Potsdam, Prussia . .	+52 22 56.0 ^p	-11 13.3	97 ^p	9.999091	-0 52 15.86 ^p	- 8.59
180	Poughkeepsie, N. Y. .	+41 41 18	-11 30.8	61	9.999360	+4 55 33.6 ^b	+48.55
181	Prague, Bohemia . . .	+50 5 16.0 ^o	-11 25.1	197 ^o	9.999155	-0 57 40.28 ^o	- 9.47
182	Princeton, N. J. . .	+40 20 55.8	-11 26.1	75	9.999395	+4 58 39.44	+49.06
183	Princeton, N. J. . .	+40 20 57.8 ^d	-11 26.1	65 ^d	9.999394	+4 58 37.61 ^d	+49.06
184	Providence, R. I. . .	+41 50 21	-11 31.2	64	9.999356	+4 45 35.95	+46.92
185	Providence, R. I. . .	+41 49 46.4	-11 31.2	. . .	9.999352	+4 45 37.64	+46.92
186	Pulkowa, Russia . . .	+59 46 18.7 ^a	-10 6.2	75 ^q	9.998914	-2 1 18.57 ^a	-19.93
187	Quebec, Canada . . .	+46 47 59.2	-11 34.4	90	9.999231	+4 44 52.71 ^b	+46.80
188	Quito, Ecuador . . .	- 0 14 0	+ 0 5.6	2908	0.000198	+5 14 6.66	+51.60
189	Riga, Russia . . .	+56 57 9.3	-10 36.9	. . .	9.998974	-1 36 28.10 ^r	-15.85
190	Rio de Janeiro, Brazil .	-22 54 23.8 ^o	+ 8 17.7	62 ^o	9.999784	+2 52 41.4 ^o	+28.37
191	Rome, Italy . . .	+41 53 53.6 ^d	-11 31.3	51 ^j	9.999354	-0 49 55.12 ^d	- 8.20
192	Rome, Italy . . .	+41 53 33.6 ^d	-11 31.3	65 ^q	9.999355	-0 49 56.34 ^d	- 8.20
193	Rome, Italy . . .	+41 54 12.4 ^d	-11 31.4	100 ^d	9.999357	-0 49 48.02 ^d	- 8.18
194	Rome, Italy . . .	+41 54 16.7	-11 31.4	75 ^j	9.999355	-0 49 49.28 ^d	- 8.18
195	San Fernando, Spain . .	+36 27 42.0 ^s	-11 4.3	30 ^s	9.999488	+0 24 49.32 ^s	+ 4.08
196	San Fernando, Spain . .	+36 31 7	-11 4.7	. . .	9.999485	+0 25 10.82	+ 4.14
197	San Francisco, Cal. . .	+37 47 27.9	-11 13.2	. . .	9.999454	+8 9 42.86 ^t	+80.45
198	San Luis, Arg. Rep. . .	-33 17 45.7	+10 37.6	800	9.999616	+4 25 22	+43.60
199	Santiago, Chile . . .	-33 26 42 ^d	+10 39.0	520 ^d	9.999594	+4 42 46.0 ^d	+46.45
200	Santiago, Chile . . .	-33 26 25	+10 38.9	619	9.999600	+4 42 36.5	+46.42
201	Santiago, Chile . . .	-33 33 46 ^b	+10 40.1	580 ^b	9.999595	+4 42 46 ^b	+46.45

^a Center of observatory.^b Transit instrument.^c Bench mark on obs. steps.^d Meridian circle.^e Small meridian circle.^f Meridian circle pier.^g Bench mark in east wall.^h Barometer basin.ⁱ Axis of tower.^j Barometer.^k Center of south dome.^l South facade of observatory.^m Level of obs. terrace.ⁿ Cassini's Meridian.^o Center of dome.^p Center of middle dome.^q Main floor.^r Tower of school.^s Center of building, ground floor.^t West transit pier.

No.	Authority for—		Description.
	Latitude.	Longitude.	
151	Letter from Director, 1897.	<i>Astron. Nach.</i> , Nr. 3202, 1893.	Royal Obs., Capo di Monte.
152	Letter from the Dean, 1913.	Letter from Director, 1893.	Obs. of Vanderbilt Univ.
153	Swiss Triangulation, 1890.	<i>Astron. Nach.</i> , Nr. 3202, 1893.	Cantonal Observatory.
154	Letter from Director, 1913.	Letter from Director, 1913.	Schanck Obs., Rutgers College.
155	Letter from Director, 1893.	See footnote (a).	Yale Univ. Obs., since 1882.
156	Letter, Director new Obs., 1893.	Letter, Director new Obs., 1893.	Yale Univ. Obs., before 1882.
157	<i>Contributions from the Obs.</i> , 1906.	<i>Contributions from the Obs.</i> , 1906.	Columbia Univ. Obs., since 1897.
158	Letter from Director, 1879.	<i>British Nautical Almanac.</i>	Columbia Univ. Obs., before 1897.
159	<i>Annales de l'Obs.</i> , Tome II, 1887.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Mt. Gros, near Nice.
160	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Astron. Nach.</i> , Nr. 3202, 1893.	Naval Observatory.
161	Letter from Director, 1913.	<i>Harvard Annals</i> , 1893.	Smith College Obs.
162	Letter from Director, 1912.	<i>Publications of Obs.</i> , 1901.	^a Goodsell Obs., Carleton College.
163	Letter from Director, 1912.	Letter from Director, 1912.	Chabot Observatory.
164	Pulkowa <i>Mitteilungen</i> , No. 56, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Branch of Pulkowa Obs.
165	Letter from Director, 1897.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	University Observatory.
166	Letter from Director, 1897.	Letter from Director, 1897.	Royal Astrophysical Obs.
167	Letter from Director, 1912.	Letter from Director, 1912.	Creighton University Obs.
168	Letter from Director, 1912.	Letter from Director, 1912.	Obs. Univ. of Maine.
169	Letter from Chief Astronomer, 1913.	Letter from Chief Astronomer, 1913.	Dominion Astronomical Obs.
170	<i>Smithsonian Report</i> , 1880.	<i>Smithsonian Report</i> , 1880.	Obs. Univ. of Mississippi.
171	<i>Radcliffe Catalogue of Stars</i> , 1900.	<i>Radcliffe Observations</i> , 1842.	Radcliffe Observatory.
172	<i>Oxford Astron. Observations</i> , 1878.	<i>Oxford Astron. Observations</i> , 1878.	University Observatory.
173	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal University Obs.
174	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3202, 1893.	Royal Observatory.
175	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Observatory of Paris.
176	<i>Meridian Observations</i> , Vol. 2, 1908.	¹ <i>Meridian Observations</i> , Vol. 2, 1908.	Government Observatory.
177	Letter from Director, 1913.	Letter from Director, 1913.	Flower Obs., Univ. of Pa.
178	Letter from Director, 1913.	Letter from Director, 1913.	See footnote (b).
179	<i>Veröff. K. Preuss. Geol. Inst.</i> , 1905.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal Astrophysical Obs.
180	<i>Smithsonian Report</i> , 1880.	<i>Smithsonian Report</i> , 1880.	Vassar College Obs.
181	<i>Prague Observations</i> , 1907.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Imperial and Royal Obs.
182	Letter from Director, 1913.	Letter from Director, 1913.	Halsted Obs., Princeton Univ.
183	Letter from Director, 1913.	<i>Washington Observations</i> , 1878.	Obs. of Instruction, Princeton Univ.
184	Letter from Director, 1893.	Letter from Director, 1893.	Ladd Obs., Brown Univ.
185	<i>Astron. Nach.</i> , Nr. 2254, 1879.	<i>Astron. Nach.</i> , Nr. 2254, 1879.	Mr. Seagrave's Observatory.
186	<i>Description de l'Obs.</i> , 1845.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Obs. Central Nicolas.
187	Letter from Director, 1912.	Letter from Director, 1912.	Quebec Obs., Plains of Abraham.
188	Letter from Director, 1897.	Letter from Director, 1897.	National Observatory.
189	Letter from Director, 1897.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Polytechnic School Obs.
190	See footnote (c).	See footnote (c).	National Observatory.
191	<i>Memorie del R. Osserv.</i> , 1904.	Letter from Director, 1913.	Royal Obs. at Roman College.
192	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Royal Univ. Obs. at Capitol.
193	Letter from Director, 1913.	Letter from Director, 1913.	Vatican Obs., since 1906-7.
194	<i>Pubb. della Specola Vaticana</i> , 1905.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	^d Vatican Obs., before 1906-7.
195	<i>Annales del Obs.</i> , 1892.	Letter from Director, 1913.	Naval Obs., since 1797.
196	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	^e Naval Obs., before 1797.
197	Letter from Director, 1897.	<i>U. S. C. and G. S. Report</i> , 1897.	Davidson Observatory.
198	Letter from Director, 1911.	Letter from Director, 1911.	Southern Obs. of Carnegie Inst.
199	Letter from Director, 1913.	Letter from Director, 1913.	^f National Obs., since 1862.
200	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	^g National Obs., before 1862.
201	Letter from Director, 1913.	Letter from Director, 1913.	National Obs., Espejo.

^a Old observatory, 1877-1896, 415 feet W.^b Observatory of Imperial and Royal Hydrographic Office.^c Green and Davis, *Telegraphic Determinations of Longitudes on the East Coast of South America*, 1888.^d In the Gregorian tower.^e In Cadix.^f In Quinta Normal.^g On the hill Santa Lucia, in Santiago.^h Based upon data from the U. S. C. and G. Survey.ⁱ With the new value of the longitude of Sydney.

No.	Place.	Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Greenwich.	Reduction from Greenwich to Local S.T.M.N.
		" ' "	" "			h m s	"
202	South Bethlehem, Pa. .	+40 36 23.2 ^a	-11 27.2	110	9.999391	+ 5 1 31.96 ^a	+ 49.53
203	South Hadley, Mass. .	+42 15 18.2 ^b	-11 32.2	76 ^b	9.999346	+ 4 50 20.40 ^b	+ 47.70
204	St. Louis, Mo.	+38 38 3.0	-11 18.1	. . .	9.999432	+ 6 0 49.26	+ 59.27
205	St. Petersburg, Russia .	+59 56 32.0	-10 4.2	4	9.998906	- 2 1 11.4	- 19.91
206	Stockholm, Sweden . .	+59 20 32.7 ^c	-10 11.3	44 ^c	9.998922	- 1 12 13.97 ^c	- 11.87
207	Stonyhurst, England . .	+53 50 40	-11 3.4	117 ^c	9.999056	+ 0 9 52.68	+ 1.62
208	Strassburg, Alsace . . .	+48 35 0.3 ^c	-11 30.5	144 ^c	9.999190	- 0 31 4.52 ^c	- 5.11
209	Swarthmore, Pa.	+39 54 23.3	-11 24.3	. . .	9.999401	+ 5 1 24.89	+ 49.52
210	Sydney, N. S. W.	-33 51 41.1	+10 42.9	44	9.999552	-10 4 49.31	- 99.36
211	Syracuse, N. Y.	+43 2 13.1	-11 33.9	160	9.999332	+ 5 4 33.36	+ 50.03
212	Syracuse, N. Y.	+43 0 48.8 ^h	-11 33.8	137 ^h	9.999332	+ 5 4 34.31 ^h	+ 50.03
213	Tacubaya, Mexico . . .	+19 24 17.9 ^c	- 7 14.8	2285 ^c	9.999995	+ 6 36 46.67 ^c	+ 65.18
214	Tashkent, Turkestan . .	+41 19 31.3	-11 29.6	457	9.999396	- 4 37 10.80	- 45.53
215	Taunton, Mass.	+41 54 0	-11 31.3	8	9.999351	+ 4 44 20	+ 46.71
216	Teramo, Italy	+42 39 27 ^d	-11 33.1	398	9.999358	- 0 54 56	- 9.02
217	Tokyo, Japan	+35 39 17.0 ^c	-10 58.3	25	9.999507	- 9 18 58.22 ^e	- 91.82
218	Toronto, Canada	+43 39 46.0 ^f	-11 34.8	110 ^g	9.999313	+ 5 17 34.70 ^g	+ 52.17
219	Toronto, Canada	+43 40 0.8 ^g	-11 34.8	116 ^g	9.999313	+ 5 17 35.60 ^g	+ 52.17
220	Toulouse, France	+43 36 44.0	-11 34.7	194	9.999320	- 0 5 51.23	- 0.96
221	Triest, Austria	+45 38 35.5 ^h	-11 35.5	68 ⁱ	9.999260	- 0 55 5.23 ^h	- 9.05
222	Triest, Austria	+45 38 45.4 ^j	-11 35.5	26 ⁱ	9.999257	- 0 55 3.0	- 9.04
223	Tschardjui, Turkestan .	+39 8 11.0 ^d	-11 20.7	188 ^d	9.999433	- 4 14 17.2 ^d	- 41.77
224	Tschardjui, Turkestan .	+39 8 10.7 ^d	-11 20.7	167	9.999431	- 4 13 57.3	- 41.72
225	Tulce Hill, England . . .	+51 26 47	-11 18.6	48	9.999111	+ 0 0 27.7	+ 0.08
226	Turin, Italy	+45 2 16.3 ^k	-11 35.7	616 ^k	9.999313	- 0 31 5.96 ^k	- 5.11
227	Turin, Italy	+45 4 8.3 ^c	-11 35.7	276 ⁱ	9.999288	- 0 30 47.15 ^c	- 5.06
228	Tuscaloosa, Ala.	+33 12 36.8 ^c	-10 36.7	69	9.999568	+ 5 50 11.74 ^c	+ 57.53
229	Ukiah, Cal.	+39 8 12.1 ^d	-11 20.7	220 ^d	9.999435	+ 8 12 50.3 ^d	+ 80.96
230	Upsala, Sweden	+59 51 29.4 ^b	-10 5.2	21 ^b	9.998909	- 1 10 30.12 ^b	- 11.58
231	Urbana, Ill.	+40 6 20.2 ⁱ	-11 25.2	236 ⁱ	9.999412	+ 5 52 53.90 ⁱ	+ 57.97
232	Utrecht, Netherlands . .	+52 5 9.7 ^m	-11 15.0	12 ^m	9.999093	- 0 20 31.0 ^m	- 3.37
233	Utrecht, Netherlands . .	+52 5 13	-11 15.0	23	9.999093	- 0 20 28.9	- 3.36
234	Venice, Italy	+45 26 10.5 ^c	-11 35.6	15 ^c	9.999261	- 0 49 22.12 ^c	- 8.11
235	Vienna, Austria	+48 13 55.1 ⁿ	-11 31.5	240 ⁱ	9.999205	- 1 5 21.35 ⁿ	- 10.74
236	Vienna, Austria	+48 12 35.5	-11 31.6	186 ⁱ	9.999202	- 1 5 31.61	- 10.76
237	Vienna, Austria	+48 12 53.8	-11 31.6	214	9.999204	- 1 5 25.17	- 10.75
238	Vienna, Austria	+48 12 46.7 ^c	-11 31.6	285	9.999209	- 1 5 10.96	- 10.71
239	Warsaw, Russia	+52 13 4.6 ^c	-11 14.3	121 ^c	9.999097	- 1 24 7.25 ^c	- 13.82
240	Washington, D. C. . . .	+38 55 14.0 ^o	-11 19.6	82 ^p	9.999431	+ 5 8 15.78 ^o	+ 50.64
241	Washington, D. C. . . .	+38 53 38.7 ^q	-11 19.4	31 ^r	9.999428	+ 5 8 12.15 ^q	+ 50.63
242	Washington, D. C. . . .	+38 53 17.3 ^s	-11 19.4	10 ^s	9.999427	+ 5 8 6.24 ^s	+ 50.61
243	Washington, D. C. . . .	+38 56 14.8 ^a	-11 19.7	. . .	9.999425	+ 5 8 0.0 ^a	+ 50.60
244	Wellesley, Mass.	+42 17 34.8	-11 32.3	61	9.999344	+ 4 45 12.7	+ 46.85
245	Wellington, N. Z.	-41 17 3.8 ^b	+11 29.5	127 ^b	9.999375	-11 39 4.27 ^b	-114.84
246	West Point, N. Y.	+41 23 22.1	-11 29.9	170	9.999375	+ 4 55 50.55	+ 48.60
247	Wilhelmshaven, Germany	+53 31 52.1 ^c	-11 5.7	9 ^c	9.999057	- 0 32 35.06 ^c	- 5.35
248	Williams Bay, Wis. . . .	+42 34 12.6 ^t	-11 33.0	320 ^t	9.999355	+ 5 54 13.24 ^t	+ 58.19
249	Williamstown, Mass. . .	+42 42 30	-11 33.2	213	9.999344	+ 4 52 50	+ 48.10
250	Winchester, Mass.	+42 27 11	-11 32.7	30	9.999338	+ 4 44 32.4	+ 46.74
251	Windsor, N. S. W.	-33 36 30.8 ^b	+10 40.6	16 ^r	9.999556	-10 3 19.9	- 99.11
252	Zô-Sô, China	+31 5 48.0 ^c	-10 14.4	100 ^c	9.999619	- 8 4 44.82 ^c	- 79.63
253	Zurich, Switzerland . .	+47 22 38.3 ^c	-11 33.5	469 ^c	9.999243	- 0 34 12.26 ^c	- 5.62

^a Center of dome.^b Transit instrument.^c Meridian circle.^d Zenith telescope.^e Great transit instrument.^f Main dome.^g Transit pier.^h Equatorial pier.ⁱ Barometer cistern.^j Stone pier in terrace wall.^k Prime vertical instrument.^l 12-inch equatorial.^m Altazimuth pier.ⁿ Central dome.^o Center of the clock room.^p Ground floor of main building.^q Small dome.^r Barometer.^s Sidereal pier.^t 40-inch equatorial.^u Intersection of equatorial axes.

No.	Authority for—		Description.
	Latitude.	Longitude.	
202	Letter from Director, 1913.	<i>Washington Observations</i> , 1875.	Sayre Obs., Lehigh Univ.
203	<i>Amer. Jour. of Sci.</i> , 1883.	Letter from Director, 1913.	Williston Obs., Mt. Holyoke Coll.
204	Letter from Director, 1897.	<i>U. S. C. and G. S. Report</i> , 1897.	^a Washington University Obs.
205	<i>Astron. Nach.</i> , Nr. 2582, 1884.	<i>Astron. Nach.</i> , Nr. 2582, 1884.	Imperial University Obs.
206	Letter from Director, 1914.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Obs. of Acad. of Sci.
207	Letter from Director, 1913.	<i>Monthly Notices, R. A. S.</i> , 1851.	Stonyhurst College Obs.
208	<i>Annalen der Sternw.</i> , 1896.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Imperial Univ. Obs.
209	Letter from Director, 1912.	Letter from Director, 1912.	Sprout Obs., Swarthmore College.
210	<i>Astron. Results</i> , 1879-81.	See footnote (b).	Government Observatory.
211	Letter from Director, 1891.	Letter from Director, 1891.	Syracuse Univ. Obs.
212	Letter from Director, 1914.	Letter from Director, 1914.	Roe Observatory.
213	<i>Boletin del Obs.</i> , 1914.	<i>Annuario del Obs.</i> , 1902.	National Observatory.
214	Letter from Director, 1897.	Letter from Director, 1897.	Tashkent Observatory.
215	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Mr. Metcalf's Obs., before 1911.
216	<i>Pubbl. dell'Osserv.</i> , 1900.	Letter from Director, 1913.	Collurania Observatory.
217	<i>Annales de l'Obs.</i> , 1894.	<i>Annales de l'Obs.</i> , 1894.	University Observatory.
218	Letter from Director, 1913.	Letter from Director, 1913.	University Observatory.
219	Letter from Director, 1912.	Letter from Director, 1912.	Meteorological Observatory.
220	<i>Annales de l'Obs.</i> , 1912.	<i>British Nautical Almanac.</i>	University Observatory.
221	Letter from Director, 1913.	Letter from Director, 1913.	^c Imperial and Royal Maritime Obs.
222	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	^d Imperial and Royal Maritime Obs.
223	<i>Astron. Nach.</i> , Nr. 4588, 1912.	Letter from Director, 1913.	International Lat. Obs., since 1909.
224	See footnote (c).	See footnote (i).	International Lat. Obs., before 1909.
225	<i>British Nautical Almanac.</i>	<i>British Nautical Almanac.</i>	Obs. of Sir W. Huggins, London.
226	Letter from Director, 1915.	Letter from Director, 1915.	^f Royal Obs. of the Univ., since 1913.
227	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	^g Royal Obs. of the Univ., before 1913.
228	Letter from Director, 1897.	Letter from Director, 1897.	Obs. Univ. of Ala.
229	See footnote (c).	Letter from Director, 1912.	International Lat. Obs.
230	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	University Observatory.
231	Letter from Director, 1913.	Letter from Director, 1913.	Obs., Univ. of Ill.
232	Letter from Director, 1913.	Letter from Director, 1913.	University Obs., since 1855.
233	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	University Obs., before 1855.
234	Letter from Director, 1913.	Letter from Director, 1913.	Obs. of the Nautical Institute.
235	See footnote (h).	<i>Astron. Nach.</i> , Nr. 3993, 1905.	ⁱ Imperial and Royal Univ. Obs.
236	Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	^j Imperial and Royal Univ. Obs.
237	<i>Berliner Jahrbuch.</i>	<i>Berliner Jahrbuch.</i>	Oppolzer Obs., Josephstadt.
238	<i>Publik. der Sternw.</i> , 1892.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Kuffner Obs., Ottakring.
239	<i>Astron. Nach.</i> , Nr. 4666, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Imperial University Obs.
240	<i>U. S. Naval Obs. Publications</i> , 1900.	<i>U. S. C. and G. S. Report</i> , 1897.	U. S. N. Obs., Georgetown Heights.
241	See footnote (m).	<i>U. S. C. and G. S. Report</i> , 1897.	U. S. Naval Obs., 1842-1893.
242	Letter from Director, 1912.	Letter from Director, 1912.	Smithsonian Astrophysical Obs.
243	<i>Astronomical Journal</i> , 1897.	<i>Astronomical Journal</i> , 1897.	Catholic Univ. Obs., Brookland.
244	Letter from Director, 1912.	<i>Les Obs. Astron.</i> , Bruxelles, 1907.	Whitin Obs., Wellesley College.
245	<i>New Zealand Gazette</i> , May 7, 1914.	<i>New Zealand Gazette</i> , May 7, 1914.	Hector Observatory.
246	Letter from Director, 1891.	Letter from Director, 1891.	^k U. S. Military Academy.
247	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3993, 1905.	Imperial Naval Obs.
248	<i>Astrophysical Journal</i> , 1901.	<i>Astrophysical Journal</i> , 1901.	Yerkes Obs., Univ. of Chicago.
249	Letter from Director, 1893.	Letter from Director, 1893.	Field Memorial Obs., Williams Coll.
250	Letter from Director, 1913.	Letter from Director, 1913.	Mr. Metcalf's Obs., since 1911.
251	<i>Monthly Notices, R. A. S.</i> , 1884.	ⁿ <i>Monthly Notices, R. A. S.</i> , 1888.	Mr. John Tebbutt's Obs.
252	<i>Annales de l'Obs.</i> , 1907.	<i>Annales de l'Obs.</i> , 1907.	Obs. of the Jesuits near Shanghai.
253	Letter from Director, 1913.	<i>Astron. Nach.</i> , Nr. 3202, 1893.	Obs. of Swiss Polytechnic School.

^a Old observatory 0° 125' E.^b Letter from Government Astronomer at Adelaide, 1913.^c Since 1898.^d Before 1898.^e *Resultate des Internationalen Breitendienstes*, 1900-1908.^f At Pino Torinese.^g At Palazzo Madama.^h *Astron. Arbeiten des K. K. Gradmessungs-Bureau*, 1896.ⁱ Since 1879.^j Before 1879.^k Old observatory 9° N., 1° 2' E.^l *Resultate des Internationalen Breitendienstes*, Band I, 1908.^m *Washington Observations for 1892*, Appendix I, pp. XXX

and XXXII.

ⁿ And the new value of the longitude of Sydney.

LUNAR DISTANCES.

THE COMPUTATION OF LUNAR DISTANCES.

Tables of lunar distances are no longer given in the Ephemeris, in accordance with the decision of the Navy Department that they are now of little practical use to navigators. However, in case it is desired to use this method, the angular distance between the Moon and any heavenly body may be calculated by solving the spherical triangle of which the known parts are the polar distances of the Moon and the other body and the difference of their right ascensions, or, in other words, the angle at the pole between their hour-circles. Then, the Greenwich mean time of the observation being approximately known, and the lunar distances for the star or other body calculated for the even hour before and after, the required lunar distance may be interpolated and the longitude derived by the methods given in books on navigation.

EXAMPLE 1.

Find the lunar distance of Aldebaran, July 27, 1919, at 10 P. M., Greenwich Mean Time.

Let α and δ - Right Ascension and Declination of the star			
" α' and δ' -	"	"	" " Moon
" D - Lunar Distance			
Also let $\tan M = \tan \delta' \sec (\alpha - \alpha')$			
Then $\cos D = \sin \delta' \cos (M - \delta) \operatorname{cosec} M$			
α	$4^h 31^m 18^s.5$	M	$28^\circ 23' 10''$
α'	$8^h 55^m 22^s.2$	δ	$+16^\circ 20' 53''$
$\alpha - \alpha'$	$19^h 35^m 56^s.3$	$M - \delta$	$12^\circ 2' 17''$
$\alpha - \alpha'$	$293^\circ 59' 4''$	$\sin \delta'$	9.331520
δ'	$+ 12^\circ 23' 20''$	$\cos (M - \delta)$	9.990343
		$\operatorname{cosec} M$	0.322931
$\tan \delta'$	9.341753	$\cos D$	9.644794
$\sec (\alpha - \alpha')$	0.390952	D	$63^\circ 48' 33''$
$\tan M$	9.732705		

EXAMPLE 2.

Find the lunar distance of Jupiter, March 11, 1919, at noon, Greenwich Mean Time. In this case the distance is smaller and the following method is more accurate:

Let α and δ - Right Ascension and Declination of the planet			
" α' and δ' -	"	"	" " Moon
" D - Lunar Distance			
Also let $\tan N = \tan \frac{1}{2} (\alpha - \alpha') \cos \frac{1}{2} (\delta + \delta') \operatorname{cosec} \frac{1}{2} (\delta - \delta')$			
Then $\sin \frac{1}{2} D = \sin \frac{1}{2} (\alpha - \alpha') \cos \frac{1}{2} (\delta + \delta') \operatorname{cosec} N$			
Sin N and $\sin \frac{1}{2} (\alpha - \alpha')$ have the same algebraic sign.			
α	$6^h 25^m 40^s.9$	$\tan \frac{1}{2} (\alpha - \alpha')$	9.092439 n
α'	$7^h 22^m 6^s.3$	$\cos \frac{1}{2} (\delta + \delta')$	9.969878
$\alpha - \alpha'$	$23^h 3^m 34^s.6$	$\operatorname{cosec} \frac{1}{2} (\delta - \delta')$	1.379447
$\alpha - \alpha'$	$345^\circ 53' 39''$	$\tan N$	0.441764 n
δ	$+ 23^\circ 29' 9''$	N	$109^\circ 52' 49''$
δ'	$+ 18^\circ 42' 5''$	$\sin \frac{1}{2} (\alpha - \alpha')$	9.089140
$\delta + \delta'$	$+ 42^\circ 11' 14''$	$\cos \frac{1}{2} (\delta + \delta')$	9.969878
$\delta - \delta'$	$+ 4^\circ 47' 4''$	$\operatorname{cosec} N$	0.026685
$\frac{1}{2} (\alpha - \alpha')$	$172^\circ 56' 50''$	$\sin \frac{1}{2} D$	9.085703
$\frac{1}{2} (\delta + \delta')$	$+ 21^\circ 5' 37''$	$\frac{1}{2} D$	$6^\circ 59' 49''$
$\frac{1}{2} (\delta - \delta')$	$+ 2^\circ 23' 32''$	D	$13^\circ 58' 38''$

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1919.

Reduce the observed altitude of Polaris to the true altitude.
Reduce the recorded time of observation to the local sidereal time.
Take out the apparent right ascension and declination of Polaris for the time of observation.
Subtract the apparent right ascension from the local sidereal time of observation and the remainder is the hour-angle of Polaris.
With this hour-angle as the vertical argument, and the apparent declination of Polaris as the horizontal argument, take out the correction from Table I and add it to or subtract it from the true altitude, according to its sign.
For altitudes other than 45°, corrections taken from the supplementary table at the bottom of Table I (Table Ia) may be applied when necessary for the degree of accuracy required.
Example.—August 5, 1919, at 10^h 40^m 30^s P. M. local mean solar time, in longitude 59° west of Greenwich, suppose the true altitude of Polaris to be 33° 20' 0", required the latitude of the place.

Local astronomical mean time	h	m	s
Reduction from Table III for 10 ^h 40 ^m 30 ^s	10	40	30
Greenwich sidereal time of mean noon, August 5, page 10	+ 1	45	
Reduction from Table III, for longitude (−3 ^h 56 ^m west, or plus)	8	51	57
	+ 0	39	
Sum (having regard to signs) is equal to local sidereal time	19	34	51
R. A. of Polaris (page 281) for time of observation	1	32	13
Remainder is equal to hour-angle of Polaris	18	2	38
Decl. of Polaris (page 281) for time of observation, 88° 52' 17"	.	.	.
True altitude	+33	20	0
Correction from Table I	− 0	7	
Correction from Table Ia		−13	
Latitude of the place	+33	19	40

Observations of Polaris for latitude should be made when practicable near the times of upper or of lower culminations (hour-angle 0^h or 12^h). However, at sea, if made near elongation (hour-angle 6^h or 18^h), the hour-angle, and hence the local time, should be known within one minute.

Decl. H. A.	88° 52' 10"	88° 52' 20"	88° 52' 30"	88° 52' 40"	88° 52' 50"	88° 53' 0"	Decl. H. A.
h m	' "	' "	' "	' "	' "	' "	h m
0 0	−67 50 0	−67 40 0	−67 30 0	−67 20 0	−67 10 0	−67 0 0	24 0
3	67 50 1	67 40 1	67 30 1	67 20 1	67 10 1	67 0 1	23 57
6	67 49 2	67 39 2	67 29 2	67 19 2	67 9 2	66 59 2	54
9	67 47 3	67 37 3	67 27 3	67 17 3	67 7 3	66 57 3	51
12	67 44 3	67 34 3	67 24 3	67 14 3	67 4 3	66 54 3	48
0 15	−67 41 4	−67 31 4	−67 21 4	−67 11 4	−67 1 4	−66 51 4	23 45
18	67 37 4	67 27 4	67 17 4	67 7 4	66 57 4	66 47 4	42
21	67 33 4	67 23 4	67 13 4	67 3 4	66 53 4	66 43 4	39
24	67 27 6	67 17 6	67 7 6	66 57 6	66 48 6	66 38 6	36
27	67 21 7	67 11 7	67 1 6	66 51 6	66 42 7	66 32 7	33
0 30	−67 14 7	−67 4 7	−66 55 8	−66 45 8	−66 35 8	−66 25 8	23 30
33	67 7 8	66 57 8	66 47 8	66 37 8	66 27 8	66 18 8	27
36	66 59 9	66 49 9	66 39 9	66 29 9	66 19 9	66 10 9	24
39	66 50 9	66 40 9	66 30 9	66 21 10	66 11 10	66 1 10	21
42	66 41 11	66 31 11	66 21 10	66 11 10	66 1 10	65 51 10	18
0 45	−66 30 11	−66 20 11	−66 11 11	−66 1 11	−65 51 11	−65 41 11	23 15
48	66 19 11	66 9 11	66 0 12	65 50 12	65 40 12	65 30 12	12
51	66 8 13	65 58 12	65 48 12	65 38 12	65 29 12	65 19 12	9
54	65 55 13	65 46 13	65 36 13	65 26 13	65 17 13	65 7 13	6
0 57	65 42 13	65 33 14	65 23 14	65 13 13	65 4 14	64 54 14	3
1 0	−65 29 15	−65 19 14	−65 9 14	−65 0 15	−64 50 14	−64 40 14	23 0
3	65 14 15	65 5 15	64 55 15	64 45 15	64 36 15	64 26 15	22 57
6	64 59 16	64 50 16	64 40 16	64 30 15	64 21 16	64 11 16	54
9	64 43 16	64 34 16	64 24 16	64 15 16	64 5 16	63 56 16	51
1 12	−64 27 16	−64 18 16	−64 8 16	−63 59 16	−63 49 16	−63 40 16	22 48

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1919.

Decl. H. A.	88° 52' 10''	88° 52' 20''	88° 52' 30''	88° 52' 40''	88° 52' 50''	88° 53' 0''	Decl. H. A.
h m	' "	' "	' "	' "	' "	' "	h m
1 12	-64 27 17	-64 18 18	-64 8 17	-63 59 17	-63 49 17	-63 40 17	22 48
15	64 10 18	64 0 17	63 51 18	63 42 18	63 32 18	63 23 18	45
18	63 52 18	63 43 19	63 33 18	63 24 18	63 14 18	63 5 18	42
21	63 34 19	63 24 19	63 15 18	63 6 18	62 56 18	62 47 18	39
24	63 15 20	63 5 19	62 56 20	62 47 20	62 37 19	62 28 20	36
1 27	-62 55 21	-62 46 21	-62 36 20	-62 27 20	-62 18 20	-62 8 20	22 33
30	62 34 21	62 25 21	62 16 21	62 7 21	61 58 21	61 48 21	30
33	62 13 21	62 4 22	61 55 21	61 46 21	61 37 21	61 27 21	27
36	61 52 21	61 42 22	61 33 22	61 24 22	61 15 22	61 6 22	24
39	61 29 23	61 20 23	61 11 22	61 2 23	60 53 23	60 44 23	21
1 42	-61 6 24	-60 57 23	-60 48 23	-60 39 23	-60 30 23	-60 21 23	22 18
45	60 42 24	60 34 25	60 25 24	60 16 24	60 7 24	59 58 24	15
48	60 18 24	60 9 25	60 1 24	59 52 24	59 43 24	59 34 24	12
51	59 53 25	59 44 25	59 36 25	59 27 25	59 18 25	59 9 25	9
54	59 28 25	59 19 25	59 10 26	59 2 26	58 53 26	58 44 26	6
1 57	-59 2 27	-58 53 27	-58 44 26	-58 36 27	-58 27 27	-58 18 26	22 3
2 0	58 35 28	58 26 27	58 18 28	58 9 27	58 0 27	57 52 27	22 0
3	58 7 28	57 59 28	57 50 28	57 42 28	57 33 27	57 25 28	21 57
6	57 39 28	57 31 29	57 22 28	57 14 28	57 6 29	56 57 28	54
9	57 11 29	57 2 29	56 54 29	56 46 29	56 37 29	56 29 29	51
2 12	-56 42 30	-56 33 29	-56 25 30	-56 17 30	-56 8 30	-56 0 30	21 48
15	56 12 31	56 4 31	55 55 30	55 47 30	55 39 30	55 31 30	45
18	55 41 31	55 33 31	55 25 31	55 17 31	55 9 31	55 1 31	42
21	55 10 31	55 2 31	54 54 31	54 46 31	54 38 31	54 30 31	39
24	54 39 32	54 31 32	54 23 32	54 15 32	54 7 32	53 59 32	36
2 27	-54 7 33	-53 59 33	-53 51 32	-53 43 32	-53 35 32	-53 27 32	21 33
30	53 34 33	53 26 33	53 18 33	53 11 33	53 3 33	52 55 33	30
33	53 1 34	52 53 34	52 45 33	52 38 34	52 30 34	52 22 33	27
36	52 27 34	52 19 34	52 12 34	52 4 34	51 56 34	51 49 34	24
39	51 53 34	51 45 34	51 38 35	51 30 35	51 22 34	51 15 34	21
2 42	-51 18 35	-51 11 36	-51 3 35	-50 55 35	-50 48 35	-50 41 35	21 18
45	50 43 36	50 35 36	50 28 36	50 20 36	50 13 36	50 6 36	15
48	50 7 37	49 59 36	49 52 36	49 45 36	49 37 36	49 30 36	12
51	49 30 37	49 23 37	49 16 37	49 9 37	49 1 36	48 54 36	9
54	48 53 37	48 46 37	48 39 37	48 32 37	48 25 37	48 18 37	6
2 57	-48 16 38	-48 9 38	-48 2 38	-47 55 38	-47 48 38	-47 41 38	21 3
3 0	47 38 38	47 31 38	47 24 38	47 17 38	47 10 38	47 3 38	21 0
3	47 0 39	46 53 39	46 46 39	46 39 39	46 32 38	46 25 38	20 57
6	46 21 39	46 14 39	46 7 39	45 54 39	45 47 39	45 40 39	54
9	45 41 40	45 35 40	45 28 40	45 21 39	45 15 40	45 8 40	51
3 12	-45 1 40	-44 55 40	-44 48 40	-44 42 40	-44 35 40	-44 28 39	20 48
15	44 21 41	44 15 41	44 8 41	44 2 41	43 55 40	43 49 41	45
18	43 40 41	43 34 41	43 27 41	43 21 41	43 15 41	43 8 40	42
21	42 59 41	42 53 42	42 46 41	42 40 41	42 34 41	42 28 42	39
24	42 17 42	42 11 42	42 5 42	41 59 42	41 53 42	41 46 41	36
3 27	-41 35 42	-41 29 42	-41 23 42	-41 17 42	-41 11 42	-41 5 42	20 33
30	40 53 43	40 47 43	40 41 43	40 35 43	40 29 43	40 23 43	30
33	40 10 44	40 4 43	39 58 43	39 52 43	39 46 43	39 40 43	27
36	39 26 44	39 21 44	39 15 44	39 9 43	39 3 43	38 57 43	24
39	38 42 44	38 37 44	38 31 44	38 26 44	38 20 44	38 14 43	21
3 42	-37 58 44	-37 53 44	-37 47 44	-37 42 45	-37 36 44	-37 31 44	20 18
45	37 14 45	37 8 45	37 3 45	36 57 44	36 52 45	36 47 45	15
48	36 29 45	36 23 45	36 18 45	36 13 45	36 7 45	36 2 45	12
51	35 43 45	35 38 45	35 33 45	35 28 45	35 22 45	35 17 45	9
54	34 58 46	34 53 46	34 47 45	34 42 45	34 37 45	34 32 45	6
3 57	-34 12 47	-34 7 47	-34 2 47	-33 57 46	-33 52 46	-33 47 46	20 3
4 0	33 25 47	33 20 46	33 15 46	33 11 47	33 6 47	33 1 46	20 0
3	32 38 47	32 34 47	32 29 47	32 24 47	32 19 47	32 15 47	19 57
6	31 51 47	31 47 48	31 42 47	31 37 47	31 33 47	31 28 47	54
4 9	-31 4 47	-30 59 48	-30 55 47	-30 50 47	-30 45 47	-30 41 47	19 51

TABLE I.

681

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1910.

Decl. H. A.	88° 52' 10"	88° 52' 20"	88° 52' 30"	88° 52' 40"	88° 52' 50"	88° 53' 0"	Decl. H. A.
h m	' "	' "	' "	' "	' "	' "	h m
4 9	-31 4 ⁴⁸	-30 59 ⁴⁷	-30 55 ⁴⁸	-30 50 ⁴⁷	-30 46 ⁴⁷	-30 41 ⁴⁷	19 51
12	30 16 ⁴⁸	30 12 ⁴⁸	30 7 ⁴⁸	30 3 ⁴⁸	29 59 ⁴⁸	29 54 ⁴⁷	48
15	29 28 ⁴⁸	29 24 ⁴⁸	29 19 ⁴⁸	29 15 ⁴⁸	29 11 ⁴⁸	29 7 ⁴⁸	45
18	28 40 ⁴⁸	28 36 ⁴⁸	28 31 ⁴⁸	28 27 ⁴⁸	28 23 ⁴⁸	28 19 ⁴⁸	42
21	27 51 ⁴⁹	27 47 ⁴⁹	27 43 ⁴⁹	27 39 ⁴⁹	27 35 ⁴⁹	27 31 ⁴⁸	39
4 24	-27 2 ⁴⁹	-26 58 ⁴⁹	-26 54 ⁴⁹	-26 50 ⁴⁹	-26 46 ⁴⁸	-26 43 ⁴⁹	19 36
27	26 13 ⁴⁹	26 9 ⁴⁹	26 5 ⁴⁹	26 1 ⁴⁹	25 58 ⁴⁹	25 54 ⁴⁹	33
30	25 24 ⁵⁰	25 20 ⁵⁰	25 16 ⁴⁹	25 12 ⁴⁹	25 9 ⁴⁹	25 5 ⁴⁹	30
33	24 34 ⁵⁰	24 30 ⁵⁰	24 27 ⁵⁰	24 23 ⁴⁹	24 20 ⁵⁰	24 16 ⁴⁹	27
36	23 44 ⁵⁰	23 40 ⁵⁰	23 37 ⁵⁰	23 34 ⁵⁰	23 30 ⁵⁰	23 27 ⁵⁰	24
4 39	-22 54 ⁵¹	-22 50 ⁵⁰	-22 47 ⁵⁰	-22 44 ⁵⁰	-22 40 ⁵⁰	-22 37 ⁵⁰	19 21
42	22 3 ⁵⁰	22 0 ⁵¹	21 57 ⁵¹	21 54 ⁵¹	21 50 ⁵⁰	21 47 ⁵⁰	18
45	21 13 ⁵¹	21 9 ⁵⁰	21 6 ⁵⁰	21 3 ⁵⁰	21 0 ⁵⁰	20 57 ⁵⁰	15
48	20 22 ⁵¹	20 19 ⁵¹	20 16 ⁵¹	20 13 ⁵¹	20 10 ⁵¹	20 7 ⁵⁰	12
51	19 31 ⁵²	19 28 ⁵¹	19 25 ⁵¹	19 22 ⁵¹	19 19 ⁵⁰	19 17 ⁵¹	9
4 54	-18 39 ⁵¹	-18 37 ⁵²	-18 34 ⁵¹	-18 31 ⁵¹	-18 29 ⁵¹	-18 26 ⁵¹	19 6
4 57	17 48 ⁵²	17 45 ⁵¹	17 43 ⁵²	17 40 ⁵¹	17 38 ⁵²	17 35 ⁵¹	3
5 0	16 56 ⁵²	16 54 ⁵²	16 51 ⁵¹	16 49 ⁵²	16 46 ⁵¹	16 44 ⁵¹	19 0
3	16 4 ⁵²	16 2 ⁵²	16 0 ⁵²	15 57 ⁵¹	15 55 ⁵¹	15 53 ⁵¹	18 57
6	15 12 ⁵²	15 10 ⁵²	15 8 ⁵²	15 6 ⁵²	15 4 ⁵²	15 2 ⁵²	54
5 9	-14 20 ⁵²	-14 18 ⁵²	-14 16 ⁵²	-14 14 ⁵²	-14 12 ⁵²	-14 10 ⁵²	18 51
12	13 28 ⁵²	13 26 ⁵²	13 24 ⁵²	13 22 ⁵²	13 20 ⁵²	13 18 ⁵¹	48
15	12 36 ⁵²	12 34 ⁵²	12 32 ⁵²	12 30 ⁵²	12 28 ⁵²	12 27 ⁵²	45
18	11 43 ⁵³	11 41 ⁵³	11 40 ⁵²	11 38 ⁵²	11 36 ⁵²	11 35 ⁵²	42
21	10 50 ⁵³	10 49 ⁵³	10 47 ⁵²	10 46 ⁵²	10 44 ⁵²	10 43 ⁵²	39
5 24	-9 58 ⁵³	-9 56 ⁵²	-9 55 ⁵³	-9 54 ⁵³	-9 52 ⁵²	-9 51 ⁵³	18 36
27	9 5 ⁵³	9 4 ⁵³	9 2 ⁵²	9 1 ⁵³	9 0 ⁵³	8 58 ⁵²	33
30	8 12 ⁵³	8 11 ⁵³	8 10 ⁵²	8 8 ⁵²	8 7 ⁵²	8 6 ⁵²	30
33	7 19 ⁵³	7 18 ⁵³	7 17 ⁵³	7 16 ⁵²	7 15 ⁵³	7 14 ⁵²	27
36	6 26 ⁵³	6 25 ⁵³	6 24 ⁵³	6 23 ⁵³	6 22 ⁵²	6 21 ⁵²	24
5 39	-5 33 ⁵³	-5 32 ⁵³	-5 31 ⁵³	-5 30 ⁵²	-5 30 ⁵³	-5 29 ⁵³	18 21
42	4 40 ⁵⁴	4 39 ⁵³	4 38 ⁵³	4 38 ⁵³	4 37 ⁵³	4 36 ⁵²	18
45	3 46 ⁵⁴	3 46 ⁵³	3 45 ⁵³	3 45 ⁵³	3 44 ⁵²	3 44 ⁵³	15
48	2 53 ⁵³	2 53 ⁵³	2 52 ⁵³	2 52 ⁵³	2 52 ⁵³	2 51 ⁵²	12
51	2 0 ⁵⁴	2 0 ⁵⁴	1 59 ⁵³	1 59 ⁵³	1 59 ⁵³	1 59 ⁵³	9
5 54	-1 6 ⁵³	-1 6 ⁵³	-1 6 ⁵³	-1 6 ⁵³	-1 6 ⁵³	-1 6 ⁵³	18 6
5 57	-0 13 ⁵³	-0 13 ⁵³	-0 13 ⁵³	-0 13 ⁵³	-0 13 ⁵²	-0 13 ⁵²	3
6 0	+0 40 ⁵³	+0 40 ⁵³	+0 40 ⁵³	+0 40 ⁵²	+0 39 ⁵²	+0 39 ⁵²	18 0
3	1 33 ⁵⁴	1 33 ⁵³	1 33 ⁵³	1 32 ⁵³	1 32 ⁵³	1 32 ⁵²	17 57
6	2 27 ⁵³	2 26 ⁵³	2 26 ⁵³	2 25 ⁵³	2 25 ⁵³	2 24 ⁵³	54
6 9	+3 20 ⁵³	+3 19 ⁵³	+3 19 ⁵³	+3 18 ⁵³	+3 18 ⁵²	+3 17 ⁵²	17 51
12	4 13 ⁵³	4 12 ⁵³	4 12 ⁵²	4 11 ⁵³	4 10 ⁵²	4 9 ⁵³	48
15	5 6 ⁵³	5 5 ⁵³	5 4 ⁵²	5 4 ⁵²	5 3 ⁵²	5 2 ⁵²	45
18	5 59 ⁵³	5 58 ⁵³	5 57 ⁵³	5 56 ⁵²	5 55 ⁵³	5 54 ⁵³	42
21	6 52 ⁵³	6 51 ⁵³	6 50 ⁵³	6 49 ⁵²	6 48 ⁵²	6 47 ⁵²	39
6 24	+7 45 ⁵³	+7 44 ⁵³	+7 43 ⁵²	+7 41 ⁵³	+7 40 ⁵³	+7 39 ⁵²	17 36
27	8 38 ⁵³	8 37 ⁵²	8 35 ⁵³	8 34 ⁵²	8 33 ⁵²	8 31 ⁵²	33
30	9 31 ⁵²	9 29 ⁵²	9 28 ⁵²	9 26 ⁵²	9 25 ⁵²	9 23 ⁵²	30
33	10 23 ⁵²	10 22 ⁵²	10 20 ⁵²	10 19 ⁵²	10 17 ⁵²	10 15 ⁵²	27
36	11 16 ⁵²	11 14 ⁵²	11 12 ⁵³	11 11 ⁵²	11 9 ⁵²	11 7 ⁵²	24
6 39	+12 8 ⁵³	+12 6 ⁵³	+12 5 ⁵²	+12 3 ⁵²	+12 1 ⁵²	+11 59 ⁵²	17 21
42	13 1 ⁵²	12 59 ⁵²	12 57 ⁵¹	12 55 ⁵¹	12 53 ⁵¹	12 51 ⁵¹	18
45	13 53 ⁵²	13 51 ⁵¹	13 48 ⁵²	13 46 ⁵²	13 44 ⁵²	13 42 ⁵¹	15
48	14 45 ⁵²	14 42 ⁵²	14 40 ⁵²	14 38 ⁵¹	14 36 ⁵¹	14 33 ⁵²	12
51	15 37 ⁵¹	15 34 ⁵²	15 32 ⁵¹	15 29 ⁵²	15 27 ⁵¹	15 25 ⁵¹	9
6 54	+16 28 ⁵²	+16 26 ⁵¹	+16 23 ⁵¹	+16 21 ⁵¹	+16 18 ⁵¹	+16 16 ⁵⁰	17 6
6 57	17 20 ⁵¹	17 17 ⁵¹	17 14 ⁵¹	17 12 ⁵¹	17 9 ⁵¹	17 6 ⁵¹	3
7 0	18 11 ⁵¹	18 8 ⁵¹	18 5 ⁵¹	18 3 ⁵⁰	18 0 ⁵⁰	17 57 ⁵¹	17 0
3	19 2 ⁵¹	18 59 ⁵¹	18 56 ⁵¹	18 53 ⁵¹	18 50 ⁵¹	18 48 ⁵⁰	16 57
7 6	+19 53 ⁵¹	+19 50 ⁵¹	+19 47 ⁵¹	+19 44 ⁵¹	+19 41 ⁵¹	+19 38 ⁵⁰	16 54

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1919.

Decl.		88° 52' 10"		88° 52' 20"		88° 52' 30"		88° 52' 40"		88° 52' 50"		88° 53' 0"		Decl.	
H. A.														H. A.	
h	m	'	"	'	"	'	"	'	"	'	"	'	"	h	m
7	6	+19	53	+19	50	+19	47	+19	44	+19	41	+19	38	16	54
	9	20	44	20	41	20	37	20	34	20	31	20	28	16	51
	12	21	34	21	31	21	28	21	24	21	21	21	18	16	48
	15	22	24	22	21	22	18	22	14	22	11	22	8	16	45
	18	23	14	23	11	23	7	23	4	23	0	22	57	16	42
7	21	+24	4	+24	1	+23	57	+23	53	+23	50	+23	46	16	39
	24	24	54	24	50	24	46	24	42	24	39	24	35	16	36
	27	25	43	25	39	25	35	25	31	25	28	25	24	16	33
	30	26	32	26	28	26	24	26	20	26	16	26	12	16	30
	33	27	21	27	17	27	12	27	8	27	4	27	0	16	27
7	36	+28	9	+28	5	+28	1	+27	56	+27	52	+27	48	16	24
	39	28	57	28	53	28	49	28	44	28	40	28	36	16	21
	42	29	45	29	41	29	36	29	32	29	27	29	23	16	18
	45	30	33	30	28	30	23	30	19	30	14	30	10	16	15
	48	31	20	31	15	31	10	31	6	31	1	30	56	16	12
7	51	+32	7	+32	2	+31	57	+31	52	+31	47	+31	43	16	9
	54	32	53	32	48	32	43	32	38	32	33	32	29	16	6
	57	33	39	33	34	33	29	33	24	33	19	33	14	16	3
8	0	34	25	34	20	34	15	34	10	34	5	34	0	16	0
	3	35	11	35	6	35	0	34	55	34	50	34	45	15	57
8	6	+35	56	+35	51	+35	45	+35	40	+35	34	+35	29	15	54
	9	36	41	36	35	36	30	36	24	36	19	36	13	15	51
	12	37	25	37	19	37	14	37	8	37	3	36	57	15	48
	15	38	9	38	3	37	58	37	52	37	46	37	41	15	45
	18	38	53	38	47	38	41	38	35	38	29	38	24	15	42
8	21	+39	36	+39	30	+39	24	+39	18	+39	12	+39	7	15	39
	24	40	19	40	13	40	7	40	1	39	55	39	49	15	36
	27	41	1	40	55	40	49	40	43	40	37	40	31	15	33
	30	41	43	41	37	41	31	41	25	41	18	41	12	15	30
	33	42	25	42	18	42	12	42	6	41	59	41	53	15	27
8	36	+43	6	+42	59	+42	53	+42	47	+42	40	+42	34	15	24
	39	43	47	43	40	43	33	43	27	43	20	43	14	15	21
	42	44	27	44	20	44	13	44	7	44	0	43	54	15	18
	45	45	7	45	0	44	53	44	46	44	40	44	33	15	15
	48	45	46	45	39	45	32	45	25	45	19	45	12	15	12
8	51	+46	25	+46	18	+46	11	+46	4	+45	57	+45	50	15	9
	54	47	3	46	56	46	49	46	42	46	35	46	28	15	6
	57	47	41	47	34	47	27	47	20	47	13	47	5	15	3
9	0	48	18	48	11	48	4	47	57	47	50	47	42	15	0
	3	48	55	48	48	48	41	48	33	48	26	48	19	14	57
9	6	+49	31	+49	24	+49	17	+49	9	+49	2	+48	55	14	54
	9	50	7	50	0	49	53	49	45	49	38	49	30	14	51
	12	50	43	50	35	50	28	50	20	50	13	50	5	14	48
	15	51	18	51	10	51	2	50	55	50	47	50	40	14	45
	18	51	52	51	44	51	37	51	29	51	21	51	14	14	42
9	21	+52	26	+52	18	+52	10	+52	2	+51	55	+51	47	14	39
	24	52	59	52	51	52	43	52	35	52	28	52	20	14	36
	27	53	32	53	24	53	16	53	8	53	0	52	52	14	33
	30	54	4	53	56	53	48	53	40	53	32	53	24	14	30
	33	54	36	54	28	54	19	54	11	54	3	53	55	14	27
9	36	+55	7	+54	59	+54	50	+54	42	+54	34	+54	26	14	24
	39	55	37	55	29	55	21	55	12	55	4	54	56	14	21
	42	56	7	55	59	55	51	55	42	55	34	55	26	14	18
	45	56	37	56	28	56	20	56	11	56	3	55	55	14	15
	48	57	6	56	57	56	49	56	40	56	32	56	23	14	12
9	51	+57	34	+57	25	+57	17	+57	8	+57	0	+56	51	14	9
	54	58	1	57	53	57	44	57	36	57	27	57	18	14	6
	57	58	28	58	20	58	11	58	3	57	54	57	45	14	3
10	0	58	55	58	46	58	37	58	29	58	20	58	11	14	0
10	3	+59	21	+59	12	+59	3	+58	54	+58	46	+58	37	13	57

TABLE I.

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1919.

Decl. H. A.		88° 52' 10"	88° 52' 20"	88° 52' 30"	88° 52' 40"	88° 52' 50"	88° 53' 0"	Decl. H. A.
h	m	' "	' "	' "	' "	' "	' "	h m
10	3	+59 21	+59 12	+59 3	+58 54	+58 46	+58 37	13 57
	6	59 46	59 37	59 28	59 19	59 11	59 2	54
	9	60 11	60 2	59 53	59 44	59 35	59 26	51
	12	60 35	60 26	60 17	60 8	59 59	59 50	48
	15	60 58	60 49	60 40	60 31	60 22	60 13	45
10	18	+61 21	+61 12	+61 3	+60 54	+60 45	+60 36	13 42
	21	61 43	61 34	61 25	61 16	61 7	60 58	39
	24	62 5	61 56	61 46	61 37	61 28	61 19	36
	27	62 26	62 17	62 7	61 58	61 49	61 40	33
	30	62 46	62 37	62 28	62 18	62 9	62 0	30
10	33	+63 6	+62 57	+62 47	+62 38	+62 29	+62 19	13 27
	36	63 25	63 16	63 6	62 57	62 47	62 38	24
	39	63 43	63 34	63 24	63 15	63 6	62 56	21
	42	64 1	63 52	63 42	63 33	63 23	63 14	18
	45	64 18	64 9	63 59	63 50	63 40	63 31	15
10	48	+64 35	+64 25	+64 16	+64 6	+63 57	+63 47	13 12
	51	64 51	64 41	64 31	64 22	64 12	64 3	9
	54	65 6	64 56	64 46	64 37	64 27	64 18	6
10	57	65 20	65 11	65 1	64 51	64 42	64 32	3
11	0	65 34	65 24	65 15	65 5	64 55	64 46	13 0
11	3	+65 47	+65 38	+65 28	+65 18	+65 8	+64 59	12 57
	6	66 0	65 50	65 40	65 31	65 21	65 11	54
	9	66 12	66 2	65 52	65 42	65 33	65 23	51
	12	66 23	66 13	66 3	65 53	65 44	65 34	48
	15	66 33	66 24	66 14	66 4	65 54	65 44	45
11	18	+66 43	+66 33	+66 24	+66 14	+66 4	+65 54	12 42
	21	66 52	66 42	66 33	66 23	66 13	66 3	39
	24	67 1	66 51	66 41	66 31	66 21	66 11	36
	27	67 9	66 59	66 49	66 39	66 29	66 19	33
	30	67 16	67 6	66 56	66 46	66 36	66 26	30
11	33	+67 22	+67 12	+67 2	+66 52	+66 43	+66 33	12 27
	36	67 28	67 18	67 8	66 58	66 48	66 38	24
	39	67 33	67 23	67 13	67 3	66 53	66 43	21
	42	67 38	67 28	67 18	67 8	66 58	66 48	18
	45	67 41	67 31	67 21	67 12	67 2	66 52	15
11	48	+67 44	+67 34	+67 24	+67 15	+67 5	+66 55	12 12
	51	67 47	67 37	67 27	67 17	67 7	66 57	9
	54	67 49	67 39	67 29	67 19	67 9	66 59	6
11	57	67 50	67 40	67 30	67 20	67 10	67 0	3
12	0	+67 50	+67 40	+67 30	+67 20	+67 10	+67 0	12 0

TABLE Ia.

Table I has been computed for an altitude of 45°. For other altitudes, corrections taken from the following table may be applied when the desired degree of accuracy requires it.

Altitude.		10°	20°	30°	40°	50°	60°	70°	Altitude.	
H. A.									H. A.	
h	h	"	"	"	"	"	"	"	h	h
0	12	0	0	0	0	0	0	0	12	24
1	11	- 2	- 2	- 1	0	+ 1	+ 2	+ 5	13	23
2	10	8	6	4	- 2	2	7	17	14	22
3	9	16	13	8	3	4	14	35	15	21
4	8	24	19	13	5	6	22	52	16	20
5	7	30	23	16	6	7	27	65	17	19
6	6	- 33	- 25	- 17	- 6	+ 8	+ 29	+ 69	18	18

SIDEREAL INTO MEAN SOLAR TIME.
TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal.	0 ^h	1 ^h	2 ^h	3 ^h	4 ^h	5 ^h	6 ^h	7 ^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 8.807	0	0.000
1	0 0.164	0 9.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 8.971	1	0.003
2	0 0.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 9.135	2	0.005
3	0 0.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 9.298	3	0.008
4	0 0.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 9.462	4	0.011
5	0 0.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 9.626	5	0.014
6	0 0.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 9.790	6	0.016
7	0 1.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 0.124	1 9.954	7	0.019
8	0 1.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 0.288	1 10.118	8	0.022
9	0 1.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 0.452	1 10.281	9	0.025
10	0 1.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 0.616	1 10.445	10	0.027
11	0 1.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 0.779	1 10.609	11	0.030
12	0 1.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 0.943	1 10.773	12	0.033
13	0 2.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 1.107	1 10.937	13	0.035
14	0 2.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 1.271	1 11.100	14	0.038
15	0 2.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 1.435	1 11.264	15	0.041
16	0 2.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 1.599	1 11.428	16	0.044
17	0 2.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 1.762	1 11.592	17	0.046
18	0 2.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 1.926	1 11.756	18	0.049
19	0 3.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 2.090	1 11.920	19	0.052
20	0 3.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 2.254	1 12.083	20	0.055
21	0 3.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 2.418	1 12.247	21	0.057
22	0 3.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 2.582	1 12.411	22	0.060
23	0 3.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 2.745	1 12.575	23	0.063
24	0 3.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 2.909	1 12.739	24	0.066
25	0 4.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 3.073	1 12.903	25	0.068
26	0 4.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 3.237	1 13.066	26	0.071
27	0 4.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 3.401	1 13.230	27	0.074
28	0 4.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 3.564	1 13.394	28	0.076
29	0 4.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 3.728	1 13.558	29	0.079
30	0 4.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 3.892	1 13.722	30	0.082
31	0 5.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 4.056	1 13.886	31	0.085
32	0 5.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 4.220	1 14.049	32	0.087
33	0 5.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 4.384	1 14.213	33	0.090
34	0 5.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 4.547	1 14.377	34	0.093
35	0 5.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 4.711	1 14.541	35	0.096
36	0 5.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 4.875	1 14.705	36	0.098
37	0 6.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 5.039	1 14.868	37	0.101
38	0 6.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 5.203	1 15.032	38	0.104
39	0 6.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 5.367	1 15.196	39	0.106
40	0 6.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 5.530	1 15.360	40	0.109
41	0 6.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 5.694	1 15.524	41	0.112
42	0 6.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 5.858	1 15.688	42	0.115
43	0 7.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 6.022	1 15.851	43	0.117
44	0 7.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 6.186	1 16.015	44	0.120
45	0 7.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 6.350	1 16.179	45	0.123
46	0 7.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 6.513	1 16.343	46	0.126
47	0 7.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 6.677	1 16.507	47	0.128
48	0 7.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 6.841	1 16.671	48	0.131
49	0 8.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 7.005	1 16.834	49	0.134
50	0 8.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 7.169	1 16.998	50	0.137
51	0 8.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 7.332	1 17.162	51	0.139
52	0 8.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 7.496	1 17.326	52	0.142
53	0 8.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 7.660	1 17.490	53	0.145
54	0 8.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 7.824	1 17.654	54	0.147
55	0 9.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 7.988	1 17.817	55	0.150
56	0 9.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 8.152	1 17.981	56	0.153
57	0 9.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 8.315	1 18.145	57	0.156
58	0 9.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 8.479	1 18.309	58	0.158
59	0 9.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 8.643	1 18.473	59	0.161

TABLE II.

685

SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

sidereal.	8 ^h	9 ^h	10 ^h	11 ^h	12 ^h	13 ^h	14 ^h	15 ^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 7.784	2 17.614	2 27.443	0	0.000
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 7.948	2 17.778	2 27.607	1	0.003
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 8.112	2 17.941	2 27.771	2	0.005
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 8.276	2 18.105	2 27.935	3	0.008
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 8.440	2 18.269	2 28.099	4	0.011
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 8.603	2 18.433	2 28.263	5	0.014
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 8.767	2 18.597	2 28.426	6	0.016
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 8.931	2 18.761	2 28.590	7	0.019
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 9.095	2 18.924	2 28.754	8	0.022
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 9.259	2 19.088	2 28.918	9	0.025
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 9.423	2 19.252	2 29.082	10	0.027
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 9.586	2 19.416	2 29.245	11	0.030
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 9.750	2 19.580	2 29.409	12	0.033
13	1 20.766	1 30.596	1 40.425	1 50.255	2 0.084	2 9.914	2 19.744	2 29.573	13	0.035
14	1 20.930	1 30.760	1 40.589	1 50.419	2 0.248	2 10.078	2 19.907	2 29.737	14	0.038
15	1 21.094	1 30.923	1 40.753	1 50.583	2 0.412	2 10.242	2 20.071	2 29.901	15	0.041
16	1 21.258	1 31.087	1 40.917	1 50.746	2 0.576	2 10.405	2 20.235	2 30.065	16	0.044
17	1 21.422	1 31.251	1 41.081	1 50.910	2 0.740	2 10.569	2 20.399	2 30.228	17	0.046
18	1 21.585	1 31.415	1 41.244	1 51.074	2 0.904	2 10.733	2 20.563	2 30.392	18	0.049
19	1 21.749	1 31.579	1 41.408	1 51.238	2 1.067	2 10.897	2 20.727	2 30.556	19	0.052
20	1 21.913	1 31.743	1 41.572	1 51.402	2 1.231	2 11.061	2 20.890	2 30.720	20	0.055
21	1 22.077	1 31.906	1 41.736	1 51.565	2 1.395	2 11.225	2 21.054	2 30.884	21	0.057
22	1 22.241	1 32.070	1 41.900	1 51.729	2 1.559	2 11.388	2 21.218	2 31.048	22	0.060
23	1 22.404	1 32.234	1 42.064	1 51.893	2 1.723	2 11.552	2 21.382	2 31.211	23	0.063
24	1 22.568	1 32.398	1 42.227	1 52.057	2 1.887	2 11.716	2 21.546	2 31.375	24	0.066
25	1 22.732	1 32.562	1 42.391	1 52.221	2 2.050	2 11.880	2 21.709	2 31.539	25	0.068
26	1 22.896	1 32.726	1 42.555	1 52.385	2 2.214	2 12.044	2 21.873	2 31.703	26	0.071
27	1 23.060	1 32.889	1 42.719	1 52.548	2 2.378	2 12.208	2 22.037	2 31.867	27	0.074
28	1 23.224	1 33.053	1 42.883	1 52.712	2 2.542	2 12.371	2 22.201	2 32.031	28	0.076
29	1 23.387	1 33.217	1 43.047	1 52.876	2 2.706	2 12.535	2 22.365	2 32.194	29	0.079
30	1 23.551	1 33.381	1 43.210	1 53.040	2 2.869	2 12.699	2 22.529	2 32.358	30	0.082
31	1 23.715	1 33.545	1 43.374	1 53.204	2 3.033	2 12.863	2 22.692	2 32.522	31	0.085
32	1 23.879	1 33.708	1 43.538	1 53.368	2 3.197	2 13.027	2 22.856	2 32.686	32	0.087
33	1 24.043	1 33.872	1 43.702	1 53.531	2 3.361	2 13.191	2 23.020	2 32.850	33	0.090
34	1 24.207	1 34.036	1 43.866	1 53.695	2 3.525	2 13.354	2 23.184	2 33.013	34	0.093
35	1 24.370	1 34.200	1 44.029	1 53.859	2 3.689	2 13.518	2 23.348	2 33.177	35	0.096
36	1 24.534	1 34.364	1 44.193	1 54.023	2 3.852	2 13.682	2 23.512	2 33.341	36	0.098
37	1 24.698	1 34.528	1 44.357	1 54.187	2 4.016	2 13.846	2 23.675	2 33.505	37	0.101
38	1 24.862	1 34.691	1 44.521	1 54.351	2 4.180	2 14.010	2 23.839	2 33.669	38	0.104
39	1 25.026	1 34.855	1 44.685	1 54.514	2 4.344	2 14.173	2 24.003	2 33.833	39	0.106
40	1 25.190	1 35.019	1 44.849	1 54.678	2 4.508	2 14.337	2 24.167	2 33.996	40	0.109
41	1 25.353	1 35.183	1 45.012	1 54.842	2 4.672	2 14.501	2 24.331	2 34.160	41	0.112
42	1 25.517	1 35.347	1 45.176	1 55.006	2 4.835	2 14.665	2 24.495	2 34.324	42	0.115
43	1 25.681	1 35.511	1 45.340	1 55.170	2 4.999	2 14.829	2 24.658	2 34.488	43	0.117
44	1 25.845	1 35.674	1 45.504	1 55.333	2 5.163	2 14.993	2 24.822	2 34.652	44	0.120
45	1 26.009	1 35.838	1 45.668	1 55.497	2 5.327	2 15.156	2 24.986	2 34.816	45	0.123
46	1 26.172	1 36.002	1 45.832	1 55.661	2 5.491	2 15.320	2 25.150	2 34.979	46	0.126
47	1 26.336	1 36.166	1 45.995	1 55.825	2 5.655	2 15.484	2 25.314	2 35.143	47	0.128
48	1 26.500	1 36.330	1 46.159	1 55.989	2 5.818	2 15.648	2 25.477	2 35.307	48	0.131
49	1 26.664	1 36.493	1 46.323	1 56.153	2 5.982	2 15.812	2 25.641	2 35.471	49	0.134
50	1 26.828	1 36.657	1 46.487	1 56.316	2 6.146	2 15.976	2 25.805	2 35.635	50	0.137
51	1 26.992	1 36.821	1 46.651	1 56.480	2 6.310	2 16.139	2 25.969	2 35.798	51	0.139
52	1 27.155	1 36.985	1 46.815	1 56.644	2 6.474	2 16.303	2 26.133	2 35.962	52	0.142
53	1 27.319	1 37.149	1 46.978	1 56.808	2 6.637	2 16.467	2 26.297	2 36.126	53	0.145
54	1 27.483	1 37.313	1 47.142	1 56.972	2 6.801	2 16.631	2 26.460	2 36.290	54	0.147
55	1 27.647	1 37.476	1 47.306	1 57.136	2 6.965	2 16.795	2 26.624	2 36.454	55	0.150
56	1 27.811	1 37.640	1 47.470	1 57.299	2 7.129	2 16.959	2 26.788	2 36.618	56	0.153
57	1 27.975	1 37.804	1 47.634	1 57.463	2 7.293	2 17.122	2 26.952	2 36.781	57	0.156
58	1 28.138	1 37.968	1 47.797	1 57.627	2 7.457	2 17.286	2 27.116	2 36.945	58	0.158
59	1 28.302	1 38.132	1 47.961	1 57.791	2 7.620	2 17.450	2 27.280	2 37.109	59	0.161

SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal.	16 ^h	17 ^h	18 ^h	19 ^h	20 ^h	21 ^h	22 ^h	23 ^h	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	0 0.000
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1 0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2 0.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3 0.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4 0.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5 0.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6 0.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7 0.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8 0.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9 0.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10 0.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11 0.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12 0.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13 0.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14 0.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15 0.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16 0.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17 0.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18 0.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19 0.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20 0.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21 0.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22 0.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23 0.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24 0.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25 0.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26 0.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27 0.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28 0.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29 0.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30 0.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31 0.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32 0.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33 0.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34 0.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35 0.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36 0.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37 0.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38 0.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39 0.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40 0.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41 0.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42 0.115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43 0.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44 0.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45 0.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46 0.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47 0.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48 0.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49 0.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50 0.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51 0.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52 0.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53 0.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54 0.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55 0.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56 0.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57 0.156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58 0.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59 0.161

TABLE III.

687

MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	0 ^h	1 ^h	2 ^h	3 ^h	4 ^h	5 ^h	6 ^h	7 ^h	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	0 0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.995	0 0.000
1	0 0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1 0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2 0.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3 0.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4 0.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5 0.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6 0.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7 0.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8 0.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9 0.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10 0.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11 0.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12 0.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13 0.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14 0.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15 0.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16 0.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17 0.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18 0.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19 0.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20 0.055
21	0 3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21 0.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22 0.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23 0.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24 0.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25 0.068
26	0 4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 3.410	1 13.266	26 0.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27 0.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28 0.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29 0.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30 0.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31 0.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32 0.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33 0.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34 0.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35 0.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36 0.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37 0.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38 0.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39 0.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40 0.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41 0.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42 0.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43 0.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44 0.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45 0.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46 0.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47 0.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48 0.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.188	1 17.045	49 0.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50 0.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51 0.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52 0.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53 0.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54 0.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55 0.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56 0.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57 0.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58 0.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59 0.162

TABLE III.

MEAN SOLAR INTO SIDEREAL TIME.
TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	8 ^h	9 ^h	10 ^h	11 ^h	12 ^h	13 ^h	14 ^h	15 ^h	Per Second.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	1 18.852	1 28.708	1 38.565	1 48.421	1 58.278	2 8.134	2 17.991	2 27.847	0 0.000
1	1 19.016	1 28.873	1 38.730	1 48.586	1 58.442	2 8.296	2 18.155	2 28.011	1 0.005
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 8.458	2 18.319	2 28.176	2 0.005
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 8.627	2 18.483	2 28.340	3 0.005
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 8.791	2 18.648	2 28.504	4 0.011
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 8.956	2 18.812	2 28.668	5 0.014
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 9.120	2 18.976	2 28.833	6 0.016
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 9.284	2 19.141	2 28.997	7 0.019
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 9.448	2 19.305	2 29.161	8 0.022
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 9.613	2 19.469	2 29.326	9 0.025
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 9.777	2 19.633	2 29.490	10 0.027
11	1 20.659	1 30.515	1 40.372	1 50.228	2 0.085	2 9.941	2 19.798	2 29.654	11 0.030
12	1 20.823	1 30.680	1 40.536	1 50.393	2 0.249	2 10.105	2 19.962	2 29.818	12 0.032
13	1 20.987	1 30.844	1 40.700	1 50.557	2 0.413	2 10.270	2 20.126	2 29.983	13 0.034
14	1 21.152	1 31.008	1 40.865	1 50.721	2 0.578	2 10.434	2 20.290	2 30.147	14 0.036
15	1 21.316	1 31.172	1 41.029	1 50.885	2 0.742	2 10.598	2 20.455	2 30.311	15 0.041
16	1 21.480	1 31.337	1 41.193	1 51.050	2 0.906	2 10.763	2 20.619	2 30.476	16 0.044
17	1 21.644	1 31.501	1 41.357	1 51.214	2 1.070	2 10.927	2 20.783	2 30.640	17 0.047
18	1 21.809	1 31.665	1 41.522	1 51.378	2 1.235	2 11.091	2 20.948	2 30.804	18 0.049
19	1 21.973	1 31.829	1 41.686	1 51.542	2 1.399	2 11.255	2 21.112	2 30.968	19 0.052
20	1 22.137	1 31.994	1 41.850	1 51.707	2 1.563	2 11.420	2 21.276	2 31.133	20 0.055
21	1 22.302	1 32.158	1 42.015	1 51.871	2 1.727	2 11.584	2 21.440	2 31.297	21 0.057
22	1 22.466	1 32.322	1 42.179	1 52.035	2 1.892	2 11.748	2 21.605	2 31.461	22 0.059
23	1 22.630	1 32.487	1 42.343	1 52.200	2 2.056	2 11.912	2 21.769	2 31.625	23 0.063
24	1 22.794	1 32.651	1 42.507	1 52.364	2 2.220	2 12.077	2 21.933	2 31.790	24 0.066
25	1 22.959	1 32.815	1 42.672	1 52.528	2 2.385	2 12.241	2 22.098	2 31.954	25 0.068
26	1 23.123	1 32.979	1 42.836	1 52.692	2 2.549	2 12.405	2 22.262	2 32.118	26 0.071
27	1 23.287	1 33.144	1 43.000	1 52.857	2 2.713	2 12.570	2 22.426	2 32.283	27 0.074
28	1 23.451	1 33.308	1 43.164	1 53.021	2 2.877	2 12.734	2 22.590	2 32.447	28 0.077
29	1 23.616	1 33.472	1 43.329	1 53.185	2 3.042	2 12.898	2 22.755	2 32.611	29 0.079
30	1 23.780	1 33.637	1 43.493	1 53.349	2 3.206	2 13.062	2 22.919	2 32.775	30 0.082
31	1 23.944	1 33.801	1 43.657	1 53.514	2 3.370	2 13.227	2 23.083	2 32.940	31 0.085
32	1 24.109	1 33.965	1 43.822	1 53.678	2 3.534	2 13.391	2 23.247	2 33.104	32 0.088
33	1 24.273	1 34.129	1 43.986	1 53.842	2 3.699	2 13.555	2 23.412	2 33.268	33 0.090
34	1 24.437	1 34.294	1 44.150	1 54.007	2 3.863	2 13.720	2 23.576	2 33.432	34 0.093
35	1 24.601	1 34.458	1 44.314	1 54.171	2 4.027	2 13.884	2 23.740	2 33.597	35 0.096
36	1 24.766	1 34.622	1 44.479	1 54.335	2 4.192	2 14.048	2 23.905	2 33.761	36 0.099
37	1 24.930	1 34.786	1 44.643	1 54.499	2 4.356	2 14.212	2 24.069	2 33.925	37 0.101
38	1 25.094	1 34.951	1 44.807	1 54.664	2 4.520	2 14.377	2 24.233	2 34.090	38 0.104
39	1 25.259	1 35.115	1 44.971	1 54.828	2 4.684	2 14.541	2 24.397	2 34.254	39 0.107
40	1 25.423	1 35.279	1 45.136	1 54.992	2 4.849	2 14.705	2 24.562	2 34.418	40 0.110
41	1 25.587	1 35.444	1 45.300	1 55.156	2 5.013	2 14.869	2 24.726	2 34.582	41 0.112
42	1 25.751	1 35.608	1 45.464	1 55.321	2 5.177	2 15.034	2 24.890	2 34.747	42 0.115
43	1 25.916	1 35.772	1 45.629	1 55.485	2 5.342	2 15.198	2 25.054	2 34.911	43 0.118
44	1 26.080	1 35.936	1 45.793	1 55.649	2 5.506	2 15.362	2 25.219	2 35.075	44 0.120
45	1 26.244	1 36.101	1 45.957	1 55.814	2 5.670	2 15.527	2 25.383	2 35.239	45 0.123
46	1 26.408	1 36.265	1 46.121	1 55.978	2 5.834	2 15.691	2 25.547	2 35.404	46 0.126
47	1 26.573	1 36.429	1 46.286	1 56.142	2 5.999	2 15.855	2 25.712	2 35.568	47 0.129
48	1 26.737	1 36.593	1 46.450	1 56.306	2 6.163	2 16.019	2 25.876	2 35.732	48 0.131
49	1 26.901	1 36.758	1 46.614	1 56.471	2 6.327	2 16.184	2 26.040	2 35.897	49 0.134
50	1 27.066	1 36.922	1 46.778	1 56.635	2 6.491	2 16.348	2 26.204	2 36.061	50 0.137
51	1 27.230	1 37.086	1 46.943	1 56.799	2 6.656	2 16.512	2 26.369	2 36.225	51 0.140
52	1 27.394	1 37.251	1 47.107	1 56.964	2 6.820	2 16.676	2 26.533	2 36.389	52 0.142
53	1 27.558	1 37.415	1 47.271	1 57.128	2 6.984	2 16.841	2 26.697	2 36.554	53 0.145
54	1 27.723	1 37.579	1 47.436	1 57.292	2 7.149	2 17.005	2 26.861	2 36.718	54 0.148
55	1 27.887	1 37.743	1 47.600	1 57.456	2 7.313	2 17.169	2 27.026	2 36.883	55 0.151
56	1 28.051	1 37.908	1 47.764	1 57.621	2 7.477	2 17.334	2 27.190	2 37.047	56 0.153
57	1 28.215	1 38.072	1 47.928	1 57.785	2 7.641	2 17.498	2 27.354	2 37.211	57 0.156
58	1 28.380	1 38.236	1 48.093	1 57.949	2 7.806	2 17.662	2 27.519	2 37.375	58 0.159
59	1 28.544	1 38.400	1 48.257	1 58.113	2 7.970	2 17.826	2 27.683	2 37.539	59 0.162

TABLE III.

689

MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	16 ^h	17 ^h	18 ^h	19 ^h	20 ^h	21 ^h	22 ^h	23 ^h	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	0 0.000
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1 0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2 0.005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3 0.008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4 0.011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5 0.014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6 0.016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7 0.019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8 0.022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9 0.025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10 0.027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11 0.030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12 0.033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13 0.036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14 0.038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15 0.041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16 0.044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17 0.047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18 0.049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19 0.052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20 0.055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21 0.057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22 0.060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23 0.063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24 0.066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25 0.068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26 0.071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27 0.074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28 0.077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29 0.079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30 0.082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31 0.085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32 0.088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33 0.090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34 0.093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35 0.096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36 0.099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37 0.101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38 0.104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39 0.107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40 0.110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41 0.112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42 0.115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43 0.118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44 0.120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45 0.123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46 0.126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47 0.129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48 0.131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49 0.134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50 0.137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51 0.140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52 0.142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53 0.145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54 0.148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55 0.151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56 0.153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57 0.156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58 0.159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59 0.162

TABLE IV.

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1919.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

Lat.		10°	15°	20°	22°	24°	26°	28°	30°	32°	Lat.
H. A.											H. A.
h m	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24 0
10	0 3.0	0 3.0	0 3.1	0 3.2	0 3.2	0 3.3	0 3.4	0 3.4	0 3.4	0 3.5	23 50
20	0 6.0	0 6.1	0 6.3	0 6.4	0 6.5	0 6.6	0 6.7	0 6.7	0 6.8	0 7.0	40
0 30	0 9.0	0 9.1	0 9.4	0 9.6	0 9.7	0 9.9	0 10.1	0 10.1	0 10.3	0 10.5	23 30
40	0 11.9	0 12.2	0 12.5	0 12.7	0 12.9	0 13.1	0 13.4	0 13.4	0 13.6	0 13.9	20
50	0 14.8	0 15.2	0 15.6	0 15.8	0 16.1	0 16.4	0 16.7	0 16.7	0 17.0	0 17.4	10
1 0	0 17.7	0 18.1	0 18.7	0 18.9	0 19.2	0 19.6	0 19.9	0 19.9	0 20.3	0 20.8	23 0
10	0 20.6	0 21.1	0 21.7	0 22.0	0 22.3	0 22.7	0 23.1	0 23.1	0 23.6	0 24.2	22 50
20	0 23.5	0 24.0	0 24.7	0 25.0	0 25.4	0 25.8	0 26.3	0 26.3	0 26.9	0 27.5	40
1 30	0 26.3	0 26.8	0 27.6	0 28.0	0 28.4	0 28.9	0 29.5	0 29.5	0 30.1	0 30.7	22 30
40	0 29.0	0 29.6	0 30.5	0 30.9	0 31.4	0 31.9	0 32.5	0 32.5	0 33.2	0 33.9	20
50	0 31.7	0 32.3	0 33.3	0 33.8	0 34.3	0 34.9	0 35.5	0 35.5	0 36.3	0 37.0	10
2 0	0 34.3	0 35.0	0 36.0	0 36.6	0 37.1	0 37.8	0 38.5	0 38.5	0 39.3	0 40.1	22 0
10	0 36.8	0 37.6	0 38.7	0 39.3	0 39.9	0 40.6	0 41.3	0 41.3	0 42.2	0 43.1	21 50
20	0 39.3	0 40.2	0 41.3	0 41.9	0 42.6	0 43.3	0 44.1	0 44.1	0 45.0	0 46.0	40
2 30	0 41.7	0 42.6	0 43.9	0 44.5	0 45.2	0 46.0	0 46.8	0 46.8	0 47.8	0 48.8	21 30
40	0 44.1	0 45.0	0 46.3	0 47.0	0 47.7	0 48.5	0 49.4	0 49.4	0 50.4	0 51.5	20
50	0 46.3	0 47.3	0 48.7	0 49.4	0 50.1	0 51.0	0 51.9	0 51.9	0 53.0	0 54.1	10
3 0	0 48.5	0 49.5	0 50.9	0 51.6	0 52.4	0 53.3	0 54.3	0 54.3	0 55.4	0 56.6	21 0
10	0 50.5	0 51.6	0 53.1	0 53.8	0 54.7	0 55.6	0 56.6	0 56.6	0 57.7	0 59.0	20 50
20	0 52.5	0 53.6	0 55.2	0 55.9	0 56.8	0 57.7	0 58.8	1 0.0	1 1.3		40
3 30	0 54.4	0 55.5	0 57.1	0 57.9	0 58.8	0 59.8	1 0.9	1 2.1	1 3.5		20 30
40	0 56.1	0 57.3	0 58.9	0 59.8	1 0.7	1 1.7	1 2.9	1 4.1	1 5.5		20
50	0 57.8	0 59.0	1 0.7	1 1.5	1 2.5	1 3.5	1 4.7	1 6.0	1 7.4		10
4 0	0 59.3	1 0.5	1 2.3	1 3.1	1 4.1	1 5.2	1 6.4	1 7.7	1 9.2		20 0
10	1 0.7	1 2.0	1 3.8	1 4.6	1 5.6	1 6.7	1 8.0	1 9.3	1 10.8		19 50
20	1 2.1	1 3.3	1 5.1	1 6.0	1 7.0	1 8.2	1 9.4	1 10.8	1 12.3		40
4 30	1 3.3	1 4.5	1 6.4	1 7.3	1 8.3	1 9.5	1 10.7	1 12.1	1 13.7		19 30
40	1 4.3	1 5.6	1 7.5	1 8.4	1 9.5	1 10.6	1 11.9	1 13.3	1 14.9		20
50	1 5.3	1 6.6	1 8.5	1 9.4	1 10.5	1 11.6	1 13.0	1 14.4	1 16.0		10
5 0	1 6.1	1 7.4	1 9.3	1 10.3	1 11.4	1 12.5	1 13.9	1 15.3	1 16.9		19 0
10	1 6.8	1 8.1	1 10.1	1 11.0	1 12.1	1 13.3	1 14.6	1 16.1	1 17.7		18 50
20	1 7.4	1 8.7	1 10.7	1 11.6	1 12.7	1 13.9	1 15.2	1 16.7	1 18.3		40
5 30	1 7.8	1 9.2	1 11.1	1 12.1	1 13.2	1 14.4	1 15.7	1 17.2	1 18.8		18 30
40	1 8.1	1 9.5	1 11.4	1 12.4	1 13.5	1 14.7	1 16.0	1 17.5	1 19.2		20
50	1 8.3	1 9.7	1 11.6	1 12.6	1 13.7	1 14.9	1 16.2	1 17.7	1 19.4		10
6 0	1 8.4	1 9.7	1 11.7	1 12.6	1 13.7	1 14.9	1 16.3	1 17.7	1 19.4		18 0
10	1 8.3	1 9.6	1 11.6	1 12.5	1 13.6	1 14.8	1 16.2	1 17.6	1 19.3		17 50
20	1 8.1	1 9.4	1 11.3	1 12.3	1 13.4	1 14.6	1 15.9	1 17.4	1 19.0		40
6 30	1 7.8	1 9.1	1 11.0	1 11.9	1 13.0	1 14.2	1 15.5	1 17.0	1 18.6		17 30
40	1 7.3	1 8.6	1 10.5	1 11.4	1 12.5	1 13.7	1 15.0	1 16.4	1 18.0		20
50	1 6.7	1 8.0	1 9.9	1 10.8	1 11.8	1 13.0	1 14.3	1 15.7	1 17.3		10
7 0	1 6.0	1 7.2	1 9.1	1 10.0	1 11.0	1 12.2	1 13.5	1 14.9	1 16.4		17 0
10	1 5.2	1 6.4	1 8.2	1 9.1	1 10.1	1 11.2	1 12.5	1 13.9	1 15.4		16 50
20	1 4.2	1 5.4	1 7.2	1 8.1	1 9.0	1 10.2	1 11.4	1 12.8	1 14.3		40
7 30	1 3.1	1 4.3	1 6.0	1 6.9	1 7.9	1 9.0	1 10.2	1 11.5	1 13.0		16 30
40	1 1.9	1 3.0	1 4.7	1 5.6	1 6.6	1 7.6	1 8.8	1 10.1	1 11.6		20
50	1 0.6	1 1.7	1 3.3	1 4.2	1 5.1	1 6.2	1 7.3	1 8.6	1 10.0		10
8 0	0 59.1	1 0.2	1 1.8	1 2.6	1 3.6	1 4.6	1 5.7	1 7.0	1 8.3		16 0
10	0 57.6	0 58.6	1 0.2	1 1.0	1 1.9	1 2.9	1 4.0	1 5.2	1 6.5		15 50
20	0 55.9	0 56.9	0 58.5	0 59.2	1 0.1	1 1.0	1 2.1	1 3.3	1 4.6		40
8 30	0 54.1	0 55.1	0 56.6	0 57.3	0 58.2	0 59.1	1 0.1	1 1.3	1 2.5		15 30
40	0 52.3	0 53.2	0 54.6	0 55.3	0 56.1	0 57.0	0 58.0	0 59.1	1 0.3		20
50	0 50.3	0 51.2	0 52.6	0 53.2	0 54.0	0 54.9	0 55.8	0 56.9	0 58.0		10
9 0	0 48.2	0 49.1	0 50.4	0 51.1	0 51.8	0 52.5	0 53.5	0 54.5	0 55.7		15 0

TABLE IV.

691

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1919.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

Lat. H. A.	10°	15°	20°	22°	24°	26°	28°	30°	32°	Lat. H. A.
h m	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m
9 0	0 48.2	0 49.1	0 50.4	0 51.1	0 51.8	0 52.6	0 53.5	0 54.5	0 55.7	15 0
10	0 46.1	0 46.9	0 48.1	0 48.8	0 49.5	0 50.2	0 51.1	0 52.1	0 53.2	14 50
20	0 43.8	0 44.6	0 45.8	0 46.4	0 47.0	0 47.8	0 48.6	0 49.5	0 50.6	40
9 30	0 41.5	0 42.3	0 43.4	0 43.9	0 44.6	0 45.3	0 46.0	0 46.9	0 47.9	14 30
40	0 39.1	0 39.8	0 40.9	0 41.4	0 42.0	0 42.6	0 43.4	0 44.2	0 45.1	20
50	0 36.6	0 37.3	0 38.3	0 38.8	0 39.3	0 39.9	0 40.6	0 41.4	0 42.2	10
10 0	0 34.1	0 34.7	0 35.6	0 36.1	0 36.6	0 37.2	0 37.8	0 38.5	0 39.3	14 0
10	0 31.5	0 32.0	0 32.9	0 33.3	0 33.8	0 34.3	0 34.9	0 35.5	0 36.3	13 50
20	0 28.8	0 29.3	0 30.1	0 30.5	0 30.9	0 31.4	0 31.9	0 32.5	0 33.2	40
10 30	0 26.1	0 26.5	0 27.2	0 27.6	0 28.0	0 28.4	0 28.9	0 29.4	0 30.0	13 30
40	0 23.3	0 23.7	0 24.3	0 24.7	0 25.0	0 25.4	0 25.8	0 26.3	0 26.8	20
50	0 20.5	0 20.8	0 21.4	0 21.7	0 22.0	0 22.3	0 22.7	0 23.1	0 23.6	10
11 0	0 17.7	0 17.9	0 18.4	0 18.7	0 18.9	0 19.2	0 19.5	0 19.9	0 20.3	13 0
10	0 14.8	0 15.0	0 15.4	0 15.6	0 15.8	0 16.1	0 16.3	0 16.6	0 17.0	12 50
20	0 11.8	0 12.1	0 12.3	0 12.5	0 12.7	0 12.9	0 13.1	0 13.3	0 13.6	40
11 30	0 8.9	0 9.1	0 9.3	0 9.4	0 9.5	0 9.7	0 9.8	0 10.0	0 10.2	12 30
40	0 5.9	0 6.0	0 6.2	0 6.3	0 6.4	0 6.5	0 6.6	0 6.7	0 6.8	20
50	0 3.0	0 3.0	0 3.1	0 3.1	0 3.2	0 3.2	0 3.3	0 3.4	0 3.4	10
12 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12 0

Lat. H. A.	32°	34°	36°	38°	40°	42°	44°	46°	48°	Lat. H. A.
h m	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24 0
10	0 3.5	0 3.6	0 3.7	0 3.8	0 3.9	0 4.0	0 4.2	0 4.3	0 4.5	23 50
20	0 7.0	0 7.2	0 7.4	0 7.6	0 7.8	0 8.0	0 8.3	0 8.6	0 9.0	40
0 30	0 10.5	0 10.7	0 11.0	0 11.3	0 11.7	0 12.1	0 12.5	0 12.9	0 13.4	23 30
40	0 13.9	0 14.3	0 14.7	0 15.1	0 15.5	0 16.0	0 16.6	0 17.2	0 17.8	20
50	0 17.4	0 17.8	0 18.3	0 18.8	0 19.3	0 20.0	0 20.7	0 21.4	0 22.2	10
1 0	0 20.8	0 21.3	0 21.8	0 22.4	0 23.1	0 23.9	0 24.7	0 25.6	0 26.6	23 0
10	0 24.2	0 24.7	0 25.3	0 26.0	0 26.8	0 27.7	0 28.7	0 29.7	0 30.9	22 50
20	0 27.5	0 28.1	0 28.8	0 29.6	0 30.5	0 31.5	0 32.6	0 33.8	0 35.1	40
1 30	0 30.7	0 31.4	0 32.2	0 33.1	0 34.1	0 35.2	0 36.4	0 37.8	0 39.3	22 30
40	0 33.9	0 34.7	0 35.6	0 36.6	0 37.7	0 38.9	0 40.2	0 41.7	0 43.4	20
50	0 37.0	0 37.9	0 38.9	0 40.0	0 41.2	0 42.5	0 44.0	0 45.6	0 47.4	10
2 0	0 40.1	0 41.1	0 42.1	0 43.3	0 44.6	0 46.0	0 47.6	0 49.4	0 51.3	22 0
10	0 43.1	0 44.1	0 45.2	0 46.5	0 47.9	0 49.4	0 51.1	0 53.0	0 55.1	21 50
20	0 46.0	0 47.1	0 48.3	0 49.6	0 51.1	0 52.7	0 54.5	0 56.5	0 58.8	40
2 30	0 48.8	0 50.0	0 51.2	0 52.6	0 54.2	0 55.9	0 57.8	1 0.0	1 2.3	21 30
40	0 51.5	0 52.7	0 54.1	0 55.6	0 57.2	0 59.0	1 1.0	1 3.3	1 5.8	20
50	0 54.1	0 55.4	0 56.8	0 58.4	1 0.1	1 2.0	1 4.1	1 6.5	1 9.1	10
3 0	0 56.6	0 58.0	0 59.4	1 1.1	1 2.9	1 4.9	1 7.1	1 9.6	1 12.3	21 0
10	0 59.0	1 0.4	1 1.9	1 3.6	1 5.5	1 7.6	1 9.9	1 12.5	1 15.3	20 50
20	1 1.3	1 2.7	1 4.3	1 6.1	1 8.0	1 10.2	1 12.6	1 15.2	1 18.2	40
3 30	1 3.5	1 4.9	1 6.6	1 8.4	1 10.4	1 12.7	1 15.1	1 17.8	1 20.9	20 30
40	1 5.5	1 7.0	1 8.7	1 10.6	1 12.7	1 15.0	1 17.5	1 20.3	1 23.5	20
50	1 7.4	1 9.0	1 10.7	1 12.7	1 14.8	1 17.2	1 19.7	1 22.6	1 25.9	10
4 0	1 9.2	1 10.8	1 12.6	1 14.6	1 16.8	1 19.2	1 21.8	1 24.8	1 28.1	20 0
10	1 10.8	1 12.5	1 14.3	1 16.3	1 18.6	1 21.0	1 23.7	1 26.8	1 30.2	19 50
20	1 12.3	1 14.0	1 15.9	1 17.9	1 20.2	1 22.7	1 25.5	1 28.6	1 32.0	40
4 30	1 13.7	1 15.4	1 17.3	1 19.4	1 21.7	1 24.3	1 27.1	1 30.3	1 33.7	19 30
40	1 14.9	1 16.7	1 18.6	1 20.7	1 23.1	1 25.7	1 28.5	1 31.7	1 35.3	20
50	1 16.0	1 17.8	1 19.7	1 21.9	1 24.3	1 26.9	1 29.7	1 33.0	1 36.8	10
5 0	1 16.9	1 18.7	1 20.7	1 22.9	1 25.3	1 27.9	1 30.8	1 34.1	1 37.7	19 0

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1910.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

Lat. H. A.	32°	34°	36°	38°	40°	42°	44°	46°	48°	Lat. H. A.
h m	° '	° '	° '	° '	° '	° '	° '	° '	° '	h m
5 0	1 16.9	1 18.7	1 20.7	1 22.9	1 25.3	1 27.9	1 30.8	1 34.1	1 37.7	19 0
10	1 17.7	1 19.5	1 21.5	1 23.7	1 26.1	1 28.8	1 31.8	1 35.0	1 38.7	18 50
20	1 18.3	1 20.2	1 22.2	1 24.4	1 26.8	1 29.5	1 32.5	1 35.8	1 39.5	40
5 30	1 18.8	1 20.7	1 22.7	1 24.9	1 27.3	1 30.0	1 33.0	1 36.4	1 40.0	18 30
40	1 19.2	1 21.0	1 23.0	1 25.2	1 27.7	1 30.4	1 33.4	1 36.7	1 40.4	20
50	1 19.4	1 21.2	1 23.2	1 25.4	1 27.9	1 30.6	1 33.6	1 36.9	1 40.6	10
6 0	1 19.4	1 21.2	1 23.2	1 25.4	1 27.9	1 30.6	1 33.6	1 36.9	1 40.6	18 0
10	1 19.3	1 21.1	1 23.1	1 25.3	1 27.7	1 30.4	1 33.4	1 36.7	1 40.4	17 50
20	1 19.0	1 20.8	1 22.8	1 25.0	1 27.4	1 30.1	1 33.1	1 36.4	1 40.1	40
6 30	1 18.6	1 20.4	1 22.4	1 24.5	1 27.0	1 29.6	1 32.6	1 35.8	1 39.5	17 30
40	1 18.0	1 19.8	1 21.8	1 23.9	1 26.4	1 28.9	1 31.9	1 35.1	1 38.7	20
50	1 17.3	1 19.1	1 21.0	1 23.1	1 25.5	1 28.1	1 31.0	1 34.2	1 37.7	10
7 0	1 16.4	1 18.2	1 20.1	1 22.2	1 24.5	1 27.1	1 30.0	1 33.1	1 36.6	17 0
10	1 15.4	1 17.2	1 19.0	1 21.1	1 23.4	1 25.9	1 28.8	1 31.9	1 35.3	16 50
20	1 14.3	1 16.0	1 17.8	1 19.9	1 22.1	1 24.6	1 27.4	1 30.4	1 33.9	40
7 30	1 13.0	1 14.7	1 16.5	1 18.5	1 20.7	1 23.1	1 25.9	1 28.8	1 32.2	16 30
40	1 11.6	1 13.2	1 15.0	1 16.9	1 19.1	1 21.5	1 24.2	1 27.1	1 30.4	20
50	1 10.0	1 11.6	1 13.3	1 15.2	1 17.3	1 19.7	1 22.3	1 25.2	1 28.4	10
8 0	1 8.3	1 9.9	1 11.6	1 13.4	1 15.5	1 17.8	1 20.3	1 23.1	1 26.2	16 0
10	1 6.5	1 8.0	1 9.7	1 11.5	1 13.5	1 15.7	1 18.1	1 20.9	1 23.9	15 50
20	1 4.6	1 6.0	1 7.6	1 9.4	1 11.3	1 13.5	1 15.8	1 18.5	1 21.4	40
8 30	1 2.5	1 3.9	1 5.5	1 7.2	1 9.0	1 11.1	1 13.4	1 16.0	1 18.8	15 30
40	1 0.3	1 1.7	1 3.2	1 4.8	1 6.6	1 8.6	1 10.8	1 13.3	1 16.0	20
50	0 58.0	0 59.3	1 0.8	1 2.4	1 4.1	1 6.0	1 8.1	1 10.5	1 13.1	10
9 0	0 55.7	0 56.9	0 58.3	0 59.8	1 1.5	1 3.3	1 5.3	1 7.6	1 10.1	15 0
10	0 53.2	0 54.3	0 55.6	0 57.1	0 58.7	1 0.4	1 2.3	1 4.5	1 6.9	14 50
20	0 50.6	0 51.7	0 52.9	0 54.3	0 55.8	0 57.4	0 59.3	1 1.3	1 3.6	40
9 30	0 47.9	0 48.9	0 50.1	0 51.4	0 52.8	0 54.4	0 56.2	0 58.1	1 0.2	14 30
40	0 45.1	0 46.1	0 47.2	0 48.4	0 49.7	0 51.2	0 52.9	0 54.7	0 56.7	20
50	0 42.2	0 43.2	0 44.2	0 45.3	0 46.6	0 48.0	0 49.5	0 51.2	0 53.1	10
10 0	0 39.3	0 40.1	0 41.1	0 42.2	0 43.3	0 44.6	0 46.0	0 47.6	0 49.4	14 0
10	0 36.3	0 37.0	0 37.9	0 38.9	0 40.0	0 41.2	0 42.5	0 44.0	0 45.6	13 50
20	0 33.2	0 33.9	0 34.7	0 35.6	0 36.6	0 37.7	0 38.9	0 40.2	0 41.7	40
10 30	0 30.0	0 30.7	0 31.4	0 32.2	0 33.1	0 34.1	0 35.2	0 36.4	0 37.7	13 30
40	0 26.8	0 27.4	0 28.1	0 28.8	0 29.6	0 30.5	0 31.4	0 32.5	0 33.7	20
50	0 23.6	0 24.1	0 24.7	0 25.3	0 26.0	0 26.8	0 27.6	0 28.6	0 29.6	10
11 0	0 20.3	0 20.8	0 21.2	0 21.8	0 22.4	0 23.1	0 23.8	0 24.6	0 25.5	13 0
10	0 17.0	0 17.4	0 17.8	0 18.2	0 18.7	0 19.3	0 19.9	0 20.6	0 21.3	12 50
20	0 13.6	0 13.9	0 14.3	0 14.6	0 15.0	0 15.5	0 16.0	0 16.5	0 17.1	40
11 30	0 10.2	0 10.5	0 10.7	0 11.0	0 11.3	0 11.6	0 12.0	0 12.4	0 12.9	12 30
40	0 6.8	0 7.0	0 7.1	0 7.3	0 7.5	0 7.8	0 8.0	0 8.3	0 8.6	20
50	0 3.4	0 3.5	0 3.6	0 3.7	0 3.8	0 3.9	0 4.0	0 4.2	0 4.3	10
12 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12 0

Lat. H. A.	48°	50°	52°	54°	56°	58°	60°	61°	62°	Lat. H. A.
h m	° '	° '	° '	° '	° '	° '	° '	° '	° '	h m
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24 0
10	0 4.5	0 4.7	0 4.9	0 5.1	0 5.4	0 5.7	0 6.1	0 6.3	0 6.5	23 50
20	0 9.0	0 9.4	0 9.8	0 10.3	0 10.8	0 11.4	0 12.1	0 12.5	0 13.0	40
0 30	0 13.4	0 14.0	0 14.7	0 15.4	0 16.2	0 17.1	0 18.2	0 18.8	0 19.4	23 30
40	0 17.8	0 18.6	0 19.5	0 20.5	0 21.5	0 22.8	0 24.2	0 25.0	0 25.8	20
50	0 22.2	0 23.2	0 24.3	0 25.5	0 26.8	0 28.4	0 30.1	0 31.1	0 32.2	10
1 0	0 26.6	0 27.7	0 29.0	0 30.4	0 32.1	0 33.9	0 36.0	0 37.2	0 38.5	23 0

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1919.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

Lat. H. A.	48°	50°	52°	54°	56°	58°	60°	61°	62°	Lat. H. A.
h m	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m
10 0	0 49.4	0 51.3	0 53.5	0 56.0	0 58.7	1 1.9	1 5.4	1 7.4	1 9.5	14 0
10 10	0 45.6	0 47.4	0 49.4	0 51.6	0 54.2	0 57.1	1 0.4	1 2.2	1 4.1	13 50
10 20	0 41.7	0 43.3	0 45.2	0 47.2	0 49.6	0 52.2	0 55.2	0 56.9	0 58.7	40
10 30	0 37.7	0 39.2	0 40.9	0 42.8	0 44.9	0 47.3	0 50.0	0 51.5	0 53.1	13 30
10 40	0 33.7	0 35.1	0 36.5	0 38.2	0 40.1	0 42.2	0 44.6	0 46.0	0 47.4	20
10 50	0 29.6	0 30.8	0 32.1	0 33.6	0 35.2	0 37.1	0 39.2	0 40.4	0 41.7	10
11 0	0 25.5	0 26.5	0 27.6	0 28.9	0 30.3	0 31.9	0 33.8	0 34.8	0 35.9	13 0
11 10	0 21.3	0 22.2	0 23.1	0 24.2	0 25.3	0 26.7	0 28.2	0 29.1	0 30.0	12 50
11 20	0 17.1	0 17.8	0 18.5	0 19.4	0 20.3	0 21.4	0 22.6	0 23.3	0 24.0	40
11 30	0 12.9	0 13.4	0 13.9	0 14.6	0 15.3	0 16.1	0 17.0	0 17.5	0 18.1	12 30
11 40	0 8.6	0 8.9	0 9.3	0 9.7	0 10.2	0 10.7	0 11.4	0 11.7	0 12.1	20
11 50	0 4.3	0 4.5	0 4.7	0 4.9	0 5.1	0 5.4	0 5.7	0 5.9	0 6.0	10
12 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12 0
Lat. H. A.	62°	63°	64°	65°	66°	67°	68°	69°	70°	Lat. H. A.
h m	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24 0
0 10	0 6.5	0 6.7	0 7.0	0 7.3	0 7.6	0 7.9	0 8.2	0 8.6	0 9.1	23 50
0 20	0 13.0	0 13.4	0 13.9	0 14.5	0 15.1	0 15.7	0 16.5	0 17.2	0 18.1	40
0 30	0 19.4	0 20.1	0 20.9	0 21.7	0 22.6	0 23.6	0 24.6	0 25.8	0 27.1	23 30
0 40	0 25.8	0 26.8	0 27.8	0 28.8	0 30.0	0 31.4	0 32.8	0 34.3	0 36.1	20
0 50	0 32.2	0 33.4	0 34.6	0 35.9	0 37.4	0 39.1	0 40.8	0 42.8	0 45.0	10
1 0	0 38.5	0 39.9	0 41.4	0 43.0	0 44.8	0 46.7	0 48.8	0 51.2	0 53.7	23 0
1 10	0 44.7	0 46.3	0 48.0	0 49.9	0 52.0	0 54.2	0 56.7	0 59.4	1 2.4	22 50
1 20	0 50.8	0 52.6	0 54.6	0 56.7	0 59.0	1 1.6	1 4.4	1 7.5	1 10.9	40
1 30	0 56.8	0 58.8	1 1.1	1 3.4	1 6.0	1 8.9	1 12.0	1 15.5	1 19.3	22 30
1 40	1 2.7	1 4.9	1 7.4	1 10.0	1 12.9	1 16.0	1 19.4	1 23.2	1 27.5	20
1 50	1 8.5	1 10.9	1 13.6	1 16.4	1 19.5	1 23.0	1 26.7	1 30.8	1 35.4	10
2 0	1 14.1	1 16.7	1 19.6	1 22.7	1 26.0	1 29.7	1 33.8	1 38.3	1 43.2	22 0
2 10	1 19.5	1 22.3	1 25.4	1 28.8	1 32.4	1 36.3	1 40.7	1 45.5	1 50.8	21 50
2 20	1 24.8	1 27.8	1 31.1	1 34.6	1 38.5	1 42.7	1 47.3	1 52.4	1 58.1	40
2 30	1 29.9	1 33.1	1 36.6	1 40.3	1 44.4	1 48.9	1 53.8	1 59.1	2 5.1	21 30
2 40	1 34.8	1 38.2	1 41.9	1 45.8	1 50.1	1 54.8	2 0.0	2 5.6	2 11.9	20
2 50	1 39.6	1 43.1	1 46.9	1 51.1	1 55.6	2 0.5	2 5.9	2 11.9	2 18.4	10
3 0	1 44.1	1 47.8	1 51.8	1 56.1	2 0.8	2 5.9	2 11.6	2 17.8	2 24.6	21 0
3 10	1 48.4	1 52.3	1 56.4	2 0.9	2 5.8	2 11.1	2 17.0	2 23.4	2 30.5	20 50
3 20	1 52.5	1 56.5	2 0.8	2 5.4	2 10.5	2 16.0	2 22.1	2 28.7	2 36.1	40
3 30	1 56.4	2 0.5	2 4.9	2 9.7	2 14.9	2 20.6	2 26.9	2 33.8	2 41.4	20 30
3 40	2 0.0	2 4.2	2 8.8	2 13.7	2 19.0	2 24.9	2 31.4	2 38.5	2 46.3	20
3 50	2 3.4	2 7.7	2 12.4	2 17.4	2 22.9	2 29.0	2 35.6	2 42.8	2 50.9	10
4 0	2 6.5	2 10.9	2 15.7	2 20.9	2 26.5	2 32.7	2 39.4	2 46.9	2 55.1	20 0
4 10	2 9.4	2 13.9	2 18.8	2 24.1	2 29.8	2 36.1	2 43.0	2 50.6	2 58.9	19 50
4 20	2 12.0	2 16.6	2 21.6	2 26.9	2 32.8	2 39.2	2 46.2	2 53.9	3 2.4	40
4 30	2 14.4	2 19.0	2 24.1	2 29.5	2 35.5	2 42.0	2 49.1	2 56.9	3 5.6	19 30
4 40	2 16.5	2 21.2	2 26.3	2 31.8	2 37.8	2 44.4	2 51.6	2 59.6	3 8.3	20
4 50	2 18.3	2 23.0	2 28.2	2 33.8	2 39.9	2 46.6	2 53.8	3 1.8	3 10.7	10
5 0	2 19.8	2 24.6	2 29.8	2 35.5	2 41.7	2 48.4	2 55.7	3 3.8	3 12.7	19 0
5 10	2 21.1	2 25.9	2 31.2	2 36.9	2 43.1	2 49.8	2 57.2	3 5.3	3 14.3	18 50
5 20	2 22.1	2 27.0	2 32.3	2 38.0	2 44.2	2 51.0	2 58.4	3 6.5	3 15.5	40
5 30	2 22.8	2 27.7	2 33.0	2 38.8	2 45.0	2 51.8	2 59.2	3 7.4	3 16.4	18 30
5 40	2 23.3	2 28.2	2 33.5	2 39.2	2 45.5	2 52.2	2 59.7	3 7.9	3 16.9	20
5 50	2 23.5	2 28.4	2 33.6	2 39.4	2 45.6	2 52.4	2 59.8	3 8.0	3 17.0	10
6 0	2 23.4	2 28.2	2 33.5	2 39.2	2 45.4	2 52.2	2 59.6	3 7.7	3 16.7	18 40

TABLE IV.

695

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1919.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

Lat. H. A.	62°	63°	64°	65°	66°	67°	68°	69°	70°	Lat. H. A.
h m	° '	° '	° '	° '	° '	° '	° '	° '	° '	h m
6 0	2 23.4	2 28.2	2 33.5	2 39.2	2 45.4	2 52.2	2 59.6	3 7.7	3 16.7	18 0
10	2 23.0	2 27.8	2 33.1	2 38.8	2 45.0	2 51.7	2 59.1	3 7.1	3 16.0	17 50
20	2 22.3	2 27.2	2 32.4	2 38.0	2 44.2	2 50.9	2 58.2	3 6.2	3 15.0	40
6 30	2 21.4	2 26.2	2 31.4	2 37.0	2 43.1	2 49.7	2 56.9	3 4.9	3 13.6	17 30
40	2 20.3	2 25.0	2 30.1	2 35.7	2 41.7	2 48.2	2 55.4	3 3.3	3 11.9	20
50	2 18.9	2 23.5	2 28.6	2 34.1	2 40.0	2 46.5	2 53.5	3 1.3	3 9.8	10
7 0	2 17.2	2 21.8	2 26.7	2 32.2	2 38.0	2 44.4	2 51.3	2 59.0	3 7.4	17 0
10	2 15.2	2 19.8	2 24.7	2 30.0	2 35.7	2 42.0	2 48.8	2 56.3	3 4.6	16 50
20	2 13.0	2 17.5	2 22.3	2 27.5	2 33.2	2 39.3	2 46.0	2 53.4	3 1.5	40
7 30	2 10.6	2 15.0	2 19.7	2 24.8	2 30.3	2 36.3	2 42.9	2 50.1	2 58.1	16 30
40	2 7.9	2 12.2	2 16.8	2 21.8	2 27.2	2 33.1	2 39.5	2 46.6	2 54.3	20
50	2 5.0	2 9.2	2 13.7	2 18.6	2 23.8	2 29.6	2 35.9	2 42.7	2 50.3	10
8 0	2 1.9	2 6.0	2 10.4	2 15.1	2 20.2	2 25.8	2 31.9	2 38.6	2 45.9	16 0
10	1 58.6	2 2.5	2 6.8	2 11.4	2 16.3	2 21.8	2 27.7	2 34.2	2 41.3	15 50
20	1 55.0	1 58.8	2 3.0	2 7.4	2 12.2	2 17.5	2 23.2	2 29.4	2 36.4	40
8 30	1 51.3	1 55.0	1 58.9	2 3.2	2 7.9	2 12.9	2 18.5	2 24.5	2 31.2	15 30
40	1 47.3	1 50.9	1 54.7	1 58.8	2 3.3	2 8.2	2 13.5	2 19.3	2 25.7	20
50	1 43.2	1 46.6	1 50.2	1 54.2	1 58.5	2 3.2	2 8.3	2 13.9	2 20.0	10
9 0	1 38.8	1 42.1	1 45.6	1 49.4	1 53.5	1 58.0	2 2.9	2 8.2	2 14.1	15 0
10	1 34.3	1 37.4	1 40.8	1 44.4	1 48.3	1 52.6	1 57.2	2 2.3	2 7.9	14 50
20	1 29.6	1 32.6	1 35.8	1 39.2	1 42.9	1 47.0	1 51.4	1 56.2	2 1.5	40
9 30	1 24.8	1 27.6	1 30.6	1 33.9	1 37.4	1 41.2	1 45.4	1 49.9	1 54.9	14 30
40	1 19.8	1 22.5	1 25.3	1 28.4	1 31.7	1 35.2	1 39.2	1 43.4	1 48.1	20
50	1 14.7	1 17.2	1 19.8	1 22.7	1 25.8	1 29.1	1 32.8	1 36.8	1 41.2	10
10 0	1 9.5	1 11.8	1 14.2	1 16.9	1 19.7	1 22.8	1 26.2	1 30.0	1 34.1	14 0
10	1 4.1	1 6.2	1 8.5	1 10.9	1 13.6	1 16.4	1 19.6	1 23.0	1 26.8	13 50
20	0 58.7	1 0.6	1 2.6	1 4.9	1 7.3	1 9.9	1 12.8	1 15.9	1 19.4	40
10 30	0 53.1	0 54.8	0 56.7	0 58.7	1 0.9	1 3.3	1 5.8	1 8.7	1 11.8	13 30
40	0 47.4	0 49.0	0 50.6	0 52.4	0 54.4	0 56.5	0 58.8	1 1.3	1 4.1	20
50	0 41.7	0 43.0	0 44.5	0 46.1	0 47.8	0 49.6	0 51.7	0 53.9	0 56.3	10
11 0	0 35.9	0 37.0	0 38.3	0 39.6	0 41.1	0 42.7	0 44.4	0 46.3	0 48.4	13 0
10	0 30.0	0 30.9	0 32.0	0 33.1	0 34.4	0 35.7	0 37.1	0 38.7	0 40.5	12 50
20	0 24.0	0 24.8	0 25.7	0 26.6	0 27.6	0 28.6	0 29.8	0 31.1	0 32.5	40
11 30	0 18.1	0 18.7	0 19.3	0 20.0	0 20.7	0 21.5	0 22.4	0 23.4	0 24.4	12 30
40	0 12.1	0 12.5	0 12.9	0 13.3	0 13.8	0 14.4	0 15.0	0 15.6	0 16.3	20
50	0 6.0	0 6.2	0 6.4	0 6.7	0 6.9	0 7.2	0 7.5	0 7.8	0 8.2	10
12 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12 0

TABLE IVa.

Table IV has been computed for a declination of 88° 52' 40". For other declinations of Polaris the corrections given below should be applied to the Azimuth taken from Table IV.

Azimuth. Decl.	0'	20'	40'	60'	80'	100'	120'	140'	160'	180'	200'	Azimuth. Decl.
° ' "	'	'	'	'	'	'	'	'	'	'	'	° ' "
88 52 15	0.0	+0.1	+0.2	+0.4	+0.5	+0.6	+0.7	+0.9	+1.0	+1.1	+1.2	88 52 15
88 52 20	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	88 52 20
88 52 25	0.0	+0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7	88 52 25
88 52 30	0.0	0.0	+0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	88 52 30
88 52 35	0.0	0.0	0.0	+0.1	+0.1	+0.1	+0.1	+0.2	+0.2	+0.2	+0.2	88 52 35
88 52 40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88 52 40
88 52 45	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	88 52 45
88 52 50	0.0	0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.5	88 52 50
88 52 55	0.0	-0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7	88 52 55
88 53 0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	88 53 0
88 53 5	0.0	-0.1	-0.2	-0.4	-0.5	-0.6	-0.7	-0.9	-1.0	-1.1	-1.2	88 53 5

AZIMUTH OF POLARIS AT ELONGATION, 1919.

Decl. Lat.	88° 52' 10"			88° 52' 20"			88° 52' 30"			88° 52' 40"			88° 52' 50"			88° 53' 0"			Variation for—	
																			1" of Lat.	1" of t.
10 0	1	8	52.8	1	8	42.6	1	8	32.5	1	8	22.3	1	8	12.2	1	8	2.1	+0.21	-1.01
10 20	1	8	57.1	1	8	46.9	1	8	36.8	1	8	26.6	1	8	16.4	1	8	6.3	0.22	1.02
10 40	1	9	1.6	1	8	51.4	1	8	41.2	1	8	31.0	1	8	20.9	1	8	10.7	0.23	1.02
11 0	1	9	6.2	1	8	56.0	1	8	45.8	1	8	35.6	1	8	25.4	1	8	15.3	0.23	1.02
11 20	1	9	11.0	1	9	0.8	1	8	50.6	1	8	40.4	1	8	30.2	1	8	20.0	0.24	1.02
11 40	1	9	15.9	1	9	5.7	1	8	55.5	1	8	45.2	1	8	35.0	1	8	24.8	+0.25	-1.02
12 0	1	9	20.9	1	9	10.7	1	9	0.5	1	8	50.3	1	8	40.0	1	8	29.8	0.26	1.02
12 20	1	9	26.2	1	9	15.9	1	9	5.7	1	8	55.5	1	8	45.2	1	8	35.0	0.26	1.02
12 40	1	9	31.5	1	9	21.3	1	9	11.0	1	9	0.8	1	8	50.5	1	8	40.3	0.27	1.02
13 0	1	9	37.1	1	9	26.8	1	9	16.5	1	9	6.3	1	8	56.0	1	8	45.8	0.28	1.03
13 20	1	9	42.8	1	9	32.5	1	9	22.2	1	9	11.9	1	9	1.6	1	8	51.4	+0.29	-1.03
13 40	1	9	48.6	1	9	38.3	1	9	28.0	1	9	17.7	1	9	7.4	1	8	57.2	0.30	1.03
14 0	1	9	54.6	1	9	44.3	1	9	34.0	1	9	23.7	1	9	13.4	1	9	3.1	0.30	1.03
14 20	1	10	0.8	1	9	50.5	1	9	40.1	1	9	29.8	1	9	19.5	1	9	9.2	0.31	1.03
14 40	1	10	7.1	1	9	56.8	1	9	46.4	1	9	36.1	1	9	25.8	1	9	15.4	0.32	1.03
15 0	1	10	13.6	1	10	3.2	1	9	52.9	1	9	42.5	1	9	32.2	1	9	21.8	+0.33	-1.04
15 20	1	10	20.2	1	10	9.9	1	9	59.5	1	9	49.1	1	9	38.8	1	9	28.4	0.34	1.04
15 40	1	10	27.1	1	10	16.7	1	10	6.3	1	9	55.9	1	9	45.5	1	9	35.1	0.34	1.04
16 0	1	10	34.0	1	10	23.6	1	10	13.2	1	10	2.8	1	9	52.4	1	9	42.0	0.35	1.04
16 20	1	10	41.2	1	10	30.8	1	10	20.3	1	10	9.9	1	9	59.5	1	9	49.1	0.36	1.04
16 40	1	10	48.5	1	10	38.1	1	10	27.6	1	10	17.2	1	10	6.8	1	9	56.3	+0.37	-1.04
17 0	1	10	56.0	1	10	45.5	1	10	35.1	1	10	24.6	1	10	14.2	1	10	3.7	0.38	1.05
17 20	1	11	3.6	1	10	53.2	1	10	42.7	1	10	32.2	1	10	21.7	1	10	11.3	0.39	1.05
17 40	1	11	11.5	1	11	1.0	1	10	50.5	1	10	40.0	1	10	29.5	1	10	19.0	0.39	1.05
18 0	1	11	19.5	1	11	9.0	1	10	58.5	1	10	47.9	1	10	37.4	1	10	26.9	0.40	1.05
18 20	1	11	27.7	1	11	17.1	1	11	6.6	1	10	56.1	1	10	45.5	1	10	35.0	+0.41	-1.05
18 40	1	11	36.0	1	11	25.5	1	11	14.9	1	11	4.4	1	10	53.8	1	10	43.2	0.42	1.06
19 0	1	11	44.5	1	11	34.0	1	11	23.4	1	11	12.8	1	11	2.2	1	10	51.7	0.43	1.06
19 20	1	11	53.3	1	11	42.7	1	11	32.1	1	11	21.5	1	11	10.9	1	11	0.3	0.44	1.06
19 40	1	12	2.2	1	11	51.5	1	11	40.9	1	11	30.3	1	11	19.7	1	11	9.1	0.45	1.06
20 0	1	12	11.2	1	12	0.6	1	11	50.0	1	11	39.3	1	11	28.7	1	11	18.0	+0.46	-1.06
20 20	1	12	20.5	1	12	9.8	1	11	59.2	1	11	48.5	1	11	37.8	1	11	27.2	0.47	1.07
20 40	1	12	30.0	1	12	19.3	1	12	8.6	1	11	57.9	1	11	47.2	1	11	36.5	0.48	1.07
21 0	1	12	39.6	1	12	28.9	1	12	18.2	1	12	7.5	1	11	56.8	1	11	46.0	0.48	1.07
21 20	1	12	49.4	1	12	38.7	1	12	28.0	1	12	17.2	1	12	6.5	1	11	55.8	0.49	1.07
21 40	1	12	59.5	1	12	48.7	1	12	37.9	1	12	27.2	1	12	16.4	1	12	5.7	+0.50	-1.08
22 0	1	13	9.7	1	12	58.9	1	12	48.1	1	12	37.3	1	12	26.5	1	12	15.8	0.51	1.08
22 20	1	13	20.1	1	13	9.3	1	12	58.5	1	12	47.7	1	12	36.9	1	12	26.0	0.52	1.08
22 40	1	13	30.7	1	13	19.9	1	13	9.0	1	12	58.2	1	12	47.4	1	12	36.5	0.53	1.08
23 0	1	13	41.5	1	13	30.7	1	13	19.8	1	13	8.9	1	12	58.1	1	12	47.2	0.54	1.09
23 20	1	13	52.6	1	13	41.7	1	13	30.8	1	13	19.9	1	13	9.0	1	12	58.1	+0.55	-1.09
23 40	1	14	3.8	1	13	52.9	1	13	42.0	1	13	31.0	1	13	20.1	1	13	9.2	0.56	1.09
24 0	1	14	15.2	1	14	4.3	1	13	53.3	1	13	42.4	1	13	31.4	1	13	20.5	0.57	1.09
24 20	1	14	26.9	1	14	15.9	1	14	4.9	1	13	53.9	1	13	43.0	1	13	32.0	0.58	1.10
24 40	1	14	38.7	1	14	27.7	1	14	16.7	1	14	5.7	1	13	54.7	1	13	43.7	0.60	1.10
25 0	1	14	50.8	1	14	39.8	1	14	28.7	1	14	17.7	1	14	6.7	1	13	55.6	+0.61	-1.10
25 20	1	15	3.1	1	14	52.0	1	14	41.0	1	14	29.9	1	14	18.8	1	14	7.8	0.62	1.11
25 40	1	15	15.6	1	15	4.5	1	14	53.4	1	14	42.3	1	14	31.2	1	14	20.1	0.63	1.11
26 0	1	15	28.4	1	15	17.2	1	15	6.1	1	14	55.0	1	14	43.8	1	14	32.7	0.64	1.11
26 20	1	15	41.3	1	15	30.2	1	15	19.0	1	15	7.8	1	14	56.7	1	14	45.5	0.65	1.12
26 40	1	15	54.5	1	15	43.3	1	15	32.1	1	15	20.9	1	15	9.8	1	14	58.6	+0.66	-1.12
27 0	1	16	7.9	1	15	56.7	1	15	45.5	1	15	34.3	1	15	23.1	1	15	11.8	0.67	1.12
27 20	1	16	21.6	1	16	10.3	1	15	59.1	1	15	47.8	1	15	36.6	1	15	25.3	0.68	1.13
27 40	1	16	35.5	1	16	24.2	1	16	12.9	1	16	1.6	1	15	50.3	1	15	39.0	0.70	1.13
28 0	1	16	49.6	1	16	38.3	1	16	27.0	1	16	15.7	1	16	4.3	1	15	53.0	0.71	1.13
28 20	1	17	4.0	1	16	52.7	1	16	41.3	1	16	29.9	1	16	18.6	1	16	7.2	+0.72	-1.14
28 40	1	17	18.7	1	17	7.3	1	16	55.9	1	16	44.5	1	16	33.1	1	16	21.7	0.73	1.14
29 0	1	17	33.5	1	17	22.1	1	17	10.7	1	16	59.2	1	16	47.8	1	16	36.4	0.74	1.14
29 20	1	17	48.7	1	17	37.2	1	17	25.7	1	17	14.3	1	17	2.8	1	16	51.3	0.76	1.15
29 40	1	18	4.1	1	17	52.6	1	17	41.0	1	17	29.5	1	17	18.0	1	17	6.5	0.77	1.15
30 0	1	18	19.7	1	18	8.2	1	17	56.6	1	17	45.1	1	17	33.5	1	17	22.0	+0.79	-1.15

TABLE V.

697

AZIMUTH OF POLARIS AT ELONGATION, 1919.

Decl. Lat.	88° 52' 10"	88° 52' 20"	88° 52' 30"	88° 52' 40"	88° 52' 50"	88° 53' 0"	Variation for—	
							1' of Lat.	1" of s.
• /	• / "	• / "	• / "	• / "	• / "	• / "	"	"
30 0	1 18 19.7	1 18 8.2	1 17 56.6	1 17 45.1	1 17 33.5	1 17 22.0	+0.79	-1.15
30 10	1 18 27.7	1 18 16.1	1 18 4.5	1 17 53.0	1 17 41.4	1 17 29.8	0.80	1.16
30 20	1 18 35.7	1 18 24.1	1 18 12.5	1 18 0.9	1 17 49.3	1 17 37.7	0.80	1.16
30 30	1 18 43.7	1 18 32.1	1 18 20.5	1 18 8.9	1 17 57.3	1 17 45.7	0.81	1.16
30 40	1 18 51.8	1 18 40.2	1 18 28.6	1 18 17.0	1 18 5.3	1 17 53.7	0.81	1.16
30 50	1 19 0.0	1 18 48.4	1 18 36.8	1 18 25.1	1 18 13.5	1 18 1.8	+0.82	-1.16
31 0	1 19 8.3	1 18 56.6	1 18 45.0	1 18 33.3	1 18 21.6	1 18 10.0	0.83	1.17
31 10	1 19 16.6	1 19 4.9	1 18 53.3	1 18 41.6	1 18 29.9	1 18 18.2	0.83	1.17
31 20	1 19 25.0	1 19 13.3	1 19 1.6	1 18 49.9	1 18 38.2	1 18 26.5	0.84	1.17
31 30	1 19 33.5	1 19 21.8	1 19 10.1	1 18 58.3	1 18 46.6	1 18 34.9	0.85	1.17
31 40	1 19 42.1	1 19 30.3	1 19 18.6	1 19 6.8	1 18 55.1	1 18 43.3	+0.86	-1.18
31 50	1 19 50.7	1 19 38.9	1 19 27.2	1 19 15.4	1 19 3.6	1 18 51.8	0.86	1.18
32 0	1 19 59.4	1 19 47.6	1 19 35.8	1 19 24.0	1 19 12.2	1 19 0.4	0.87	1.18
32 10	1 20 7.1	1 19 56.3	1 19 44.5	1 19 32.7	1 19 20.9	1 19 9.1	0.88	1.18
32 20	1 20 17.0	1 20 5.1	1 19 53.3	1 19 41.5	1 19 29.6	1 19 17.8	0.88	1.18
32 30	1 20 25.9	1 20 14.0	1 20 2.2	1 19 50.3	1 19 38.4	1 19 26.6	+0.89	-1.19
32 40	1 20 34.9	1 20 23.0	1 20 11.1	1 19 59.2	1 19 47.3	1 19 35.5	0.90	1.19
32 50	1 20 43.9	1 20 32.0	1 20 20.1	1 20 8.2	1 19 56.3	1 19 44.4	0.91	1.19
33 0	1 20 53.1	1 20 41.1	1 20 29.2	1 20 17.3	1 20 5.4	1 19 53.4	0.91	1.19
33 10	1 21 2.3	1 20 50.3	1 20 38.4	1 20 26.4	1 20 14.5	1 20 2.5	0.92	1.20
33 20	1 21 11.5	1 20 59.6	1 20 47.6	1 20 35.6	1 20 23.7	1 20 11.7	+0.93	-1.20
33 30	1 21 20.9	1 21 8.9	1 20 56.9	1 20 44.9	1 20 32.9	1 20 20.9	0.94	1.20
33 40	1 21 30.3	1 21 18.3	1 21 6.3	1 20 54.3	1 20 42.3	1 20 30.3	0.94	1.20
33 50	1 21 39.9	1 21 27.8	1 21 15.8	1 21 3.7	1 20 51.7	1 20 39.7	0.95	1.20
34 0	1 21 49.5	1 21 37.4	1 21 25.3	1 21 13.3	1 21 1.2	1 20 49.1	0.96	1.21
34 10	1 21 59.1	1 21 47.0	1 21 34.9	1 21 22.9	1 21 10.8	1 20 58.7	+0.96	-1.21
34 20	1 22 8.9	1 21 56.8	1 21 44.6	1 21 32.5	1 21 20.4	1 21 8.3	0.97	1.21
34 30	1 22 18.7	1 22 6.6	1 21 54.4	1 21 42.3	1 21 30.2	1 21 18.0	0.98	1.21
34 40	1 22 28.6	1 22 16.5	1 22 4.3	1 21 52.2	1 21 40.0	1 21 27.8	0.99	1.22
34 50	1 22 38.6	1 22 26.5	1 22 14.3	1 22 2.1	1 21 49.9	1 21 37.7	1.00	1.22
35 0	1 22 48.7	1 22 36.5	1 22 24.3	1 22 12.1	1 21 59.9	1 21 47.7	+1.01	-1.22
35 10	1 22 58.9	1 22 46.6	1 22 34.4	1 22 22.2	1 22 9.9	1 21 57.7	1.01	1.22
35 20	1 23 9.1	1 22 56.9	1 22 44.6	1 22 32.3	1 22 20.1	1 22 7.8	1.02	1.23
35 30	1 23 19.5	1 23 7.2	1 22 54.9	1 22 42.6	1 22 30.3	1 22 18.0	1.03	1.23
35 40	1 23 29.9	1 23 17.6	1 23 5.3	1 22 52.9	1 22 40.6	1 22 28.3	1.04	1.23
35 50	1 23 40.4	1 23 28.0	1 23 15.7	1 23 3.4	1 22 51.0	1 22 38.7	+1.05	-1.23
36 0	1 23 51.0	1 23 38.6	1 23 26.2	1 23 13.9	1 23 1.5	1 22 49.2	1.06	1.24
36 10	1 24 1.6	1 23 49.3	1 23 36.9	1 23 24.5	1 23 12.1	1 22 59.7	1.07	1.24
36 20	1 24 12.4	1 24 0.0	1 23 47.6	1 23 35.2	1 23 22.8	1 23 10.3	1.07	1.24
36 30	1 24 23.3	1 24 10.8	1 23 58.4	1 23 45.9	1 23 33.5	1 23 21.1	1.08	1.24
36 40	1 24 34.2	1 24 21.7	1 24 9.3	1 23 56.8	1 23 44.3	1 23 31.9	+1.09	-1.25
36 50	1 24 45.2	1 24 32.7	1 24 20.2	1 24 7.8	1 23 55.3	1 23 42.8	1.10	1.25
37 0	1 24 56.4	1 24 43.9	1 24 31.3	1 24 18.8	1 24 6.3	1 23 53.8	1.11	1.25
37 10	1 25 7.6	1 24 55.1	1 24 42.5	1 24 29.9	1 24 17.4	1 24 4.8	1.12	1.26
37 20	1 25 18.9	1 25 6.3	1 24 53.8	1 24 41.2	1 24 28.6	1 24 16.0	1.13	1.26
37 30	1 25 30.3	1 25 17.7	1 25 5.1	1 24 52.5	1 24 39.9	1 24 27.3	+1.14	-1.26
37 40	1 25 41.8	1 25 29.2	1 25 16.5	1 25 3.9	1 24 51.3	1 24 38.6	1.15	1.26
37 50	1 25 53.4	1 25 40.8	1 25 28.1	1 25 15.4	1 25 2.8	1 24 50.1	1.16	1.27
38 0	1 26 5.1	1 25 52.4	1 25 39.7	1 25 27.0	1 25 14.3	1 25 1.6	1.17	1.27
38 10	1 26 16.9	1 26 4.2	1 25 51.5	1 25 38.7	1 25 26.0	1 25 13.3	1.18	1.27
38 20	1 26 28.8	1 26 16.0	1 26 3.3	1 25 50.5	1 25 37.8	1 25 25.0	+1.19	-1.28
38 30	1 26 40.8	1 26 28.0	1 26 15.2	1 26 2.4	1 25 49.7	1 25 36.9	1.20	1.28
38 40	1 26 52.9	1 26 40.0	1 26 27.2	1 26 14.4	1 26 1.6	1 25 48.8	1.21	1.28
38 50	1 27 5.0	1 26 52.2	1 26 39.4	1 26 26.5	1 26 13.7	1 26 0.9	1.22	1.28
39 0	1 27 17.3	1 27 4.5	1 26 51.6	1 26 38.7	1 26 25.9	1 26 13.0	1.23	1.29
39 10	1 27 29.7	1 27 16.8	1 27 3.9	1 26 51.0	1 26 38.1	1 26 25.2	+1.24	-1.29
39 20	1 27 42.2	1 27 29.3	1 27 16.4	1 27 3.4	1 26 50.5	1 26 37.6	1.25	1.29
39 30	1 27 54.8	1 27 41.9	1 27 28.9	1 27 15.9	1 27 3.0	1 26 50.0	1.26	1.30
39 40	1 28 7.5	1 27 54.5	1 27 41.5	1 27 28.5	1 27 15.5	1 27 2.6	1.27	1.30
39 50	1 28 20.3	1 28 7.3	1 27 54.3	1 27 41.3	1 27 28.2	1 27 15.2	1.28	1.30
40 0	1 28 33.2	1 28 20.2	1 28 7.1	1 27 54.1	1 27 41.0	1 27 28.0	+1.29	-1.31

AZIMUTH OF POLARIS AT ELONGATION, 1919.

Decl. Lat.	88° 52' 10"	88° 52' 20"	88° 52' 30"	88° 52' 40"	88° 52' 50"	88° 53' 0"	Variation for—	
							1' of Lat.	1" of Lat.
• ' "	• ' "	• ' "	• ' "	• ' "	• ' "	• ' "	"	"
40 0	1 28 33.2	1 28 20.2	1 28 7.1	1 27 54.1	1 27 41.0	1 27 28.0	+1.29	-1.31
40 10	1 28 46.3	1 28 33.2	1 28 20.1	1 28 7.0	1 27 53.9	1 27 40.8	1.30	1.31
40 20	1 28 59.4	1 28 46.3	1 28 33.2	1 28 20.0	1 28 6.9	1 27 53.8	1.31	1.31
40 30	1 29 12.7	1 28 59.5	1 28 46.4	1 28 33.2	1 28 20.0	1 28 6.9	1.32	1.32
40 40	1 29 26.0	1 29 12.8	1 28 59.6	1 28 46.5	1 28 33.3	1 28 20.1	1.33	1.32
40 50	1 29 39.5	1 29 26.3	1 29 13.0	1 28 59.8	1 28 46.6	1 28 33.4	+1.35	-1.32
41 0	1 29 53.1	1 29 39.8	1 29 26.6	1 29 13.3	1 29 0.1	1 28 46.8	1.36	1.33
41 10	1 30 6.8	1 29 53.5	1 29 40.2	1 29 26.9	1 29 13.6	1 29 0.3	1.37	1.33
41 20	1 30 20.6	1 30 7.3	1 29 53.9	1 29 40.6	1 29 27.3	1 29 14.0	1.38	1.33
41 30	1 30 34.5	1 30 21.2	1 30 7.8	1 29 54.4	1 29 41.1	1 29 27.7	1.39	1.34
41 40	1 30 48.6	1 30 35.2	1 30 21.8	1 30 8.4	1 29 55.0	1 29 41.6	+1.40	-1.34
41 50	1 31 2.7	1 30 49.3	1 30 35.9	1 30 22.5	1 30 9.0	1 29 55.6	1.41	1.34
42 0	1 31 17.0	1 31 3.6	1 30 50.1	1 30 36.6	1 30 23.2	1 30 9.7	1.42	1.35
42 10	1 31 31.4	1 31 17.9	1 31 4.4	1 30 50.9	1 30 37.4	1 30 24.0	1.44	1.35
42 20	1 31 46.0	1 31 32.4	1 31 18.9	1 31 5.4	1 30 51.8	1 30 38.3	1.45	1.35
42 30	1 32 0.6	1 31 47.0	1 31 33.5	1 31 19.9	1 31 6.3	1 30 52.8	+1.46	-1.36
42 40	1 32 15.4	1 32 1.8	1 31 48.2	1 31 34.6	1 31 21.0	1 31 7.4	1.48	1.36
42 50	1 32 30.3	1 32 16.7	1 32 3.0	1 31 49.4	1 31 35.7	1 31 22.1	1.49	1.36
43 0	1 32 45.3	1 32 31.7	1 32 18.0	1 32 4.3	1 31 50.6	1 31 37.0	1.50	1.37
43 10	1 33 0.5	1 32 46.8	1 32 33.1	1 32 19.4	1 32 5.6	1 31 51.9	1.51	1.37
43 20	1 33 15.8	1 33 2.0	1 32 48.3	1 32 34.5	1 32 20.8	1 32 7.0	+1.53	-1.38
43 30	1 33 31.2	1 33 17.4	1 33 3.6	1 32 49.9	1 32 36.1	1 32 22.3	1.54	1.38
43 40	1 33 46.8	1 33 33.0	1 33 19.1	1 33 5.3	1 32 51.5	1 32 37.7	1.55	1.38
43 50	1 34 2.5	1 33 48.6	1 33 34.7	1 33 20.9	1 33 7.0	1 32 53.2	1.57	1.39
44 0	1 34 18.3	1 34 4.4	1 33 50.5	1 33 36.6	1 33 22.7	1 33 8.8	1.58	1.39
44 10	1 34 34.3	1 34 20.3	1 34 6.4	1 33 52.4	1 33 38.5	1 33 24.6	+1.59	-1.39
44 20	1 34 50.4	1 34 36.4	1 34 22.4	1 34 8.4	1 33 54.4	1 33 40.5	1.61	1.40
44 30	1 35 6.6	1 34 52.6	1 34 38.6	1 34 24.6	1 34 10.5	1 33 56.5	1.62	1.40
44 40	1 35 23.0	1 35 9.0	1 34 54.9	1 34 40.8	1 34 26.8	1 34 12.7	1.63	1.41
44 50	1 35 39.5	1 35 25.4	1 35 11.3	1 34 57.2	1 34 43.1	1 34 29.0	1.65	1.41
45 0	1 35 56.2	1 35 42.1	1 35 27.9	1 35 13.8	1 34 59.6	1 34 45.5	+1.67	-1.41
45 10	1 36 13.0	1 35 58.9	1 35 44.7	1 35 30.5	1 35 16.3	1 35 2.1	1.68	1.42
45 20	1 36 30.0	1 36 15.8	1 36 1.6	1 35 47.3	1 35 33.1	1 35 18.9	1.69	1.42
45 30	1 36 47.1	1 36 32.9	1 36 18.6	1 36 4.3	1 35 50.1	1 35 35.8	1.71	1.43
45 40	1 37 4.4	1 36 50.1	1 36 35.8	1 36 21.5	1 36 7.2	1 35 52.8	1.72	1.43
45 50	1 37 21.8	1 37 7.5	1 36 53.1	1 36 38.8	1 36 24.4	1 36 10.0	+1.74	-1.44
46 0	1 37 39.4	1 37 25.0	1 37 10.6	1 36 56.2	1 36 41.8	1 36 27.4	1.76	1.44
46 10	1 37 57.1	1 37 42.7	1 37 28.3	1 37 13.8	1 36 59.4	1 36 44.9	1.77	1.44
46 20	1 38 15.0	1 38 0.5	1 37 46.1	1 37 31.6	1 37 17.1	1 37 2.6	1.79	1.45
46 30	1 38 33.1	1 38 18.5	1 38 4.0	1 37 49.5	1 37 35.0	1 37 20.4	1.80	1.45
46 40	1 38 51.3	1 38 36.7	1 38 22.1	1 38 7.6	1 37 53.0	1 37 38.4	+1.82	-1.46
46 50	1 39 9.7	1 38 55.0	1 38 40.4	1 38 25.8	1 38 11.2	1 37 56.6	1.84	1.46
47 0	1 39 28.2	1 39 13.5	1 38 58.9	1 38 44.2	1 38 29.5	1 38 14.9	1.85	1.47
47 10	1 39 46.9	1 39 32.2	1 39 17.5	1 39 2.8	1 38 48.0	1 38 33.3	1.87	1.47
47 20	1 40 5.8	1 39 51.0	1 39 36.3	1 39 21.5	1 39 6.7	1 38 52.0	1.88	1.48
47 30	1 40 24.8	1 40 10.0	1 39 55.2	1 39 40.4	1 39 25.6	1 39 10.8	+1.90	-1.48
47 40	1 40 44.0	1 40 29.2	1 40 14.3	1 39 59.5	1 39 44.6	1 39 29.8	1.92	1.48
47 50	1 41 3.4	1 40 48.5	1 40 33.6	1 40 18.7	1 40 3.8	1 39 48.9	1.94	1.49
48 0	1 41 23.0	1 41 8.1	1 40 53.1	1 40 38.2	1 40 23.2	1 40 8.3	1.96	1.49
48 10	1 41 42.8	1 41 27.8	1 41 12.8	1 40 57.8	1 40 42.8	1 40 27.8	1.97	1.50
48 20	1 42 2.7	1 41 47.6	1 41 32.6	1 41 17.5	1 41 2.5	1 40 47.4	+1.99	-1.51
48 30	1 42 22.8	1 42 7.7	1 41 52.6	1 41 37.5	1 41 22.4	1 41 7.3	2.01	1.51
48 40	1 42 43.1	1 42 27.9	1 42 12.8	1 41 57.7	1 41 42.5	1 41 27.4	2.03	1.51
48 50	1 43 3.6	1 42 48.4	1 42 33.2	1 42 18.0	1 42 2.8	1 41 47.6	2.05	1.52
49 0	1 43 24.2	1 43 9.0	1 42 53.8	1 42 38.5	1 42 23.3	1 42 8.0	2.06	1.52
49 10	1 43 45.1	1 43 29.8	1 43 14.5	1 42 59.2	1 42 43.9	1 42 28.6	+2.08	-1.53
49 20	1 44 6.2	1 43 50.8	1 43 35.5	1 43 20.1	1 43 4.8	1 42 49.4	2.10	1.54
49 30	1 44 27.4	1 44 12.0	1 43 56.6	1 43 41.2	1 43 25.8	1 43 10.4	2.12	1.54
49 40	1 44 48.9	1 44 33.4	1 44 18.0	1 44 2.5	1 43 47.1	1 43 31.6	2.14	1.55
49 50	1 45 10.5	1 44 55.0	1 44 39.5	1 44 24.0	1 44 8.5	1 43 53.0	2.16	1.55
50 0	1 45 32.4	1 45 16.8	1 45 1.3	1 44 45.7	1 44 30.1	1 44 14.8	+2.18	-1.56

TABLE V.

699

AZIMUTH OF POLARIS AT ELONGATION, 1919.

Decl. Lat.	88° 52' 10"	88° 52' 20"	88° 52' 30"	88° 52' 40"	88° 52' 50"	88° 53' 0"	Variation for—	
							1' of Lat.	1" of λ .
• ' "	• ' "	• ' "	• ' "	• ' "	• ' "	• ' "	"	"
50 0	1 45 32.4	1 45 16.8	1 45 1.3	1 44 45.7	1 44 30.1	1 44 14.6	+2.18	-1.56
50 10	1 45 54.4	1 45 38.8	1 45 23.2	1 45 7.6	1 44 52.0	1 44 36.4	2.20	1.56
50 20	1 46 16.7	1 46 1.1	1 45 45.4	1 45 29.7	1 45 14.0	1 44 58.4	2.22	1.57
50 30	1 46 39.2	1 46 23.5	1 46 7.7	1 45 52.0	1 45 36.3	1 45 20.6	2.24	1.57
50 40	1 47 1.9	1 46 46.1	1 46 30.3	1 46 14.5	1 45 58.8	1 45 43.0	2.27	1.58
50 50	1 47 24.8	1 47 9.0	1 46 53.1	1 46 37.3	1 46 21.5	1 46 5.6	+2.29	-1.58
51 0	1 47 47.9	1 47 32.0	1 47 16.1	1 47 0.2	1 46 44.4	1 46 28.5	2.31	1.59
51 10	1 48 11.3	1 47 55.3	1 47 39.4	1 47 23.4	1 47 7.5	1 46 51.5	2.34	1.60
51 20	1 48 34.9	1 48 18.9	1 48 2.9	1 47 46.8	1 47 30.8	1 47 14.8	2.36	1.60
51 30	1 48 58.7	1 48 42.6	1 48 26.5	1 48 10.5	1 47 54.4	1 47 38.3	2.38	1.61
51 40	1 49 22.7	1 49 6.6	1 48 50.4	1 48 34.3	1 48 18.2	1 48 2.1	+2.40	-1.61
51 50	1 49 47.0	1 49 30.8	1 49 14.6	1 48 58.4	1 48 42.2	1 48 26.0	2.43	1.62
52 0	1 50 11.5	1 49 55.2	1 49 39.0	1 49 22.7	1 49 6.5	1 48 50.2	2.45	1.63
52 10	1 50 36.2	1 50 19.9	1 50 3.6	1 49 47.3	1 49 31.0	1 49 14.7	2.47	1.63
52 20	1 51 1.2	1 50 44.8	1 50 28.5	1 50 12.1	1 49 55.7	1 49 39.4	2.50	1.64
52 30	1 51 26.4	1 51 10.0	1 50 53.6	1 50 37.1	1 50 20.7	1 50 4.3	+2.52	-1.64
52 40	1 51 51.9	1 51 35.4	1 51 18.9	1 51 2.4	1 50 45.9	1 50 29.5	2.55	1.65
52 50	1 52 17.7	1 52 1.1	1 51 44.5	1 51 28.0	1 51 11.4	1 50 54.9	2.57	1.66
53 0	1 52 43.6	1 52 27.0	1 52 10.4	1 51 53.8	1 51 37.2	1 51 20.5	2.60	1.66
53 10	1 53 9.9	1 52 53.2	1 52 36.5	1 52 19.8	1 52 3.2	1 51 46.5	2.62	1.67
53 20	1 53 36.4	1 53 19.7	1 53 2.9	1 52 46.1	1 52 29.4	1 52 12.7	+2.65	-1.67
53 30	1 54 3.2	1 53 46.4	1 53 29.6	1 53 12.7	1 52 55.9	1 52 39.1	2.68	1.68
53 40	1 54 30.2	1 54 13.4	1 53 56.5	1 53 39.6	1 53 22.7	1 53 5.8	2.70	1.69
53 50	1 54 57.6	1 54 40.6	1 54 23.7	1 54 6.7	1 53 49.8	1 53 32.8	2.73	1.70
54 0	1 55 25.1	1 55 8.1	1 54 51.1	1 54 34.1	1 54 17.1	1 54 0.1	2.76	1.70
54 10	1 55 53.0	1 55 35.9	1 55 18.8	1 55 1.8	1 54 44.7	1 54 27.6	+2.78	-1.71
54 20	1 56 21.2	1 56 4.0	1 55 46.9	1 55 29.7	1 55 12.6	1 54 55.4	2.81	1.72
54 30	1 56 49.6	1 56 32.4	1 56 15.2	1 55 58.0	1 55 40.7	1 55 23.5	2.84	1.72
54 40	1 57 18.4	1 57 1.1	1 56 43.8	1 56 26.5	1 56 9.2	1 55 51.9	2.87	1.73
54 50	1 57 47.4	1 57 30.1	1 57 12.7	1 56 55.3	1 56 38.0	1 56 20.8	2.90	1.74
55 0	1 58 16.8	1 57 59.3	1 57 41.9	1 57 24.4	1 57 7.0	1 56 49.6	+2.93	-1.74
55 10	1 58 46.4	1 58 28.9	1 58 11.4	1 57 53.9	1 57 36.3	1 57 18.8	2.96	1.75
55 20	1 59 16.4	1 58 58.8	1 58 41.2	1 58 23.6	1 58 6.0	1 57 48.4	2.99	1.76
55 30	1 59 46.6	1 59 29.0	1 59 11.4	1 58 53.7	1 58 36.0	1 58 18.3	3.02	1.77
55 40	2 0 17.2	1 59 59.5	1 59 41.8	1 59 24.0	1 59 6.3	1 58 48.5	3.05	1.77
55 50	2 0 48.1	2 0 30.3	2 0 12.5	1 59 54.7	1 59 36.9	1 59 19.1	+3.09	-1.78
56 0	2 1 19.4	2 1 1.5	2 0 43.6	2 0 25.7	2 0 7.8	1 59 49.9	3.12	1.79
56 10	2 1 51.0	2 1 33.0	2 1 15.0	2 0 57.0	2 0 39.1	2 0 21.1	3.16	1.80
56 20	2 2 22.9	2 2 4.8	2 1 46.8	2 1 28.7	2 1 10.7	2 0 52.6	3.19	1.81
56 30	2 2 55.1	2 2 37.0	2 2 18.9	2 2 0.7	2 1 42.6	2 1 24.5	3.22	1.81
56 40	2 3 27.7	2 3 9.5	2 2 51.3	2 2 33.1	2 2 14.9	2 1 56.7	+3.26	-1.82
56 50	2 4 0.7	2 3 42.4	2 3 24.1	2 3 5.8	2 2 47.5	2 2 29.2	3.29	1.83
57 0	2 4 34.0	2 4 15.6	2 3 57.2	2 3 38.9	2 3 20.5	2 3 2.1	3.33	1.84
57 10	2 5 7.7	2 4 49.2	2 4 30.8	2 4 12.3	2 3 53.9	2 3 35.4	3.36	1.85
57 20	2 5 41.7	2 5 23.2	2 5 4.6	2 4 46.1	2 4 27.6	2 4 9.0	3.40	1.85
57 30	2 6 16.1	2 5 57.5	2 5 38.9	2 5 20.3	2 5 1.6	2 4 43.0	+3.44	-1.86
57 40	2 6 50.9	2 6 32.2	2 6 13.5	2 5 54.8	2 5 36.1	2 5 17.4	3.48	1.87
57 50	2 7 26.1	2 7 7.3	2 6 48.5	2 6 29.7	2 6 11.0	2 5 52.2	3.52	1.88
58 0	2 8 1.7	2 7 42.8	2 7 23.9	2 7 5.1	2 6 46.2	2 6 27.3	3.56	1.89
58 10	2 8 37.7	2 8 18.7	2 7 59.7	2 7 40.8	2 7 21.8	2 7 2.8	3.60	1.90
58 20	2 9 14.0	2 8 55.0	2 8 35.9	2 8 16.9	2 7 57.8	2 7 38.8	+3.64	-1.90
58 30	2 9 50.8	2 9 31.7	2 9 12.6	2 8 53.4	2 8 34.2	2 8 15.1	3.68	1.91
58 40	2 10 28.1	2 10 8.8	2 9 49.6	2 9 30.3	2 9 11.1	2 8 51.9	3.72	1.92
58 50	2 11 5.7	2 10 46.4	2 10 27.0	2 10 7.7	2 9 48.4	2 9 29.0	3.76	1.93
59 0	2 11 43.8	2 11 24.3	2 11 4.9	2 10 45.5	2 10 26.0	2 10 6.6	3.80	1.94
59 10	2 12 22.3	2 12 2.7	2 11 43.2	2 11 23.7	2 11 4.2	2 10 44.6	+3.85	-1.95
59 20	2 13 1.2	2 12 41.6	2 12 22.0	2 12 2.4	2 11 42.7	2 11 23.1	3.89	1.96
59 30	2 13 40.6	2 13 20.9	2 13 1.2	2 12 41.5	2 12 21.7	2 12 2.0	3.94	1.97
59 40	2 14 20.5	2 14 0.6	2 13 40.8	2 13 21.0	2 13 1.2	2 12 41.4	3.98	1.98
59 50	2 15 0.8	2 14 40.9	2 14 21.0	2 14 1.1	2 13 41.1	2 13 21.2	4.04	1.99
60 0	2 15 41.6	2 15 21.6	2 15 1.6	2 14 41.6	2 14 21.5	2 14 1.5	+4.08	-2.00

AZIMUTH OF POLARIS AT ELONGATION, 1919.

Decl. Lat.	88° 52' 10"	88° 52' 20"	88° 52' 30"	88° 52' 40"	88° 52' 50"	88° 53' 0"	Variation for—	
							1" of Lat.	1" of L.
• ' "	• ' "	• ' "	• ' "	• ' "	• ' "	• ' "	"	"
60 0	2 15 41.6	2 15 21.6	2 15 1.6	2 14 41.6	2 14 21.5	2 14 1.5	+4.08	-2.00
60 10	2 16 22.9	2 16 2.8	2 15 42.6	2 15 22.5	2 15 2.4	2 14 42.3	4.13	2.01
60 20	2 17 4.6	2 16 44.4	2 16 24.2	2 16 4.0	2 15 43.8	2 15 23.6	4.18	2.02
60 30	2 17 46.9	2 17 26.6	2 17 6.3	2 16 46.0	2 16 25.6	2 16 5.3	4.23	2.03
60 40	2 18 29.7	2 18 9.3	2 17 48.8	2 17 28.4	2 17 8.0	2 16 47.6	4.28	2.04
60 50	2 19 13.0	2 18 52.5	2 18 31.9	2 18 11.4	2 17 50.9	2 17 30.3	+4.33	-2.05
61 0	2 19 56.8	2 19 36.2	2 19 15.5	2 18 54.9	2 18 34.3	2 18 13.6	4.38	2.06
61 10	2 20 41.2	2 20 20.4	2 19 59.7	2 19 38.9	2 19 18.2	2 18 57.4	4.44	2.06
61 20	2 21 26.1	2 21 5.2	2 20 44.4	2 20 23.5	2 20 2.6	2 19 41.8	4.49	2.09
61 30	2 22 11.5	2 21 50.6	2 21 29.6	2 21 8.6	2 20 47.6	2 20 26.7	4.54	2.10
61 40	2 22 57.5	2 22 36.5	2 22 15.4	2 21 54.3	2 21 33.2	2 21 12.1	+4.60	-2.11
61 50	2 23 44.1	2 23 23.0	2 23 1.8	2 22 40.6	2 22 19.4	2 21 58.1	4.66	2.12
62 0	2 24 31.3	2 24 10.0	2 23 48.7	2 23 27.4	2 23 6.1	2 22 44.7	4.72	2.13
62 10	2 25 19.1	2 24 57.6	2 24 36.2	2 24 14.8	2 23 53.3	2 23 31.9	4.78	2.14
62 20	2 26 7.4	2 25 45.9	2 25 24.3	2 25 2.8	2 24 41.2	2 24 19.7	4.84	2.15
62 30	2 26 56.4	2 26 34.8	2 26 13.1	2 25 51.4	2 25 29.7	2 25 8.1	+4.90	-2.17
62 40	2 27 46.0	2 27 24.3	2 27 2.5	2 26 40.7	2 26 18.9	2 25 57.1	4.96	2.18
62 50	2 28 36.3	2 28 14.4	2 27 52.5	2 27 30.5	2 27 8.6	2 26 46.7	5.02	2.19
63 0	2 29 27.2	2 29 5.1	2 28 43.1	2 28 21.1	2 27 59.0	2 27 37.0	5.09	2.20
63 10	2 30 18.8	2 29 56.6	2 29 34.4	2 29 12.2	2 28 50.1	2 28 27.9	5.16	2.22
63 20	2 31 11.0	2 30 48.7	2 30 26.4	2 30 4.1	2 29 41.8	2 29 19.5	+5.22	-2.23
63 30	2 32 3.9	2 31 41.5	2 31 19.0	2 30 56.6	2 30 34.2	2 30 11.8	5.29	2.24
63 40	2 32 57.5	2 32 35.0	2 32 12.4	2 31 49.8	2 31 27.3	2 31 4.7	5.37	2.26
63 50	2 33 51.8	2 33 29.2	2 33 6.5	2 32 43.8	2 32 21.1	2 31 58.4	5.44	2.27
64 0	2 34 46.9	2 34 24.1	2 34 1.2	2 33 38.4	2 33 15.6	2 32 52.8	5.51	2.28
64 10	2 35 42.7	2 35 19.7	2 34 56.8	2 34 33.8	2 34 10.8	2 33 47.9	+5.58	-2.30
64 20	2 36 39.3	2 36 16.1	2 35 53.0	2 35 29.9	2 35 6.8	2 34 43.7	5.66	2.31
64 30	2 37 36.6	2 37 13.3	2 36 50.1	2 36 26.8	2 36 3.6	2 35 40.3	5.74	2.33
64 40	2 38 34.7	2 38 11.3	2 37 47.9	2 37 24.5	2 37 1.1	2 36 37.7	5.82	2.34
64 50	2 39 33.6	2 39 10.1	2 38 46.5	2 38 23.0	2 37 59.4	2 37 35.9	5.90	2.35
65 0	2 40 33.3	2 40 9.6	2 39 45.9	2 39 22.3	2 38 58.6	2 38 34.9	+5.98	-2.37
65 10	2 41 33.9	2 41 10.0	2 40 46.2	2 40 22.4	2 39 58.5	2 39 34.7	6.06	2.38
65 20	2 42 35.3	2 42 11.3	2 41 47.3	2 41 23.3	2 40 59.3	2 40 35.4	6.14	2.40
65 30	2 43 37.6	2 43 13.4	2 42 49.3	2 42 25.1	2 42 1.0	2 41 36.9	6.23	2.41
65 40	2 44 40.7	2 44 16.4	2 43 52.1	2 43 27.8	2 43 3.5	2 42 39.2	6.32	2.43
65 50	2 45 44.8	2 45 20.3	2 44 55.9	2 44 31.4	2 44 7.0	2 43 42.5	+6.41	-2.45
66 0	2 46 49.8	2 46 25.1	2 46 0.5	2 45 35.9	2 45 11.3	2 44 46.7	6.51	2.46
66 10	2 47 55.7	2 47 30.9	2 47 6.1	2 46 41.3	2 46 16.6	2 45 51.8	6.61	2.48
66 20	2 49 2.6	2 48 37.6	2 48 12.7	2 47 47.7	2 47 22.8	2 46 57.9	6.70	2.49
66 30	2 50 10.4	2 49 45.3	2 49 20.2	2 48 55.1	2 48 30.0	2 48 4.9	6.80	2.51
66 40	2 51 19.3	2 50 54.0	2 50 28.7	2 50 3.5	2 49 38.2	2 49 12.9	+6.90	-2.53
66 50	2 52 29.2	2 52 3.7	2 51 38.3	2 51 12.8	2 50 47.4	2 50 22.0	7.00	2.54
67 0	2 53 40.1	2 53 14.5	2 52 48.9	2 52 23.3	2 51 57.6	2 51 32.0	7.11	2.56
67 10	2 54 52.1	2 54 26.3	2 54 0.5	2 53 34.7	2 53 8.9	2 52 43.1	7.21	2.58
67 20	2 56 5.2	2 55 39.3	2 55 13.3	2 54 47.3	2 54 21.3	2 53 55.3	7.32	2.60
67 30	2 57 19.4	2 56 53.3	2 56 27.1	2 56 1.0	2 55 34.8	2 55 8.6	+7.43	-2.62
67 40	2 58 34.8	2 58 8.5	2 57 42.1	2 57 15.8	2 56 49.4	2 56 23.1	7.55	2.63
67 50	2 59 51.3	2 59 24.8	2 58 58.3	2 58 31.7	2 58 5.2	2 57 38.7	7.67	2.65
68 0	3 1 9.0	3 0 42.3	3 0 15.6	2 59 48.9	2 59 22.1	2 58 55.4	7.79	2.67
68 10	3 2 28.0	3 2 1.1	3 1 34.2	3 1 7.2	3 0 40.3	3 0 13.4	7.91	2.69
68 20	3 3 48.2	3 3 21.1	3 2 54.0	3 2 26.8	3 1 59.7	3 1 32.6	+8.03	-2.71
68 30	3 5 9.7	3 4 42.3	3 4 15.0	3 3 47.7	3 3 20.4	3 2 53.1	8.16	2.73
68 40	3 6 32.4	3 6 4.9	3 5 37.4	3 5 9.9	3 4 42.3	3 4 14.8	8.29	2.75
68 50	3 7 56.6	3 7 28.8	3 7 1.1	3 6 33.4	3 6 5.6	3 5 37.9	8.43	2.77
69 0	3 9 22.1	3 8 54.1	3 8 26.2	3 7 58.2	3 7 30.3	3 7 2.3	8.57	2.80
69 10	3 10 49.0	3 10 20.8	3 9 52.6	3 9 24.5	3 8 56.3	3 8 28.2	+8.71	-2.82
69 20	3 12 17.3	3 11 48.9	3 11 20.5	3 10 52.2	3 10 23.8	3 9 55.4	8.85	2.84
69 30	3 13 47.1	3 13 18.5	3 12 49.9	3 12 21.3	3 11 52.7	3 11 24.1	9.00	2.86
69 40	3 15 18.4	3 14 49.6	3 14 20.8	3 13 51.9	3 13 23.1	3 12 54.3	9.15	2.88
69 50	3 16 51.3	3 16 22.2	3 15 53.2	3 15 24.1	3 14 55.1	3 14 26.0	9.31	2.91
70 0	3 18 25.7	3 17 56.4	3 17 27.2	3 16 57.9	3 16 28.8	3 15 59.3	+9.47	-2.93

TABLE Va.

701

FOR REDUCING TO ELONGATION OBSERVATIONS MADE NEAR ELONGATION.

Time. Asimuth at Elong.	1° 0'	1° 10'	1° 20'	1° 30'	1° 40'	1° 50'	2° 0'	2° 10'	Time.* Asimuth at Elong.
m	"	"	"	"	"	"	"	"	m
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	0.0	0.0	0.0	+ 0.1	+ 0.1	+ 0.1	+0.1	+ 0.1	1
2	+ 0.1	+ 0.2	+ 0.2	0.2	0.2	0.3	0.3	0.3	2
3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	3
4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	4
5	+ 0.9	+ 1.0	+ 1.1	+ 1.3	+ 1.4	+ 1.6	+ 1.7	+ 1.9	5
6	1.2	1.4	1.6	1.8	2.1	2.3	2.5	2.7	6
7	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.7	7
8	2.2	2.6	2.9	3.3	3.7	4.0	4.4	4.8	8
9	2.8	3.2	3.7	4.2	4.6	5.1	5.6	6.0	9
10	+ 3.4	+ 4.0	+ 4.6	+ 5.1	+ 5.7	+ 6.3	+ 6.9	+ 7.4	10
11	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0	11
12	4.9	5.8	6.6	7.4	8.2	9.0	9.9	10.7	12
13	5.8	6.8	7.7	8.7	9.7	10.6	11.6	12.6	13
14	6.7	7.8	9.0	10.1	11.2	12.3	13.4	14.6	14
15	+ 7.7	+ 9.0	+10.3	+11.6	+12.8	+14.1	+15.4	+16.7	15
16	8.8	10.2	11.7	13.2	14.6	16.1	17.5	19.0	16
17	9.9	11.5	13.2	14.9	16.5	18.2	19.8	21.5	17
18	11.1	12.9	14.8	16.7	18.5	20.4	22.2	24.1	18
19	12.4	14.4	16.5	18.6	20.6	22.7	24.7	26.8	19
20	+13.7	+16.0	+18.3	+20.6	+22.8	+25.1	+27.4	+29.7	20
21	15.1	17.6	20.1	22.7	25.2	27.7	30.2	32.7	21
22	16.6	19.3	22.1	24.9	27.6	30.4	33.2	35.9	22
23	18.1	21.1	24.2	27.2	30.2	33.2	36.2	39.3	23
24	19.7	23.0	26.3	29.6	32.9	36.2	39.5	42.8	24
25	+21.4	+25.0	+28.5	+32.1	+35.7	+39.2	+42.8	+46.4	25

Time. Asimuth at Elong.	2° 10'	2° 20'	2° 30'	2° 40'	2° 50'	3° 0'	3° 10'	3° 20'	Time.* Asimuth at Elong.
m	"	"	"	"	"	"	"	"	m
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	1
2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	2
3	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	3
4	1.2	1.3	1.4	1.5	1.6	1.6	1.7	1.8	4
5	+ 1.9	+ 2.0	+ 2.1	+ 2.3	+ 2.4	+ 2.6	+ 2.7	+ 2.9	5
6	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.1	6
7	3.7	3.9	4.2	4.5	4.8	5.0	5.3	5.6	7
8	4.8	5.1	5.5	5.9	6.2	6.6	7.0	7.3	8
9	6.0	6.5	7.0	7.4	7.9	8.3	8.8	9.3	9
10	+ 7.4	+ 8.0	+ 8.6	+ 9.2	+ 9.7	+10.3	+10.9	+11.4	10
11	9.0	9.7	10.4	11.1	11.8	12.4	13.1	13.8	11
12	10.7	11.5	12.3	13.2	14.0	14.8	15.6	16.5	12
13	12.6	13.5	14.5	15.4	16.4	17.4	18.4	19.3	13
14	14.6	15.7	16.8	17.9	19.0	20.2	21.3	22.4	14
15	+16.7	+18.0	+19.3	+20.6	+21.9	+23.1	+24.4	+25.7	15
16	19.0	20.5	21.9	23.4	24.9	26.3	27.8	29.3	16
17	21.5	23.1	24.8	26.4	28.1	29.7	31.4	33.0	17
18	24.1	25.9	27.8	29.6	31.5	33.3	35.2	37.0	18
19	26.8	28.9	30.9	33.0	35.1	37.1	39.2	41.3	19
20	+29.7	+32.0	+34.3	+36.6	+38.8	+41.1	+43.4	+45.7	20
21	32.7	35.3	37.8	40.3	42.8	45.3	47.9	50.4	21
22	35.9	38.7	41.5	44.2	47.0	49.8	52.5	55.3	22
23	39.3	42.3	45.3	48.3	51.4	54.4	57.4	60.4	23
24	42.8	46.0	49.3	52.6	55.9	59.2	62.5	65.8	24
25	+46.4	+49.9	+53.5	+57.1	+60.7	+64.2	+67.8	+71.4	25

* Sidereal time from elongation.

TABLE VI.

FOR FINDING THE TIMES OF UPPER AND LOWER CULMINATION OF POLARIS, 1919, FROM THE OBSERVED TIMES WHEN THE STAR IS ON THE SAME VERTICAL CIRCLE WITH THE STARS ϵ URSE MAJORIS (MIZAR) *SUB POLO* AND δ CASSIOPEIE *SUB POLO*, RESPECTIVELY.

Except at high latitudes, the pole star at either upper or lower culmination furnishes a simple and convenient method for laying down a meridian line on the earth's surface at points in the northern hemisphere. When the local time is unknown and accurate astronomical instruments are not available, the time of culmination of Polaris may be found by observing the instant when Polaris is vertically above (has the same azimuth as) ϵ Ursa Majoris (Mizar) below the pole, or δ Cassiopeia below the pole. In the former case, for the year 1919, Polaris is approaching upper culmination and in the latter case it is approaching lower culmination. The mean time interval which elapses between either of the observed times above mentioned and upper or lower culmination, as the case may be, is given at ten-day intervals in the following table. This method can not be used at places south of 30° north latitude.

ε URSE MAJORIS (MIZAR). (Upper culmination of Polaris.)						δ CASSIOPEIE. (Lower culmination of Polaris.)							
Date.	Lat.	40°	45°	50°	55°	60°	Date.	Lat.	35°	40°	45°	50°	55°
		m s	m s	m s	m s	m s			m s	m s	m s	m s	m s
Jan.	1	10 37	10 35	10 33	10 30	10 26	Jan.	1	11 46	11 48	11 51	11 53	11 56
	11	10 27	10 25	10 23	10 20	10 16		11	11 36	11 38	11 40	11 42	11 44
	21	10 16	10 14	10 12	10 9	10 5		21	11 25	11 27	11 29	11 31	11 35
	31	10 6	10 4	10 1	9 58	9 55		31	11 14	11 16	11 18	11 21	11 24
Feb.	10	9 55	9 53	9 51	9 48	9 45	Feb.	10	11 4	11 6	11 8	11 10	11 13
	20	9 46	9 44	9 42	9 39	9 36		20	10 54	10 56	10 58	11 1	11 4
Mar.	2	9 38	9 36	9 34	9 31	9 28	Mar.	2	10 46	10 48	10 50	10 52	10 55
								12	10 40	10 41	10 43	10 46	10 49
June	30	10 20	10 18	10 16	10 13	10 9		22	10 35	10 37	10 39	10 41	10 44
July	10	10 31	10 29	10 27	10 24	10 20	Apr.	1	10 32	10 34	10 36	10 38	10 41
	20	10 42	10 40	10 38	10 35	10 31		11	10 32	10 34	10 36	10 38	10 41
	30	10 53	10 51	10 49	10 46	10 42		21	10 33	10 35	10 37	10 40	10 42
Aug.	9	11 4	11 2	10 59	10 56	10 52	May	1	10 37	10 39	10 41	10 43	10 46
	19	11 14	11 12	11 9	11 6	11 2		11	10 42	10 44	10 46	10 49	10 52
	29	11 23	11 21	11 18	11 15	11 11		21	10 50	10 51	10 53	10 56	10 59
Sept.	8	11 31	11 28	11 26	11 22	11 18		31	10 58	11 0	11 2	11 4	11 7
	18	11 37	11 35	11 32	11 29	11 25	June	10	11 8	11 9	11 11	11 14	11 17
	28	11 43	11 40	11 38	11 34	11 30		20	11 18	11 20	11 22	11 25	11 28
Oct.	8	11 46	11 44	11 41	11 38	11 34		30	11 29	11 31	11 33	11 36	11 39
	18	11 49	11 46	11 44	11 40	11 36	July	10	11 41	11 42	11 45	11 47	11 50
	28	11 49	11 47	11 44	11 41	11 36		20	11 52	11 54	11 56	11 59	12 2
Nov.	7	11 48	11 45	11 43	11 39	11 35	July	30	12 3	12 5	12 7	12 10	12 13
	17	11 45	11 42	11 40	11 36	11 32							
	27	11 40	11 37	11 35	11 32	11 27	Nov.	27	12 51	12 53	12 55	12 58	13 1
Dec.	7	11 33	11 31	11 28	11 25	11 21	Dec.	7	12 44	12 46	12 48	12 51	12 55
	17	11 25	11 23	11 21	11 17	11 13		17	12 36	12 38	12 40	12 43	12 46
	27	11 16	11 14	11 11	11 8	11 4		27	12 26	12 28	12 31	12 33	12 37
	31	11 12	11 10	11 8	11 4	11 0		31	12 22	12 24	12 27	12 29	12 33

TABLE VII.

APPARENT PLACE, TIME OF UPPER CULMINATION, AND TIME INTERVAL BETWEEN UPPER CULMINATION AND ELONGATION EAST OR WEST, OF POLARIS, 1919.

The local mean time of culmination on any meridian for a given date is found by taking from the following table the *Mean Time* of the nearest Greenwich culmination, and applying to it the product of the *Var. per Day* by the integral number of intervening days, this product being numerically additive for an earlier date and subtractive for a later date than that given in the table; and by applying also the product of the *Var. per Hour* by the longitude from Greenwich expressed in hours and fractions of an hour, this product being numerically additive for East longitudes and subtractive for West longitudes.

The time interval between upper and lower culmination is 12^h diminished by one-half the numerical value of the *Var. per Day*.

The last column below applies to all meridians.

Date.	Upper Culmination, Meridian of Greenwich.					Latitude.	Mean Time Interval, Elongation minus Upper Culm.	
	Apparent Right Ascension.	Apparent Declination.	Mean Time.	Var. per Day.	Var. per Hour.			
	h m l 30	° ' " +88 52	h m s	m s	W. E.		W. E.	h m
Jan. 1	108 ^s	45.3	6 50 20	-3 56.9	-9.87+	10	+5 58.2-	
11	98	46.3	6 10 50	3 57.0	9.87	12	5 58.1	
21	87	46.6	5 31 20	3 57.0	9.87	14	5 57.9	
31	76	46.3	4 51 51	3 57.0	9.87	16	5 57.7	
Feb. 10	66	45.3	4 12 21	3 56.9	9.87	18	5 57.6	
20	57	43.7	3 32 53	-3 56.8	-9.87+	20	+5 57.4-	
Mar. 2	49	41.6	2 53 26	3 56.6	9.86	22	5 57.2	
12	42	39.1	2 14 0	3 56.5	9.85	24	5 57.0	
22	38	36.2	1 34 37	3 56.3	9.84	26	5 56.8	
Apr. 1	35	33.1	0 55 15	3 56.1	9.84	28	5 56.6	
11	34	30.0	0 15 55	-3 55.9	-9.83+	30	+5 56.4-	
20	36	26.9	23 36 38	3 55.7	9.82	32	5 56.2	
30	39	23.9	22 57 22	3 55.5	9.81	34	5 56.0	
May 10	45	21.2	22 18 8	3 55.3	9.80	36	5 55.8	
20	52	18.8	21 38 56	3 55.1	9.80	38	5 55.5	
30	60	16.8	20 59 45	-3 55.0	-9.79+	40	+5 55.3-	
June 9	70	15.3	20 20 36	3 54.9	9.79	42	5 55.0	
19	80	14.4	19 41 27	3 54.8	9.78	44	5 54.7	
29	91	13.9	19 2 19	3 54.8	9.78	46	5 54.4	
July 9	103	14.1	18 23 11	3 54.8	9.78	48	5 54.0	
19	114	14.7	17 44 4	-3 54.8	-9.78+	50	+5 53.7-	
29	125	15.9	17 4 56	3 54.8	9.78	52	5 53.3	
Aug. 8	136	17.6	16 25 48	3 54.9	9.79	54	5 52.9	
18	146	19.7	15 46 39	3 54.9	9.79	56	5 52.4	
28	156	22.2	15 7 29	3 55.0	9.79	58	5 51.8	
Sept. 7	164	25.1	14 28 18	-3 55.2	-9.80+	60	+5 51.3-	
17	171	28.4	13 49 6	3 55.3	9.80	62	5 50.6	
27	176	31.8	13 9 52	3 55.4	9.81	64	5 49.8	
Oct. 7	180	35.5	12 30 37	3 55.6	9.82	66	5 49.0	
17	183	39.2	11 51 20	3 55.8	9.82	68	5 47.9	
27	183	43.0	11 12 2	-3 55.9	-9.83+	70	+5 46.7-	
Nov. 6	182	46.7	10 32 42	3 56.1	9.84			
16	179	50.2	9 53 20	3 56.3	9.85			
26	175	53.4	9 13 56	3 56.5	9.85			
Dec. 6	168	56.3	8 34 31	3 56.6	9.86			
16	161	58.8	7 55 4	-3 56.8	-9.86+			
26	152	60.8	7 15 36	-3 56.9	-9.87+			

LOCAL ASTRONOMICAL MEAN TIME OF SUNRISE, MERIDIAN OF GREENWICH, 1912

To obtain civil time, subtract 12 hours, mark the result A. M., and add one to the day.
To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.
For sunrise in southern latitudes see page 720.

Data.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Jan.	0	17 59	18 17	18 35	18 56	19 8	19 22	19 38	19 59	20 8	20 19	20 32	20 46	21 3
	1	18 0	18 17	18 35	18 56	19 8	19 22	19 39	19 59	20 8	20 19	20 32	20 46	21 3
	2	18 0	18 18	18 36	18 56	19 8	18 22	19 39	19 59	20 8	20 19	20 31	20 46	21 2
	3	18 1	18 18	18 36	18 57	19 9	19 22	19 39	19 59	20 8	20 19	20 31	20 45	21 2
	4	18 1	18 18	18 36	18 57	19 9	19 22	19 38	19 58	20 8	20 18	20 30	20 44	21 1
	5	18 2	18 19	18 36	18 57	19 9	19 22	19 38	19 58	20 8	20 18	20 30	20 44	21 0
	6	18 2	18 19	18 37	18 57	19 9	19 22	19 38	19 58	20 7	20 18	20 30	20 43	20 59
	7	18 3	18 19	18 37	18 57	19 9	19 22	19 38	19 58	20 7	20 17	20 29	20 42	20 58
	8	18 3	18 20	18 37	18 57	19 9	19 22	19 38	19 57	20 6	20 16	20 28	20 42	20 57
	9	18 4	18 20	18 37	18 57	19 9	19 22	19 38	19 57	20 6	20 16	20 28	20 41	20 56
	10	18 4	18 20	18 38	18 57	19 9	19 22	19 37	19 56	20 5	20 15	20 27	20 40	20 55
	11	18 4	18 20	18 38	18 57	19 9	19 22	19 37	19 56	20 5	20 14	20 26	20 39	20 54
	12	18 5	18 21	18 38	18 57	19 8	19 21	19 36	19 55	20 4	20 14	20 25	20 38	20 52
	13	18 5	18 21	18 38	18 57	19 8	19 21	19 36	19 54	20 3	20 13	20 24	20 36	20 51
	14	18 6	18 21	18 38	18 57	19 8	19 21	19 36	19 54	20 2	20 12	20 23	20 35	20 50
	15	18 6	18 21	18 38	18 57	19 8	19 20	19 35	19 53	20 2	20 11	20 22	20 34	20 48
	16	18 6	18 22	18 38	18 57	19 8	19 20	19 34	19 52	20 1	20 10	20 21	20 33	20 47
	17	18 7	18 22	18 38	18 56	19 7	19 19	19 34	19 51	20 0	20 9	20 19	20 31	20 45
	18	18 7	18 22	18 38	18 56	19 7	19 19	19 33	19 50	19 59	20 8	20 18	20 30	20 43
	19	18 7	18 22	18 38	18 56	19 6	19 18	19 32	19 49	19 58	20 6	20 17	20 28	20 42
	20	18 8	18 22	18 38	18 56	19 6	19 18	19 32	19 48	19 57	20 5	20 15	20 27	20 40
	21	18 8	18 22	18 38	18 56	19 6	19 17	19 31	19 47	19 56	20 4	20 14	20 25	20 38
	22	18 8	18 23	18 38	18 55	19 5	19 17	19 30	19 46	19 54	20 3	20 12	20 23	20 36
	23	18 8	18 23	18 38	18 55	19 5	19 16	19 29	19 45	19 53	20 1	20 11	20 22	20 34
	24	18 9	18 23	18 38	18 54	19 4	19 15	19 28	19 44	19 52	20 0	20 9	20 20	20 32
	25	18 9	18 23	18 37	18 54	19 4	19 15	19 28	19 43	19 50	19 59	20 8	20 18	20 30
	26	18 9	18 23	18 37	18 54	19 3	19 14	19 27	19 42	19 49	19 57	20 6	20 16	20 28
	27	18 9	18 23	18 37	18 53	19 2	19 13	19 26	19 41	19 48	19 56	20 4	20 14	20 26
	28	18 10	18 23	18 37	18 53	19 2	19 12	19 25	19 40	19 46	19 54	20 3	20 12	20 24
	29	18 10	18 23	18 36	18 52	19 1	19 12	19 24	19 38	19 45	19 52	20 1	20 10	20 21
Feb.	30	18 10	18 23	18 36	18 52	19 0	19 11	19 22	19 37	19 43	19 51	19 59	20 8	20 19
	31	18 10	18 23	18 36	18 51	19 0	19 10	19 21	19 35	19 42	19 49	19 57	20 6	20 17
	1	18 10	18 22	18 36	18 50	18 59	19 9	19 20	19 34	19 40	19 47	19 55	20 4	20 14
	2	18 10	18 22	18 35	18 50	18 58	19 8	19 19	19 32	19 39	19 46	19 53	20 2	20 12
	3	18 10	18 22	18 35	18 49	18 58	19 7	19 18	19 31	19 37	19 44	19 51	20 0	20 10
	4	18 10	18 22	18 35	18 49	18 57	19 6	19 17	19 30	19 36	19 42	19 49	19 58	20 7
	5	18 10	18 22	18 34	18 48	18 56	19 5	19 15	19 28	19 34	19 40	19 47	19 56	20 5
	6	18 11	18 22	18 34	18 47	18 55	19 4	19 14	19 26	19 32	19 38	19 45	19 53	20 2
	7	18 11	18 22	18 33	18 47	18 54	19 3	19 13	19 25	19 30	19 36	19 43	19 51	20 0
	8	18 11	18 22	18 33	18 46	18 53	19 2	19 11	19 23	19 28	19 34	19 41	19 49	19 57
	9	18 11	18 21	18 32	18 45	18 52	19 0	19 10	19 22	19 27	19 33	19 39	19 46	19 55
	10	18 11	18 21	18 32	18 44	18 51	18 59	19 9	19 20	19 25	19 31	19 37	19 44	19 52
	11	18 11	18 21	18 32	18 44	18 50	18 58	19 7	19 18	19 23	19 28	19 35	19 42	19 49
	12	18 11	18 21	18 31	18 43	18 49	18 57	19 6	19 16	19 21	19 26	19 32	19 39	19 47
	13	18 11	18 20	18 30	18 42	18 48	18 56	19 4	19 15	19 19	19 24	19 30	19 37	19 44
	14	18 11	18 20	18 30	18 41	18 47	18 54	19 3	19 13	19 17	19 22	19 28	19 34	19 41
	15	18 11	18 20	18 29	18 40	18 46	18 53	19 1	19 11	19 15	19 20	19 26	19 32	19 39

TABLE VIII.

705

LOCAL ASTRONOMICAL MEAN TIME OF SUNSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunset in southern latitudes see page 720.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Jan.	1	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	2	6 7	5 50	5 32	5 11	4 59	4 45	4 28	4 8	3 58	3 48	3 35	3 21	3 4
	3	6 8	5 51	5 32	5 12	5 0	4 46	4 29	4 9	3 59	3 49	3 36	3 22	3 5
	4	6 8	5 51	5 33	5 12	5 0	4 46	4 30	4 10	4 0	3 50	3 38	3 24	3 7
	5	6 8	5 51	5 34	5 13	5 1	4 47	4 31	4 11	4 2	3 51	3 39	3 25	3 8
	6	6 9	5 52	5 34	5 14	5 2	4 48	4 32	4 12	4 3	3 52	3 40	3 26	3 10
	7	6 9	5 53	5 35	5 14	5 3	4 49	4 33	4 13	4 4	3 54	3 42	3 28	3 12
	8	6 10	5 53	5 36	5 15	5 4	4 50	4 34	4 14	4 5	3 55	3 43	3 30	3 14
	9	6 10	5 54	5 36	5 16	5 4	4 51	4 35	4 16	4 7	3 56	3 45	3 31	3 15
	10	6 11	5 54	5 37	5 17	5 5	4 52	4 36	4 17	4 8	3 58	3 46	3 33	3 17
	11	6 11	5 55	5 38	5 18	5 6	4 53	4 38	4 18	4 9	3 59	3 48	3 35	3 19
	12	6 12	5 55	5 38	5 18	5 7	4 54	4 39	4 20	4 11	4 1	3 50	3 36	3 21
	13	6 12	5 56	5 39	5 19	5 8	4 55	4 40	4 21	4 12	4 2	3 51	3 38	3 23
	14	6 12	5 56	5 39	5 20	5 9	4 56	4 41	4 22	4 14	4 4	3 53	3 40	3 26
	15	6 13	5 57	5 40	5 21	5 10	4 57	4 42	4 24	4 15	4 6	3 55	3 42	3 28
	16	6 13	5 57	5 41	5 22	5 11	4 58	4 43	4 25	4 17	4 7	3 56	3 44	3 30
	17	6 13	5 58	5 41	5 23	5 12	4 59	4 45	4 27	4 18	4 9	3 58	3 46	3 32
	18	6 14	5 58	5 42	5 24	5 13	5 0	4 46	4 28	4 20	4 11	4 0	3 48	3 34
	19	6 14	5 59	5 43	5 24	5 14	5 2	4 47	4 30	4 22	4 12	4 * 2	3 50	3 37
	20	6 14	5 59	5 43	5 25	5 15	5 3	4 49	4 31	4 23	4 14	4 4	3 52	3 39
	21	6 14	6 0	5 44	5 26	5 16	5 4	4 50	4 33	4 25	4 16	4 6	3 55	3 41
	22	6 15	6 0	5 45	5 27	5 17	5 5	4 51	4 34	4 26	4 18	4 8	3 57	3 44
	23	6 15	6 1	5 45	5 28	5 18	5 6	4 52	4 36	4 28	4 20	4 10	3 59	3 46
	24	6 16	6 1	5 46	5 29	5 19	5 7	4 54	4 38	4 30	4 22	4 12	4 1	3 49
	25	6 16	6 2	5 47	5 30	5 20	5 8	4 55	4 39	4 32	4 24	4 14	4 4	3 51
	26	6 16	6 2	5 47	5 30	5 21	5 10	4 57	4 41	4 34	4 25	4 16	4 6	3 54
	27	6 16	6 3	5 48	5 31	5 22	5 11	4 58	4 43	4 35	4 27	4 18	4 8	3 56
	28	6 16	6 3	5 48	5 32	5 23	5 12	4 59	4 44	4 37	4 29	4 20	4 10	3 59
	29	6 17	6 3	5 49	5 33	5 24	5 13	5 1	4 46	4 39	4 31	4 22	4 13	4 1
	30	6 17	6 4	5 50	5 34	5 25	5 14	5 2	4 48	4 41	4 33	4 24	4 15	4 4
Feb.	31	6 17	6 4	5 50	5 35	5 26	5 16	5 4	4 49	4 42	4 35	4 27	4 17	4 6
	1	6 17	6 5	5 51	5 36	5 27	5 17	5 5	4 51	4 44	4 37	4 29	4 20	4 9
	2	6 17	6 5	5 52	5 36	5 28	5 18	5 6	4 53	4 46	4 39	4 31	4 22	4 12
	3	6 17	6 5	5 52	5 37	5 29	5 19	5 8	4 54	4 48	4 41	4 33	4 24	4 14
	4	6 18	6 5	5 53	5 38	5 30	5 20	5 9	4 56	4 50	4 43	4 35	4 27	4 17
	5	6 18	6 6	5 53	5 39	5 31	5 22	5 11	4 58	4 52	4 45	4 38	4 29	4 20
	6	6 18	6 6	5 54	5 40	5 32	5 23	5 12	5 0	4 54	4 47	4 40	4 32	4 22
	7	6 18	6 6	5 54	5 41	5 33	5 24	5 14	5 1	4 55	4 49	4 42	4 34	4 25
	8	6 18	6 7	5 55	5 42	5 34	5 25	5 15	5 3	4 57	4 51	4 44	4 36	4 28
	9	6 18	6 7	5 55	5 42	5 35	5 26	5 16	5 5	4 59	4 53	4 46	4 39	4 30
	10	6 18	6 7	5 56	5 43	5 36	5 28	5 18	5 6	5 1	4 55	4 49	4 41	4 33
	11	6 18	6 8	5 56	5 44	5 37	5 29	5 19	5 8	5 3	4 57	4 51	4 44	4 35
	12	6 18	6 8	5 57	5 45	5 38	5 30	5 21	5 10	5 5	4 59	4 53	4 46	4 38
	13	6 18	6 8	5 58	5 46	5 39	5 31	5 22	5 12	5 7	5 1	4 55	4 48	4 41
	14	6 18	6 8	5 58	5 46	5 40	5 32	5 24	5 13	5 8	5 3	4 57	4 51	4 43
	15	6 18	6 8	5 58	5 47	5 41	5 34	5 25	5 15	5 10	5 5	5 0	4 53	4 46
	16	6 18	6 8	5 59	5 48	5 42	5 35	5 26	5 17	5 12	5 7	5 2	4 56	4 48
	17	6 18	6 9	5 59	5 49	5 43	5 36	5 28	5 18	5 14	5 9	5 4	4 58	4 51

LOCAL ASTRONOMICAL MEAN TIME OF SUNRISE, MERIDIAN OF GREENWICH, 1911.

To obtain civil time, subtract 12 hours, mark the result A. M., and add one to the day.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunrise in southern latitudes see page 720.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Feb.	15	18 11	18 20	18 29	18 40	18 46	18 53	19 1	19 11	19 15	19 20	19 26	19 32	19 39
	16	18 11	18 20	18 29	18 39	18 45	18 52	19 0	19 9	19 14	19 18	19 23	19 29	19 36
	17	18 11	18 19	18 28	18 38	18 44	18 51	18 58	19 7	19 12	19 16	19 21	19 27	19 33
	18	18 11	18 19	18 28	18 37	18 43	18 49	18 57	19 5	19 10	19 14	19 19	19 24	19 30
	19	18 10	18 19	18 27	18 36	18 42	18 48	18 55	19 4	19 7	19 12	19 16	19 22	19 28
	20	18 10	18 18	18 26	18 36	18 41	18 47	18 54	19 2	19 5	19 10	19 14	19 19	19 25
	21	18 10	18 18	18 26	18 35	18 40	18 45	18 52	19 0	19 3	19 7	19 12	19 17	19 22
	22	18 10	18 17	18 25	18 34	18 38	18 44	18 50	18 58	19 1	19 5	19 9	19 14	19 19
	23	18 10	18 17	18 24	18 33	18 37	18 42	18 48	18 56	18 59	19 3	19 7	19 11	19 16
	24	18 10	18 17	18 24	18 32	18 36	18 41	18 47	18 54	18 57	19 0	19 4	19 9	19 14
	25	18 10	18 16	18 23	18 30	18 35	18 40	18 45	18 52	18 55	18 58	19 2	19 6	19 11
	26	18 10	18 16	18 22	18 29	18 34	18 38	18 44	18 50	18 53	18 56	18 59	19 3	19 8
	27	18 9	18 15	18 22	18 28	18 32	18 37	18 42	18 48	18 51	18 54	18 57	19 1	19 5
	28	18 9	18 15	18 21	18 27	18 31	18 35	18 40	18 46	18 48	18 51	18 54	18 58	19 2
Mar.	1	18 9	18 14	18 20	18 26	18 30	18 34	18 38	18 44	18 46	18 49	18 52	18 55	18 59
	2	18 9	18 14	18 19	18 25	18 28	18 32	18 37	18 42	18 44	18 47	18 49	18 53	18 56
	3	18 9	18 14	18 18	18 24	18 27	18 31	18 35	18 40	18 42	18 44	18 47	18 50	18 53
	4	18 8	18 13	18 18	18 23	18 26	18 29	18 33	18 38	18 40	18 42	18 44	18 47	18 50
	5	18 8	18 12	18 17	18 22	18 25	18 28	18 31	18 36	18 37	18 40	18 42	18 44	18 47
	6	18 8	18 12	18 16	18 21	18 23	18 26	18 30	18 33	18 35	18 37	18 39	18 42	18 44
	7	18 8	18 12	18 15	18 20	18 22	18 25	18 28	18 31	18 33	18 35	18 37	18 39	18 41
	8	18 8	18 11	18 14	18 18	18 20	18 23	18 26	18 29	18 30	18 32	18 34	18 36	18 38
	9	18 7	18 10	18 14	18 17	18 19	18 21	18 24	18 27	18 28	18 30	18 31	18 33	18 35
	10	18 7	18 10	18 13	18 16	18 18	18 20	18 22	18 25	18 26	18 27	18 29	18 30	18 32
	11	18 7	18 9	18 12	18 15	18 16	18 18	18 20	18 23	18 24	18 25	18 26	18 28	18 29
	12	18 6	18 9	18 11	18 14	18 15	18 17	18 18	18 20	18 21	18 22	18 24	18 25	18 26
	13	18 6	18 8	18 10	18 13	18 14	18 15	18 17	18 18	18 19	18 20	18 21	18 22	18 23
	14	18 6	18 8	18 9	18 11	18 12	18 14	18 15	18 16	18 17	18 18	18 18	18 19	18 20
	15	18 6	18 7	18 9	18 10	18 11	18 12	18 13	18 14	18 15	18 15	18 16	18 16	18 17
	16	18 5	18 6	18 8	18 9	18 10	18 10	18 11	18 12	18 12	18 13	18 13	18 14	18 14
	17	18 5	18 6	18 7	18 8	18 8	18 9	18 9	18 10	18 10	18 10	18 11	18 11	18 11
	18	18 5	18 5	18 6	18 7	18 7	18 7	18 7	18 8	18 8	18 8	18 8	18 8	18 8
	19	18 4	18 5	18 5	18 5	18 5	18 6	18 5	18 5	18 5	18 5	18 5	18 5	18 5
	20	18 4	18 4	18 4	18 4	18 4	18 4	18 4	18 3	18 3	18 3	18 3	18 3	18 2
	21	18 4	18 4	18 3	18 3	18 3	18 2	18 2	18 1	18 1	18 0	18 0	18 0	17 59
	22	18 4	18 3	18 2	18 2	18 1	18 1	18 0	17 59	17 58	17 58	17 57	17 57	17 56
	23	18 3	18 2	18 2	18 0	18 0	17 59	17 58	17 57	17 56	17 55	17 55	17 54	17 53
	24	18 3	18 2	18 1	17 59	17 58	17 57	17 56	17 54	17 54	17 53	17 52	17 51	17 50
	25	18 3	18 1	18 0	17 58	17 57	17 56	17 54	17 52	17 52	17 50	17 50	17 48	17 47
	26	18 2	18 1	17 59	17 57	17 56	17 54	17 52	17 50	17 49	17 48	17 47	17 46	17 44
	27	18 2	18 0	17 58	17 56	17 54	17 52	17 50	17 48	17 47	17 46	17 44	17 43	17 41
	28	18 2	18 0	17 57	17 54	17 53	17 51	17 48	17 46	17 44	17 43	17 41	17 40	17 38
	29	18 2	17 59	17 56	17 53	17 51	17 49	17 47	17 44	17 42	17 41	17 39	17 37	17 35
	30	18 1	17 58	17 56	17 52	17 50	17 48	17 45	17 41	17 40	17 38	17 36	17 34	17 32
	31	18 1	17 58	17 55	17 51	17 48	17 46	17 43	17 39	17 38	17 36	17 34	17 31	17 29
Apr.	1	18 1	17 57	17 54	17 50	17 47	17 44	17 41	17 37	17 35	17 33	17 31	17 28	17 26
	2	18 0	17 57	17 53	17 48	17 46	17 43	17 39	17 35	17 33	17 31	17 28	17 26	17 23

TABLE VIII.

707

LOCAL ASTRONOMICAL MEAN TIME OF SUNSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunset in southern latitudes see page 720.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Feb.	16	6 18	6 9	5 59	5 49	5 43	5 36	5 28	5 18	5 14	5 9	5 4	4 58	4 51
	17	6 18	6 9	6 0	5 50	5 44	5 37	5 29	5 20	5 16	5 11	5 6	5 0	4 54
	18	6 18	6 9	6 0	5 50	5 45	5 38	5 31	5 22	5 18	5 13	5 8	5 3	4 56
	19	6 18	6 9	6 1	5 51	5 46	5 40	5 32	5 24	5 20	5 15	5 10	5 5	4 59
	20	6 17	6 10	6 1	5 52	5 47	5 41	5 34	5 25	5 22	5 17	5 13	5 7	5 2
	21	6 17	6 10	6 2	5 53	5 48	5 42	5 35	5 27	5 23	5 19	5 15	5 10	5 4
	22	6 17	6 10	6 2	5 53	5 48	5 43	5 36	5 29	5 25	5 21	5 17	5 12	5 7
	23	6 17	6 10	6 3	5 54	5 49	5 44	5 38	5 30	5 27	5 23	5 19	5 14	5 9
	24	6 17	6 10	6 3	5 55	5 50	5 45	5 39	5 32	5 29	5 25	5 21	5 17	5 12
	25	6 17	6 10	6 3	5 56	5 51	5 46	5 40	5 34	5 31	5 27	5 23	5 19	5 14
	26	6 17	6 10	6 4	5 56	5 52	5 47	5 42	5 35	5 32	5 29	5 26	5 22	5 17
	27	6 16	6 10	6 4	5 57	5 53	5 49	5 43	5 37	5 34	5 31	5 28	5 24	5 20
	28	6 16	6 10	6 4	5 58	5 54	5 50	5 44	5 39	5 36	5 33	5 30	5 26	5 22
Mar.	1	6 16	6 10	6 5	5 58	5 55	5 51	5 46	5 40	5 38	5 35	5 32	5 28	5 25
	2	6 16	6 10	6 5	5 59	5 56	5 52	5 47	5 42	5 40	5 37	5 34	5 31	5 27
	3	6 16	6 11	6 6	6 0	5 56	5 53	5 49	5 44	5 42	5 39	5 36	5 33	5 30
	4	6 15	6 11	6 6	6 0	5 57	5 54	5 50	5 45	5 43	5 41	5 38	5 35	5 32
	5	6 15	6 11	6 6	6 1	5 58	5 55	5 51	5 47	5 45	5 43	5 40	5 38	5 35
	6	6 15	6 11	6 7	6 2	5 59	5 56	5 53	5 49	5 47	5 45	5 43	5 40	5 37
	7	6 15	6 11	6 7	6 3	6 0	5 57	5 54	5 50	5 49	5 47	5 45	5 42	5 40
	8	6 14	6 11	6 7	6 3	6 1	5 58	5 55	5 52	5 50	5 49	5 47	5 45	5 42
	9	6 14	6 11	6 8	6 4	6 2	5 59	5 57	5 54	5 52	5 51	5 49	5 47	5 45
	10	6 14	6 11	6 8	6 4	6 2	6 0	5 58	5 55	5 54	5 52	5 51	5 49	5 47
	11	6 14	6 11	6 8	6 5	6 3	6 1	5 59	5 57	5 56	5 54	5 53	5 51	5 50
	12	6 13	6 11	6 8	6 6	6 4	6 2	6 1	5 58	5 57	5 56	5 55	5 54	5 52
	13	6 13	6 11	6 9	6 6	6 5	6 4	6 2	6 0	5 59	5 58	5 57	5 56	5 55
	14	6 13	6 11	6 9	6 7	6 6	6 5	6 3	6 2	6 1	6 0	5 59	5 58	5 57
	15	6 13	6 11	6 10	6 8	6 7	6 6	6 5	6 3	6 3	6 2	6 1	6 1	6 0
	16	6 12	6 11	6 10	6 8	6 8	6 7	6 6	6 5	6 4	6 4	6 3	6 3	6 2
	17	6 12	6 11	6 10	6 9	6 8	6 8	6 7	6 6	6 6	6 6	6 5	6 5	6 4
	18	6 12	6 11	6 10	6 10	6 9	6 9	6 8	6 8	6 8	6 8	6 8	6 7	6 7
	19	6 12	6 11	6 11	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 10	6 9
	20	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 11	6 12	6 12	6 12	6 12
	21	6 11	6 11	6 11	6 11	6 12	6 12	6 12	6 13	6 13	6 13	6 14	6 14	6 14
	22	6 10	6 11	6 11	6 12	6 12	6 13	6 14	6 14	6 15	6 15	6 16	6 16	6 17
	23	6 10	6 11	6 12	6 13	6 13	6 14	6 15	6 16	6 16	6 17	6 18	6 18	6 19
	24	6 10	6 11	6 12	6 13	6 14	6 15	6 16	6 18	6 18	6 19	6 20	6 21	6 22
	25	6 10	6 11	6 12	6 14	6 15	6 16	6 17	6 19	6 20	6 21	6 22	6 23	6 24
	26	6 9	6 11	6 12	6 14	6 16	6 17	6 19	6 21	6 22	6 23	6 24	6 25	6 26
	27	6 9	6 11	6 13	6 15	6 16	6 18	6 20	6 22	6 23	6 25	6 26	6 27	6 29
	28	6 9	6 11	6 13	6 16	6 17	6 19	6 21	6 24	6 25	6 26	6 28	6 30	6 31
	29	6 8	6 11	6 13	6 16	6 18	6 20	6 22	6 25	6 27	6 28	6 30	6 32	6 34
	30	6 8	6 11	6 14	6 17	6 19	6 21	6 24	6 27	6 28	6 30	6 32	6 34	6 36
	31	6 8	6 11	6 14	6 18	6 20	6 22	6 25	6 28	6 30	6 32	6 34	6 36	6 39
Apr.	1	6 8	6 11	6 14	6 18	6 20	6 23	6 26	6 30	6 32	6 34	6 36	6 38	6 41
	2	6 7	6 10	6 14	6 19	6 21	6 24	6 28	6 32	6 34	6 36	6 38	6 41	6 44
	3	6 7	6 10	6 15	6 19	6 22	6 25	6 29	6 33	6 35	6 38	6 40	6 43	6 46

LOCAL ASTRONOMICAL MEAN TIME OF SUNRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, subtract 12 hours, mark the result A. M., and add one to the day.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunrise in southern latitudes see page 720.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Apr. 1	h m 18 1	h m 17 57	h m 17 54	h m 17 50	h m 17 47	h m 17 44	h m 17 41	h m 17 37	h m 17 35	h m 17 33	h m 17 31	h m 17 28	h m 17 26
2	18 0	17 57	17 53	17 48	17 46	17 43	17 39	17 35	17 33	17 31	17 28	17 26	17 23
3	18 0	17 56	17 52	17 47	17 44	17 41	17 37	17 33	17 31	17 28	17 26	17 23	17 20
4	18 0	17 56	17 51	17 46	17 43	17 40	17 35	17 30	17 28	17 26	17 23	17 20	17 17
5	17 59	17 55	17 50	17 45	17 42	17 38	17 34	17 28	17 26	17 23	17 20	17 17	17 14
6	17 59	17 54	17 50	17 44	17 40	17 36	17 32	17 26	17 24	17 21	17 18	17 14	17 10
7	17 59	17 54	17 49	17 42	17 39	17 35	17 30	17 24	17 22	17 18	17 15	17 12	17 7
8	17 58	17 53	17 48	17 41	17 38	17 33	17 28	17 22	17 19	17 16	17 13	17 9	17 4
9	17 58	17 53	17 47	17 41	17 36	17 32	17 26	17 20	17 17	17 14	17 10	17 6	17 2
10	17 58	17 52	17 46	17 39	17 35	17 30	17 24	17 18	17 15	17 11	17 8	17 3	16 59
11	17 58	17 52	17 45	17 38	17 34	17 29	17 23	17 16	17 12	17 9	17 5	17 1	16 56
12	17 57	17 51	17 45	17 37	17 32	17 27	17 21	17 14	17 10	17 7	17 2	16 58	16 53
13	17 57	17 51	17 44	17 36	17 31	17 26	17 19	17 12	17 8	17 4	17 0	16 55	16 50
14	17 57	17 50	17 43	17 34	17 30	17 24	17 17	17 10	17 6	17 2	16 57	16 52	16 47
15	17 57	17 50	17 42	17 33	17 28	17 22	17 16	17 8	17 4	17 0	16 55	16 50	16 44
16	17 56	17 49	17 41	17 32	17 27	17 21	17 14	17 5	17 1	16 57	16 52	16 47	16 41
17	17 56	17 49	17 41	17 31	17 26	17 20	17 12	17 3	16 59	16 55	16 50	16 44	16 38
18	17 56	17 48	17 40	17 30	17 24	17 18	17 10	17 1	16 57	16 52	16 47	16 42	16 35
19	17 56	17 48	17 39	17 29	17 23	17 16	17 9	16 59	16 55	16 50	16 45	16 39	16 32
20	17 55	17 47	17 38	17 28	17 22	17 15	17 7	16 57	16 53	16 48	16 42	16 36	16 29
21	17 55	17 47	17 38	17 27	17 21	17 14	17 5	16 55	16 51	16 46	16 40	16 34	16 26
22	17 55	17 46	17 37	17 26	17 20	17 12	17 4	16 53	16 49	16 43	16 37	16 31	16 23
23	17 55	17 46	17 36	17 25	17 18	17 11	17 2	16 51	16 46	16 41	16 35	16 28	16 20
24	17 55	17 45	17 35	17 24	17 17	17 10	17 0	16 50	16 44	16 39	16 33	16 26	16 18
25	17 54	17 45	17 35	17 23	17 16	17 8	16 59	16 48	16 42	16 37	16 30	16 23	16 15
26	17 54	17 45	17 34	17 22	17 15	17 7	16 57	16 46	16 40	16 34	16 28	16 20	16 12
27	17 54	17 44	17 33	17 21	17 14	17 5	16 56	16 44	16 38	16 32	16 25	16 18	16 9
28	17 54	17 44	17 33	17 20	17 13	17 4	16 54	16 42	16 36	16 30	16 23	16 15	16 6
29	17 54	17 43	17 32	17 19	17 11	17 3	16 52	16 40	16 34	16 28	16 21	16 13	16 4
30	17 54	17 43	17 32	17 18	17 10	17 2	16 51	16 38	16 32	16 26	16 18	16 10	16 1
May 1	17 54	17 43	17 31	17 17	17 9	17 0	16 50	16 37	16 30	16 24	16 16	16 8	15 58
2	17 54	17 42	17 30	17 16	17 8	16 59	16 48	16 35	16 29	16 22	16 14	16 5	15 55
3	17 53	17 42	17 30	17 16	17 7	16 58	16 46	16 33	16 27	16 20	16 12	16 3	15 53
4	17 53	17 42	17 29	17 15	17 6	16 57	16 45	16 31	16 25	16 18	16 10	16 0	15 50
5	17 53	17 41	17 28	17 14	17 5	16 55	16 44	16 30	16 23	16 16	16 7	15 58	15 47
6	17 53	17 41	17 28	17 13	17 4	16 54	16 42	16 28	16 21	16 14	16 5	15 56	15 45
7	17 53	17 41	17 28	17 12	17 3	16 53	16 41	16 26	16 19	16 12	16 3	15 53	15 42
8	17 53	17 40	17 27	17 11	17 2	16 52	16 40	16 25	16 18	16 10	16 1	15 51	15 40
9	17 53	17 40	17 26	17 11	17 1	16 51	16 38	16 23	16 16	16 8	15 59	15 49	15 37
10	17 53	17 40	17 26	17 10	17 0	16 50	16 37	16 22	16 14	16 6	15 57	15 46	15 34
11	17 53	17 40	17 26	17 9	17 0	16 49	16 36	16 20	16 12	16 4	15 55	15 44	15 32
12	17 53	17 40	17 26	17 9	16 59	16 48	16 34	16 18	16 11	16 2	15 53	15 42	15 29
13	17 53	17 39	17 25	17 8	16 58	16 47	16 33	16 17	16 9	16 1	15 51	15 40	15 27
14	17 53	17 39	17 24	17 7	16 57	16 46	16 32	16 16	16 8	15 59	15 49	15 38	15 25
15	17 53	17 39	17 24	17 7	16 56	16 45	16 31	16 14	16 6	15 57	15 47	15 36	15 22
16	17 53	17 39	17 24	17 6	16 56	16 44	16 30	16 13	16 5	15 56	15 45	15 34	15 20
17	17 53	17 38	17 23	17 5	16 55	16 43	16 29	16 11	16 3	15 54	15 44	15 32	15 18

TABLE VIII.

709

LOCAL ASTRONOMICAL MEAN TIME OF SUNSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunset in southern latitudes see page 720.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Apr. 2	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
3	6 7	6 10	6 14	6 19	6 21	6 24	6 28	6 32	6 34	6 36	6 38	6 41	6 44
4	6 7	6 10	6 15	6 19	6 22	6 25	6 29	6 33	6 35	6 38	6 40	6 43	6 46
5	6 6	6 10	6 15	6 20	6 23	6 26	6 30	6 35	6 37	6 40	6 42	6 45	6 48
6	6 6	6 10	6 15	6 20	6 24	6 27	6 31	6 36	6 39	6 41	6 44	6 47	6 51
7	6 6	6 10	6 15	6 21	6 24	6 28	6 33	6 38	6 40	6 43	6 46	6 50	6 53
8	6 6	6 10	6 16	6 22	6 25	6 29	6 34	6 39	6 42	6 45	6 48	6 52	6 56
9	6 6	6 10	6 16	6 22	6 26	6 30	6 35	6 41	6 44	6 47	6 50	6 54	6 58
10	6 5	6 10	6 16	6 23	6 27	6 31	6 36	6 43	6 46	6 49	6 52	6 56	7 1
11	6 5	6 10	6 16	6 24	6 28	6 32	6 38	6 44	6 47	6 50	6 54	6 58	7 3
12	6 4	6 10	6 17	6 24	6 28	6 33	6 39	6 46	6 49	6 52	6 56	7 1	7 6
13	6 4	6 10	6 17	6 25	6 29	6 34	6 40	6 47	6 51	6 54	6 58	7 3	7 8
14	6 4	6 10	6 18	6 25	6 30	6 35	6 42	6 49	6 52	6 56	7 0	7 5	7 10
15	6 4	6 10	6 18	6 26	6 31	6 36	6 43	6 50	6 54	6 58	7 2	7 7	7 13
16	6 3	6 10	6 18	6 26	6 32	6 37	6 44	6 52	6 56	7 0	7 4	7 9	7 15
17	6 3	6 10	6 18	6 27	6 32	6 38	6 45	6 54	6 58	7 2	7 6	7 12	7 18
18	6 3	6 10	6 19	6 28	6 33	6 39	6 46	6 55	6 59	7 4	7 8	7 14	7 20
19	6 3	6 11	6 19	6 28	6 34	6 40	6 48	6 57	7 1	7 5	7 10	7 16	7 23
20	6 2	6 11	6 19	6 29	6 35	6 41	6 49	6 58	7 3	7 7	7 12	7 18	7 25
21	6 2	6 11	6 20	6 30	6 36	6 42	6 50	7 0	7 4	7 9	7 14	7 21	7 28
22	6 2	6 11	6 20	6 31	6 37	6 44	6 53	7 3	7 8	7 13	7 19	7 25	7 33
23	6 2	6 11	6 20	6 31	6 38	6 45	6 54	7 4	7 9	7 15	7 21	7 27	7 35
24	6 2	6 11	6 21	6 32	6 39	6 46	6 55	7 6	7 11	7 17	7 23	7 30	7 38
25	6 2	6 11	6 21	6 33	6 40	6 47	6 57	7 8	7 13	7 18	7 25	7 32	7 40
26	6 1	6 11	6 21	6 33	6 40	6 48	6 58	7 9	7 14	7 20	7 27	7 34	7 42
27	6 1	6 11	6 22	6 34	6 41	6 49	6 59	7 11	7 16	7 22	7 29	7 36	7 45
28	6 1	6 11	6 22	6 35	6 42	6 50	7 0	7 12	7 18	7 24	7 31	7 39	7 47
29	6 1	6 11	6 22	6 35	6 43	6 51	7 2	7 14	7 19	7 26	7 33	7 41	7 50
30	6 1	6 11	6 23	6 36	6 44	6 52	7 3	7 15	7 21	7 28	7 35	7 43	7 52
May 1	6 1	6 12	6 23	6 37	6 44	6 53	7 4	7 17	7 23	7 30	7 37	7 45	7 55
2	6 0	6 12	6 23	6 37	6 45	6 54	7 5	7 18	7 24	7 31	7 39	7 48	7 57
3	6 0	6 12	6 24	6 38	6 46	6 55	7 7	7 20	7 26	7 33	7 41	7 50	8 0
4	6 0	6 12	6 24	6 38	6 47	6 56	7 8	7 21	7 28	7 35	7 43	7 52	8 2
5	6 0	6 12	6 25	6 39	6 48	6 57	7 9	7 23	7 30	7 37	7 45	7 54	8 5
6	6 0	6 12	6 25	6 40	6 49	6 58	7 10	7 24	7 31	7 39	7 47	7 56	8 7
7	6 0	6 12	6 25	6 40	6 49	6 59	7 12	7 26	7 33	7 40	7 49	7 58	8 10
8	6 0	6 12	6 26	6 41	6 50	7 0	7 13	7 28	7 34	7 42	7 51	8 1	8 12
9	6 0	6 12	6 26	6 42	6 51	7 1	7 14	7 29	7 36	7 44	7 53	8 3	8 15
10	6 0	6 13	6 26	6 42	6 52	7 2	7 15	7 30	7 38	7 46	7 55	8 5	8 17
11	6 0	6 13	6 27	6 43	6 53	7 3	7 16	7 32	7 39	7 48	7 57	8 7	8 20
12	6 0	6 13	6 27	6 44	6 53	7 4	7 17	7 33	7 41	7 49	7 59	8 9	8 22
13	6 0	6 13	6 28	6 44	6 54	7 5	7 19	7 35	7 42	7 51	8 1	8 12	8 24
14	6 0	6 13	6 28	6 45	6 55	7 6	7 20	7 36	7 44	7 53	8 2	8 14	8 27
15	6 0	6 14	6 28	6 46	6 56	7 7	7 21	7 38	7 46	7 54	8 4	8 16	8 29
16	6 0	6 14	6 29	6 46	6 56	7 8	7 22	7 39	7 47	7 56	8 6	8 18	8 31
17	6 0	6 14	6 29	6 47	6 57	7 9	7 23	7 40	7 49	7 58	8 8	8 20	8 34
18	6 0	6 14	6 30	6 48	6 58	7 10	7 24	7 42	7 50	7 59	8 10	8 22	8 36

LOCAL ASTRONOMICAL MEAN TIME OF SUNRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, subtract 12 hours, mark the result A. M., and add one to the day.
To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.
For sunrise in southern latitudes see page 720.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
May	17	17 53	17 38	17 23	17 5	16 55	16 43	16 29	16 11	16 3	15 54	15 44	15 32	15 18
	18	17 53	17 38	17 23	17 5	16 54	16 42	16 28	16 10	16 2	15 52	15 42	15 30	15 16
	19	17 53	17 38	17 22	17 4	16 54	16 41	16 27	16 9	16 0	15 51	15 40	15 28	15 13
	20	17 53	17 38	17 22	17 4	16 53	16 40	16 26	16 8	15 59	15 49	15 38	15 26	15 11
	21	17 53	17 38	17 22	17 3	16 52	16 40	16 25	16 6	15 58	15 48	15 37	15 24	15 9
	22	17 53	17 38	17 22	17 3	16 52	16 39	16 24	16 5	15 56	15 46	15 35	15 22	15 7
	23	17 53	17 38	17 21	17 2	16 51	16 38	16 23	16 4	15 55	15 45	15 34	15 20	15 5
	24	17 53	17 38	17 21	17 2	16 50	16 38	16 22	16 3	15 54	15 44	15 32	15 19	15 3
	25	17 53	17 38	17 21	17 1	16 50	16 37	16 21	16 2	15 53	15 42	15 31	15 17	15 1
	26	17 53	17 38	17 21	17 1	16 50	16 36	16 20	16 1	15 52	15 41	15 29	15 15	14 59
	27	17 53	17 38	17 20	17 1	16 49	16 36	16 20	16 0	15 51	15 40	15 28	15 14	14 57
	28	17 54	17 38	17 20	17 0	16 49	16 35	16 19	15 59	15 50	15 39	15 27	15 12	14 56
	29	17 54	17 38	17 20	17 0	16 48	16 35	16 18	15 58	15 49	15 38	15 25	15 11	14 54
	30	17 54	17 38	17 20	17 0	16 48	16 34	16 18	15 57	15 48	15 37	15 24	15 10	14 52
	31	17 54	17 38	17 20	16 59	16 47	16 34	16 17	15 56	15 47	15 36	15 23	15 8	14 50
June	1	17 54	17 38	17 20	16 59	16 47	16 33	16 16	15 56	15 46	15 35	15 22	15 7	14 49
	2	17 54	17 38	17 20	16 59	16 47	16 33	16 16	15 55	15 45	15 34	15 21	15 6	14 48
	3	17 54	17 38	17 20	16 59	16 46	16 32	16 16	15 54	15 44	15 33	15 20	15 5	14 46
	4	17 54	17 38	17 20	16 59	16 46	16 32	16 15	15 54	15 44	15 32	15 19	15 4	14 45
	5	17 55	17 38	17 20	16 58	16 46	16 32	16 15	15 53	15 43	15 31	15 18	15 3	14 44
	6	17 55	17 38	17 20	16 58	16 46	16 31	16 14	15 53	15 42	15 31	15 17	15 2	14 43
	7	17 55	17 38	17 20	16 58	16 46	16 31	16 14	15 52	15 42	15 30	15 16	15 1	14 42
	8	17 55	17 38	17 20	16 58	16 46	16 31	16 14	15 52	15 41	15 30	15 16	15 0	14 41
	9	17 55	17 38	17 20	16 58	16 45	16 31	16 13	15 51	15 41	15 29	15 15	14 59	14 40
	10	17 56	17 38	17 20	16 58	16 45	16 31	16 13	15 51	15 40	15 28	15 15	14 58	14 39
	11	17 56	17 38	17 20	16 58	16 45	16 30	16 13	15 51	15 40	15 28	15 14	14 58	14 38
	12	17 56	17 39	17 20	16 58	16 45	16 30	16 13	15 50	15 40	15 28	15 14	14 57	14 37
	13	17 56	17 39	17 20	16 58	16 45	16 30	16 12	15 50	15 40	15 27	15 13	14 57	14 37
	14	17 56	17 39	17 20	16 58	16 45	16 30	16 12	15 50	15 39	15 27	15 13	14 56	14 36
	15	17 56	17 39	17 20	16 58	16 45	16 30	16 12	15 50	15 39	15 27	15 13	14 56	14 36
	16	17 57	17 39	17 20	16 58	16 45	16 30	16 12	15 50	15 39	15 27	15 13	14 56	14 36
	17	17 57	17 40	17 20	16 59	16 45	16 30	16 12	15 50	15 39	15 27	15 12	14 56	14 35
	18	17 57	17 40	17 21	16 59	16 46	16 30	16 13	15 50	15 39	15 27	15 12	14 56	14 35
	19	17 57	17 40	17 21	16 59	16 46	16 31	16 13	15 50	15 39	15 27	15 12	14 56	14 35
	20	17 58	17 40	17 21	16 59	16 46	16 31	16 13	15 50	15 39	15 27	15 13	14 56	14 35
	21	17 58	17 40	17 21	16 59	16 46	16 31	16 13	15 50	15 39	15 27	15 13	14 56	14 35
	22	17 58	17 40	17 22	16 59	16 46	16 31	16 13	15 51	15 40	15 27	15 13	14 56	14 36
	23	17 58	17 41	17 22	17 0	16 46	16 31	16 13	15 51	15 40	15 28	15 13	14 56	14 36
	24	17 58	17 41	17 22	17 0	16 47	16 32	16 14	15 51	15 40	15 28	15 14	14 57	14 36
	25	17 59	17 41	17 22	17 0	16 47	16 32	16 14	15 52	15 41	15 28	15 14	14 57	14 37
	26	17 59	17 41	17 22	17 0	16 48	16 32	16 14	15 52	15 41	15 29	15 15	14 58	14 38
	27	17 59	17 42	17 23	17 1	16 48	16 33	16 15	15 52	15 42	15 29	15 15	14 58	14 38
	28	17 59	17 42	17 23	17 1	16 48	16 33	16 15	15 53	15 42	15 30	15 16	14 59	14 39
	29	18 0	17 42	17 23	17 1	16 48	16 34	16 16	15 53	15 43	15 30	15 16	15 0	14 40
	30	18 0	17 42	17 24	17 2	16 49	16 34	16 16	15 54	15 43	15 31	15 17	15 1	14 41
July	1	18 0	17 43	17 24	17 2	16 49	16 34	16 17	15 55	15 44	15 32	15 18	15 2	14 42
	2	18 0	17 43	17 24	17 2	16 50	16 35	16 17	15 55	15 45	15 33	15 19	15 3	14 43

TABLE VIII.

711

LOCAL ASTRONOMICAL MEAN TIME OF SUNSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunset in southern latitudes see page 720.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
May 18	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
19	6 0	6 14	6 30	6 48	6 58	7 10	7 24	7 42	7 50	7 59	8 10	8 22	8 36
20	6 0	6 14	6 30	6 48	6 59	7 11	7 25	7 43	7 52	8 1	8 12	8 24	8 38
21	6 0	6 15	6 31	6 49	7 0	7 12	7 26	7 44	7 53	8 3	8 14	8 26	8 40
22	6 0	6 15	6 31	6 50	7 1	7 14	7 29	7 47	7 56	8 6	8 17	8 30	8 45
23	6 0	6 15	6 32	6 51	7 2	7 15	7 30	7 48	7 57	8 7	8 19	8 32	8 47
24	6 0	6 16	6 32	6 51	7 2	7 15	7 31	7 50	7 59	8 9	8 20	8 34	8 49
25	6 0	6 16	6 32	6 52	7 3	7 16	7 32	7 51	8 0	8 10	8 22	8 36	8 52
26	6 0	6 16	6 33	6 52	7 4	7 17	7 33	7 52	8 2	8 12	8 24	8 37	8 54
27	6 0	6 16	6 33	6 53	7 5	7 18	7 34	7 53	8 3	8 13	8 25	8 39	8 56
28	6 1	6 17	6 34	6 54	7 5	7 19	7 35	7 55	8 4	8 15	8 27	8 41	8 58
29	6 1	6 17	6 34	6 54	7 6	7 20	7 36	7 56	8 5	8 16	8 28	8 43	9 0
30	6 1	6 17	6 34	6 55	7 7	7 20	7 36	7 57	8 6	8 17	8 30	8 44	9 2
31	6 1	6 17	6 35	6 55	7 7	7 21	7 37	7 58	8 8	8 19	8 31	8 46	9 4
June 1	6 1	6 18	6 35	6 56	7 8	7 22	7 38	7 59	8 9	8 20	8 33	8 48	9 5
2	6 1	6 18	6 36	6 56	7 8	7 22	7 39	8 0	8 10	8 21	8 34	8 49	9 7
3	6 1	6 18	6 36	6 56	7 9	7 23	7 40	8 1	8 11	8 22	8 35	8 50	9 9
4	6 2	6 18	6 36	6 57	7 10	7 24	7 41	8 2	8 12	8 24	8 37	8 52	9 10
5	6 2	6 18	6 37	6 58	7 10	7 24	7 42	8 3	8 13	8 25	8 38	8 53	9 12
6	6 2	6 19	6 37	6 58	7 11	7 25	7 42	8 4	8 14	8 26	8 39	8 55	9 14
7	6 2	6 19	6 38	6 59	7 11	7 26	7 43	8 5	8 15	8 27	8 40	8 56	9 15
8	6 2	6 20	6 38	6 59	7 12	7 26	7 44	8 6	8 16	8 28	8 41	8 57	9 16
9	6 2	6 20	6 38	7 0	7 12	7 27	7 44	8 6	8 17	8 29	8 42	8 58	9 18
10	6 3	6 20	6 38	7 0	7 13	7 28	7 46	8 7	8 18	8 30	8 43	8 59	9 19
11	6 3	6 20	6 39	7 1	7 13	7 28	7 46	8 8	8 18	8 30	8 44	9 1	9 20
12	6 3	6 20	6 39	7 1	7 14	7 29	7 46	8 8	8 19	8 31	8 45	9 2	9 21
13	6 3	6 21	6 40	7 1	7 14	7 29	7 47	8 9	8 20	8 32	8 46	9 2	9 22
14	6 4	6 21	6 40	7 2	7 15	7 30	7 47	8 10	8 20	8 33	8 47	9 3	9 23
15	6 4	6 21	6 40	7 2	7 15	7 30	7 48	8 10	8 21	8 33	8 47	9 4	9 24
16	6 4	6 22	6 40	7 2	7 15	7 30	7 48	8 11	8 22	8 34	8 48	9 5	9 25
17	6 4	6 22	6 41	7 3	7 16	7 31	7 49	8 11	8 22	8 34	8 49	9 5	9 26
18	6 4	6 22	6 41	7 3	7 16	7 31	7 49	8 12	8 23	8 35	8 49	9 6	9 26
19	6 5	6 22	6 41	7 3	7 16	7 31	7 49	8 12	8 23	8 35	8 50	9 6	9 27
20	6 5	6 22	6 41	7 4	7 17	7 32	7 50	8 12	8 23	8 36	8 50	9 7	9 27
21	6 5	6 23	6 42	7 4	7 17	7 32	7 50	8 12	8 24	8 36	8 50	9 7	9 28
22	6 5	6 23	6 42	7 4	7 17	7 32	7 50	8 13	8 24	8 36	8 50	9 7	9 28
23	6 5	6 23	6 42	7 4	7 17	7 32	7 50	8 13	8 24	8 36	8 50	9 7	9 28
24	6 6	6 23	6 42	7 4	7 17	7 32	7 50	8 13	8 24	8 36	8 51	9 7	9 28
25	6 6	6 24	6 42	7 4	7 18	7 32	7 50	8 13	8 24	8 36	8 51	9 7	9 28
26	6 6	6 24	6 43	7 5	7 18	7 33	7 51	8 13	8 24	8 36	8 51	9 7	9 28
27	6 6	6 24	6 43	7 5	7 18	7 33	7 51	8 13	8 24	8 36	8 50	9 7	9 28
28	6 6	6 24	6 43	7 5	7 18	7 33	7 51	8 13	8 24	8 36	8 50	9 7	9 27
29	6 7	6 24	6 43	7 5	7 18	7 33	7 50	8 13	8 24	8 36	8 50	9 7	9 27
30	6 7	6 24	6 43	7 5	7 18	7 33	7 50	8 13	8 24	8 36	8 50	9 6	9 26
July 1	6 7	6 24	6 43	7 5	7 18	7 33	7 50	8 13	8 23	8 35	8 49	9 6	9 26
2	6 7	6 25	6 43	7 5	7 18	7 33	7 50	8 12	8 23	8 35	8 49	9 5	9 25
3	6 8	6 25	6 43	7 5	7 18	7 32	7 50	8 12	8 23	8 35	8 48	9 5	9 25

LOCAL ASTRONOMICAL MEAN TIME OF SUNRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, subtract 12 hours, mark the result A. M., and add one to the day.
To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.
For sunrise in southern latitudes see page 720.

Data.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
July	1	18 0	17 43	17 24	17 2	16 49	16 34	16 17	15 55	15 44	15 32	15 18	15 2	14 42
	2	18 0	17 43	17 24	17 2	16 50	16 35	16 17	15 55	15 45	15 33	15 19	15 3	14 43
	3	18 0	17 43	17 25	17 3	16 50	16 36	16 18	15 56	15 45	15 34	15 20	15 4	14 44
	4	18 0	17 43	17 25	17 3	16 51	16 36	16 19	15 57	15 46	15 34	15 21	15 5	14 45
	5	18 1	17 44	17 25	17 4	16 51	16 37	16 19	15 58	15 47	15 35	15 22	15 6	14 46
	6	18 1	17 44	17 26	17 4	16 52	16 37	16 20	15 58	15 48	15 36	15 23	15 7	14 48
	7	18 1	17 44	17 26	17 5	16 52	16 38	16 21	15 59	15 49	15 37	15 24	15 8	14 49
	8	18 1	17 44	17 26	17 5	16 53	16 38	16 21	16 0	15 50	15 38	15 25	15 10	14 51
	9	18 1	17 45	17 27	17 6	16 53	16 39	16 22	16 1	15 51	15 39	15 26	15 11	14 52
	10	18 2	17 45	17 27	17 6	16 54	16 40	16 23	16 2	15 52	15 40	15 27	15 12	14 54
	11	18 2	17 45	17 27	17 7	16 54	16 40	16 24	16 3	15 53	15 42	15 29	15 14	14 56
	12	18 2	17 45	17 28	17 7	16 55	16 41	16 24	16 4	15 54	15 43	15 30	15 15	14 57
	13	18 2	17 46	17 28	17 8	16 56	16 42	16 25	16 5	15 55	15 44	15 32	15 17	14 59
	14	18 2	17 46	17 28	17 8	16 56	16 43	16 26	16 6	15 56	15 45	15 33	15 18	15 1
	15	18 2	17 46	17 29	17 9	16 57	16 43	16 27	16 7	15 58	15 47	15 34	15 20	15 3
	16	18 2	17 46	17 29	17 9	16 58	16 44	16 28	16 8	15 59	15 48	15 36	15 22	15 5
	17	18 2	17 47	17 30	17 10	16 58	16 45	16 29	16 9	16 0	15 49	15 37	15 24	15 7
	18	18 2	17 47	17 30	17 10	16 59	16 46	16 30	16 10	16 1	15 51	15 39	15 25	15 9
	19	18 2	17 47	17 30	17 11	17 0	16 46	16 31	16 12	16 2	15 52	15 41	15 27	15 11
	20	18 3	17 47	17 31	17 12	17 0	16 47	16 32	16 13	16 4	15 54	15 42	15 29	15 13
	21	18 3	17 48	17 31	17 12	17 1	16 48	16 33	16 14	16 5	15 55	15 44	15 31	15 15
	22	18 3	17 48	17 32	17 13	17 2	16 49	16 34	16 15	16 7	15 57	15 45	15 33	15 17
	23	18 3	17 48	17 32	17 13	17 2	16 50	16 35	16 17	16 8	15 58	15 47	15 34	15 20
	24	18 3	17 48	17 32	17 14	17 3	16 51	16 36	16 18	16 9	16 0	15 49	15 36	15 22
	25	18 3	17 48	17 33	17 14	17 4	16 52	16 37	16 19	16 11	16 1	15 51	15 38	15 24
	26	18 3	17 48	17 33	17 15	17 5	16 52	16 38	16 20	16 12	16 3	15 52	15 40	15 26
	27	18 3	17 49	17 33	17 16	17 5	16 53	16 39	16 22	16 14	16 5	15 54	15 42	15 28
	28	18 3	17 49	17 34	17 16	17 6	16 54	16 40	16 23	16 15	16 6	15 56	15 44	15 31
	29	18 3	17 49	17 34	17 17	17 7	16 55	16 42	16 25	16 17	16 8	15 58	15 46	15 33
	30	18 3	17 49	17 34	17 18	17 8	16 56	16 43	16 26	16 18	16 10	16 0	15 48	15 35
Aug.	31	18 3	17 49	17 35	17 18	17 8	16 57	16 44	16 27	16 20	16 11	16 1	15 51	15 38
	1	18 3	17 50	17 35	17 19	17 9	16 58	16 45	16 29	16 21	16 13	16 3	15 53	15 40
	2	18 3	17 50	17 36	17 19	17 10	16 59	16 46	16 30	16 23	16 15	16 5	15 55	15 42
	3	18 3	17 50	17 36	17 20	17 10	17 0	16 47	16 32	16 24	16 16	16 7	15 57	15 45
	4	18 2	17 50	17 36	17 20	17 11	17 1	16 48	16 33	16 26	16 18	16 9	15 59	15 47
	5	18 2	17 50	17 36	17 21	17 12	17 2	16 50	16 34	16 28	16 20	16 11	16 1	15 50
	6	18 2	17 50	17 37	17 22	17 13	17 3	16 51	16 36	16 29	16 21	16 13	16 3	15 52
	7	18 2	17 50	17 37	17 22	17 14	17 4	16 52	16 37	16 31	16 23	16 15	16 5	15 54
	8	18 2	17 50	17 38	17 23	17 14	17 5	16 53	16 39	16 32	16 25	16 17	16 8	15 57
	9	18 2	17 50	17 38	17 24	17 15	17 6	16 54	16 40	16 34	16 27	16 19	16 10	15 59
	10	18 2	17 50	17 38	17 24	17 16	17 6	16 55	16 42	16 36	16 28	16 21	16 12	16 2
	11	18 2	17 51	17 38	17 25	17 17	17 7	16 57	16 43	16 37	16 30	16 23	16 14	16 4
	12	18 2	17 51	17 39	17 25	17 17	17 8	16 58	16 45	16 39	16 32	16 24	16 16	16 6
	13	18 1	17 51	17 39	17 26	17 18	17 9	16 59	16 46	16 40	16 34	16 26	16 18	16 9
	14	18 1	17 51	17 40	17 26	17 19	17 10	17 0	16 48	16 42	16 36	16 28	16 20	16 11
	15	18 1	17 51	17 40	17 27	17 20	17 11	17 1	16 49	16 44	16 37	16 30	16 22	16 14
	16	18 1	17 51	17 40	17 28	17 20	17 12	17 2	16 51	16 45	16 39	16 32	16 25	16 16

TABLE VIII.

713

LOCAL ASTRONOMICAL MEAN TIME OF SUNSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunset in southern latitudes see page 720.

Data.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
July	2	6 7	6 25	6 43	7 5	7 18	7 33	7 50	8 12	8 23	8 35	8 49	9 5	9 25
	3	6 8	6 25	6 43	7 5	7 18	7 32	7 50	8 12	8 23	8 35	8 48	9 5	9 24
	4	6 8	6 25	6 43	7 5	7 18	7 32	7 50	8 12	8 22	8 34	8 48	9 4	9 24
	5	6 8	6 25	6 43	7 5	7 18	7 32	7 50	8 11	8 22	8 34	8 47	9 3	9 23
	6	6 8	6 25	6 43	7 5	7 17	7 32	7 49	8 11	8 21	8 33	8 47	9 2	9 22
	7	6 8	6 25	6 43	7 5	7 17	7 32	7 49	8 10	8 21	8 32	8 46	9 1	9 20
	8	6 8	6 25	6 43	7 4	7 17	7 31	7 48	8 10	8 20	8 32	8 45	9 0	9 19
	9	6 8	6 25	6 43	7 4	7 17	7 31	7 48	8 9	8 19	8 31	8 44	8 59	9 18
	10	6 9	6 25	6 43	7 4	7 16	7 31	7 48	8 9	8 19	8 30	8 43	8 58	9 17
	11	6 9	6 25	6 43	7 4	7 16	7 30	7 47	8 8	8 18	8 29	8 42	8 57	9 16
	12	6 9	6 25	6 43	7 4	7 16	7 30	7 46	8 7	8 17	8 28	8 41	8 56	9 14
	13	6 9	6 25	6 43	7 3	7 16	7 29	7 46	8 6	8 16	8 27	8 40	8 55	9 12
	14	6 9	6 25	6 43	7 3	7 15	7 29	7 45	8 6	8 15	8 26	8 39	8 53	9 11
	15	6 9	6 25	6 43	7 3	7 15	7 28	7 45	8 5	8 14	8 25	8 38	8 52	9 9
	16	6 9	6 25	6 42	7 2	7 14	7 28	7 44	8 4	8 13	8 24	8 36	8 51	9 8
	17	6 9	6 25	6 42	7 2	7 14	7 27	7 43	8 3	8 12	8 23	8 35	8 49	9 6
	18	6 9	6 25	6 42	7 2	7 13	7 27	7 42	8 2	8 11	8 22	8 34	8 47	9 4
	19	6 10	6 25	6 42	7 1	7 13	7 26	7 42	8 1	8 10	8 20	8 32	8 46	9 2
	20	6 10	6 25	6 42	7 1	7 12	7 25	7 41	8 0	8 9	8 19	8 31	8 44	9 0
	21	6 10	6 25	6 41	7 0	7 12	7 25	7 40	7 59	8 8	8 18	8 29	8 42	8 58
	22	6 10	6 25	6 41	7 0	7 11	7 24	7 39	7 58	8 6	8 16	8 28	8 41	8 56
	23	6 10	6 25	6 41	6 59	7 10	7 23	7 38	7 56	8 5	8 15	8 26	8 39	8 54
	24	6 10	6 24	6 40	6 59	7 10	7 22	7 37	7 55	8 4	8 13	8 24	8 37	8 52
	25	6 10	6 24	6 40	6 58	7 9	7 21	7 36	7 54	8 2	8 12	8 23	8 35	8 50
	26	6 10	6 24	6 40	6 58	7 8	7 21	7 35	7 53	8 1	8 10	8 21	8 33	8 48
	27	6 10	6 24	6 39	6 57	7 8	7 20	7 34	7 51	8 0	8 9	8 19	8 31	8 45
	28	6 10	6 24	6 39	6 56	7 7	7 19	7 33	7 50	7 58	8 7	8 18	8 29	8 43
	29	6 10	6 24	6 39	6 56	7 6	7 18	7 32	7 49	7 56	8 5	8 16	8 27	8 40
	30	6 10	6 23	6 38	6 55	7 5	7 17	7 30	7 47	7 55	8 4	8 14	8 25	8 38
	31	6 10	6 23	6 38	6 55	7 4	7 16	7 29	7 46	7 54	8 2	8 12	8 23	8 36
Aug.	1	6 10	6 23	6 37	6 54	7 4	7 15	7 28	7 44	7 52	8 0	8 10	8 21	8 33
	2	6 9	6 23	6 37	6 53	7 3	7 14	7 27	7 43	7 50	7 58	8 8	8 18	8 31
	3	6 9	6 22	6 36	6 52	7 2	7 13	7 26	7 41	7 48	7 57	8 6	8 16	8 28
	4	6 9	6 22	6 36	6 52	7 1	7 12	7 24	7 40	7 47	7 55	8 4	8 14	8 26
	5	6 9	6 22	6 35	6 51	7 0	7 10	7 23	7 38	7 45	7 53	8 2	8 12	8 23
	6	6 9	6 22	6 35	6 50	6 59	7 9	7 21	7 36	7 43	7 51	8 0	8 9	8 21
	7	6 9	6 21	6 34	6 49	6 59	7 8	7 20	7 35	7 41	7 49	7 58	8 7	8 18
	8	6 9	6 21	6 34	6 48	6 57	7 7	7 19	7 33	7 40	7 47	7 55	8 5	8 15
	9	6 9	6 20	6 33	6 48	6 56	7 6	7 17	7 31	7 38	7 45	7 53	8 2	8 13
	10	6 9	6 20	6 32	6 47	6 55	7 5	7 16	7 29	7 36	7 43	7 51	8 0	8 10
	11	6 8	6 20	6 32	6 46	6 54	7 3	7 14	7 28	7 34	7 41	7 49	7 57	8 7
	12	6 8	6 19	6 31	6 45	6 53	7 2	7 13	7 26	7 32	7 39	7 46	7 55	8 5
	13	6 8	6 19	6 30	6 44	6 52	7 1	7 11	7 24	7 30	7 37	7 44	7 52	8 2
	14	6 8	6 18	6 30	6 43	6 51	7 0	7 10	7 22	7 28	7 35	7 42	7 50	7 59
	15	6 8	6 18	6 29	6 42	6 50	6 58	7 8	7 20	7 26	7 32	7 40	7 47	7 56
	16	6 8	6 18	6 28	6 41	6 48	6 57	7 6	7 18	7 24	7 30	7 37	7 45	7 54
	17	6 7	6 17	6 28	6 40	6 47	6 56	7 5	7 17	7 22	7 28	7 35	7 42	7 51

LOCAL ASTRONOMICAL MEAN TIME OF SUNRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, subtract 12 hours, mark the result A. M., and add one to the day.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunrise in southern latitudes see page 720.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Aug.	16	18 1	17 51	17 40	17 28	17 20	17 12	17 2	16 51	16 45	16 39	16 32	16 25	16 16
	17	18 1	17 51	17 40	17 28	17 21	17 13	17 4	16 52	16 47	16 41	16 34	16 27	16 18
	18	18 0	17 51	17 41	17 29	17 22	17 14	17 5	16 54	16 48	16 43	16 36	16 29	16 21
	19	18 0	17 51	17 41	17 29	17 23	17 15	17 6	16 55	16 50	16 44	16 38	16 31	16 23
	20	18 0	17 51	17 41	17 30	17 23	17 16	17 7	16 57	16 52	16 46	16 40	16 33	16 26
	21	18 0	17 51	17 42	17 31	17 24	17 17	17 8	16 58	16 53	16 48	16 42	16 36	16 28
	22	17 59	17 51	17 42	17 31	17 25	17 18	17 10	17 0	16 55	16 50	16 44	16 38	16 30
	23	17 59	17 51	17 42	17 32	17 26	17 19	17 11	17 1	16 57	16 52	16 46	16 40	16 33
	24	17 59	17 51	17 42	17 32	17 26	17 20	17 12	17 3	16 58	16 53	16 48	16 42	16 35
	25	17 59	17 51	17 42	17 33	17 27	17 21	17 13	17 4	17 0	16 55	16 50	16 44	16 38
	26	17 58	17 51	17 43	17 33	17 28	17 22	17 14	17 6	17 2	16 57	16 52	16 46	16 40
	27	17 58	17 51	17 43	17 34	17 29	17 23	17 16	17 7	17 3	16 59	16 54	16 48	16 42
	28	17 58	17 51	17 43	17 34	17 29	17 24	17 17	17 8	17 5	17 0	16 56	16 51	16 45
	29	17 58	17 51	17 44	17 35	17 30	17 24	17 18	17 10	17 6	17 2	16 58	16 53	16 47
	30	17 57	17 51	17 44	17 36	17 31	17 25	17 19	17 12	17 8	17 4	17 0	16 55	16 50
Sept.	31	17 57	17 51	17 44	17 36	17 32	17 26	17 20	17 13	17 10	17 6	17 2	16 57	16 52
	1	17 57	17 51	17 44	17 37	17 32	17 27	17 22	17 14	17 11	17 8	17 4	16 59	16 54
	2	17 56	17 51	17 44	17 37	17 33	17 28	17 23	17 16	17 13	17 9	17 6	17 1	16 57
	3	17 56	17 51	17 45	17 38	17 34	17 29	17 24	17 18	17 14	17 11	17 8	17 4	16 59
	4	17 56	17 50	17 45	17 38	17 34	17 30	17 25	17 19	17 16	17 13	17 10	17 6	17 2
	5	17 55	17 50	17 45	17 39	17 35	17 31	17 26	17 20	17 18	17 15	17 12	17 8	17 4
	6	17 55	17 50	17 45	17 40	17 36	17 32	17 28	17 22	17 19	17 17	17 14	17 10	17 6
	7	17 55	17 50	17 46	17 40	17 37	17 33	17 29	17 24	17 21	17 18	17 15	17 12	17 8
	8	17 54	17 50	17 46	17 41	17 38	17 34	17 30	17 25	17 23	17 20	17 17	17 14	17 11
	9	17 54	17 50	17 46	17 41	17 38	17 35	17 31	17 26	17 24	17 22	17 19	17 16	17 13
	10	17 54	17 50	17 46	17 42	17 39	17 36	17 32	17 28	17 26	17 24	17 21	17 19	17 16
	11	17 53	17 50	17 46	17 42	17 40	17 37	17 34	17 29	17 28	17 26	17 23	17 21	17 18
	12	17 53	17 50	17 47	17 43	17 40	17 38	17 35	17 31	17 29	17 27	17 25	17 23	17 20
	13	17 53	17 50	17 47	17 43	17 41	17 39	17 36	17 32	17 31	17 29	17 27	17 25	17 23
	14	17 52	17 50	17 47	17 44	17 42	17 40	17 37	17 34	17 32	17 31	17 29	17 27	17 25
	15	17 52	17 50	17 47	17 44	17 43	17 41	17 38	17 35	17 34	17 33	17 31	17 29	17 27
	16	17 52	17 50	17 48	17 45	17 43	17 42	17 40	17 37	17 36	17 34	17 33	17 31	17 30
	17	17 51	17 50	17 48	17 46	17 44	17 43	17 41	17 38	17 38	17 36	17 35	17 34	17 32
	18	17 51	17 50	17 48	17 46	17 45	17 44	17 42	17 40	17 39	17 38	17 37	17 36	17 34
	19	17 50	17 49	17 48	17 46	17 46	17 44	17 43	17 41	17 41	17 40	17 39	17 38	17 37
	20	17 50	17 49	17 48	17 47	17 46	17 45	17 44	17 43	17 42	17 42	17 41	17 40	17 39
	21	17 50	17 49	17 49	17 48	17 47	17 46	17 46	17 44	17 44	17 43	17 43	17 42	17 41
	22	17 50	17 49	17 49	17 48	17 48	17 47	17 47	17 46	17 46	17 45	17 45	17 44	17 44
	23	17 49	17 49	17 49	17 49	17 48	17 48	17 48	17 47	17 47	17 47	17 47	17 46	17 46
	24	17 49	17 49	17 49	17 49	17 49	17 49	17 49	17 49	17 49	17 49	17 49	17 48	17 48
	25	17 48	17 49	17 49	17 50	17 50	17 50	17 50	17 50	17 50	17 51	17 51	17 51	17 51
	26	17 48	17 49	17 50	17 50	17 51	17 51	17 52	17 52	17 52	17 52	17 53	17 53	17 53
	27	17 48	17 49	17 50	17 51	17 52	17 52	17 53	17 54	17 54	17 54	17 55	17 55	17 56
	28	17 47	17 49	17 50	17 52	17 52	17 53	17 54	17 55	17 56	17 56	17 57	17 57	17 58
	29	17 47	17 49	17 50	17 52	17 53	17 54	17 55	17 57	17 57	17 58	17 59	17 59	18 0
Oct.	30	17 47	17 49	17 51	17 53	17 54	17 55	17 56	17 58	17 59	18 0	18 1	18 2	18 3
	1	17 46	17 49	17 51	17 53	17 55	17 56	17 58	18 0	18 0	18 2	18 3	18 4	18 5

TABLE VIII.

715

LOCAL ASTRONOMICAL MEAN TIME OF SUNSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunset in southern latitudes see page 720.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Aug.	17	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	18	6 7	6 17	6 28	6 40	6 47	6 56	7 5	7 17	7 22	7 28	7 35	7 42	7 51
	19	6 7	6 17	6 27	6 39	6 46	6 54	7 3	7 15	7 20	7 26	7 32	7 40	7 48
	20	6 7	6 16	6 26	6 38	6 45	6 53	7 2	7 13	7 18	7 24	7 30	7 37	7 45
	21	6 6	6 15	6 25	6 36	6 44	6 51	7 0	7 11	7 16	7 21	7 28	7 34	7 42
	22	6 6	6 15	6 24	6 35	6 41	6 48	6 57	7 7	7 12	7 17	7 23	7 29	7 36
	23	6 6	6 14	6 23	6 34	6 40	6 47	6 55	7 5	7 10	7 15	7 20	7 27	7 34
	24	6 6	6 14	6 23	6 33	6 39	6 46	6 53	7 3	7 8	7 12	7 18	7 24	7 31
	25	6 6	6 13	6 22	6 32	6 38	6 44	6 52	7 1	7 5	7 10	7 15	7 21	7 28
	26	6 5	6 13	6 21	6 31	6 36	6 43	6 50	6 59	7 3	7 8	7 13	7 18	7 25
	27	6 5	6 12	6 20	6 29	6 35	6 41	6 48	6 57	7 1	7 5	7 10	7 16	7 22
	28	6 5	6 12	6 19	6 28	6 34	6 40	6 46	6 55	6 59	7 3	7 8	7 13	7 19
	29	6 4	6 11	6 18	6 27	6 32	6 38	6 45	6 53	6 58	7 0	7 5	7 10	7 16
	30	6 4	6 10	6 18	6 26	6 31	6 36	6 43	6 51	6 54	6 58	7 2	7 8	7 13
	31	6 4	6 10	6 17	6 25	6 30	6 35	6 41	6 48	6 52	6 56	7 0	7 5	7 10
Sept.	1	6 3	6 9	6 16	6 24	6 28	6 33	6 39	6 46	6 50	6 53	6 57	7 2	7 7
	2	6 3	6 9	6 15	6 22	6 27	6 32	6 37	6 44	6 48	6 51	6 55	6 59	7 4
	3	6 3	6 8	6 14	6 21	6 26	6 30	6 36	6 42	6 45	6 49	6 52	6 56	7 1
	4	6 2	6 8	6 13	6 20	6 24	6 28	6 34	6 40	6 43	6 46	6 50	6 54	6 58
	5	6 2	6 7	6 13	6 19	6 23	6 27	6 32	6 38	6 41	6 44	6 47	6 51	6 55
	6	6 2	6 6	6 12	6 18	6 21	6 25	6 30	6 36	6 38	6 41	6 44	6 48	6 52
	7	6 2	6 6	6 11	6 16	6 20	6 24	6 28	6 34	6 36	6 39	6 42	6 45	6 49
	8	6 1	6 5	6 10	6 15	6 18	6 22	6 26	6 31	6 34	6 36	6 39	6 42	6 46
	9	6 1	6 5	6 9	6 14	6 17	6 20	6 24	6 29	6 31	6 34	6 36	6 40	6 43
	10	6 0	6 4	6 8	6 13	6 16	6 19	6 22	6 27	6 29	6 31	6 34	6 37	6 40
	11	6 0	6 3	6 7	6 12	6 14	6 17	6 21	6 25	6 27	6 29	6 31	6 34	6 37
	12	6 0	6 3	6 6	6 10	6 13	6 16	6 19	6 23	6 24	6 26	6 29	6 31	6 34
	13	5 59	6 2	6 5	6 9	6 11	6 14	6 17	6 21	6 22	6 24	6 26	6 28	6 31
	14	5 59	6 2	6 4	6 8	6 10	6 12	6 15	6 18	6 20	6 22	6 23	6 26	6 28
	15	5 59	6 1	6 4	6 7	6 9	6 11	6 13	6 16	6 18	6 19	6 21	6 23	6 25
	16	5 58	6 0	6 3	6 5	6 7	6 9	6 11	6 14	6 15	6 16	6 18	6 20	6 22
	17	5 58	6 0	6 2	6 4	6 6	6 7	6 9	6 12	6 13	6 14	6 15	6 17	6 18
	18	5 58	5 59	6 1	6 3	6 4	6 6	6 7	6 10	6 10	6 11	6 13	6 14	6 15
	19	5 57	5 58	6 0	6 2	6 3	6 4	6 5	6 7	6 8	6 9	6 10	6 11	6 12
	20	5 57	5 58	5 59	6 0	6 1	6 2	6 4	6 5	6 6	6 6	6 7	6 8	6 9
	21	5 56	5 57	5 58	5 59	6 0	6 1	6 2	6 3	6 3	6 4	6 4	6 6	6 6
	22	5 56	5 57	5 57	5 58	5 58	5 59	6 0	6 1	6 1	6 2	6 2	6 3	6 3
	23	5 56	5 56	5 56	5 57	5 57	5 57	5 58	5 58	5 59	5 59	5 59	6 0	6 0
	24	5 56	5 55	5 55	5 56	5 56	5 56	5 56	5 56	5 56	5 56	5 57	5 57	5 57
	25	5 55	5 55	5 54	5 54	5 54	5 54	5 54	5 54	5 54	5 54	5 54	5 54	5 54
	26	5 55	5 54	5 54	5 53	5 53	5 52	5 52	5 52	5 52	5 52	5 51	5 51	5 51
	27	5 54	5 54	5 53	5 52	5 51	5 51	5 50	5 50	5 49	5 49	5 49	5 48	5 48
	28	5 54	5 53	5 52	5 50	5 50	5 49	5 48	5 47	5 47	5 46	5 46	5 46	5 45
	29	5 54	5 52	5 51	5 49	5 48	5 48	5 46	5 45	5 45	5 44	5 43	5 43	5 42
	30	5 54	5 52	5 50	5 48	5 47	5 46	5 44	5 43	5 42	5 42	5 41	5 40	5 39
Oct.	1	5 53	5 51	5 49	5 47	5 46	5 44	5 43	5 41	5 40	5 39	5 38	5 37	5 36
	2	5 53	5 50	5 48	5 46	5 44	5 43	5 41	5 39	5 38	5 37	5 36	5 34	5 32

LOCAL ASTRONOMICAL MEAN TIME OF SUNRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, subtract 12 hours, mark the result A. M., and add one to the day.
To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.
For sunrise in southern latitudes see page 720.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Oct.	1	17 46	17 49	17 51	17 53	17 55	17 56	17 58	18 0	18 0	18 2	18 3	18 4	18 5
	2	17 46	17 49	17 51	17 54	17 55	17 57	17 59	18 1	18 2	18 3	18 5	18 6	18 8
	3	17 46	17 49	17 51	17 54	17 56	17 58	18 0	18 3	18 4	18 5	18 7	18 8	18 10
	4	17 46	17 48	17 52	17 55	17 57	17 59	18 1	18 4	18 6	18 7	18 9	18 10	18 12
	5	17 45	17 48	17 52	17 56	17 58	18 0	18 3	18 6	18 7	18 9	18 11	18 12	18 15
	6	17 45	17 48	17 52	17 56	17 58	18 1	18 4	18 7	18 9	18 11	18 13	18 15	18 17
	7	17 45	17 48	17 52	17 57	17 59	18 2	18 5	18 9	18 11	18 13	18 15	18 17	18 19
	8	17 44	17 48	17 53	17 57	18 0	18 3	18 6	18 11	18 12	18 14	18 17	18 19	18 22
	9	17 44	17 48	17 53	17 58	18 1	18 4	18 8	18 12	18 14	18 16	18 19	18 21	18 24
	10	17 44	17 48	17 53	17 58	18 2	18 5	18 9	18 14	18 16	18 18	18 21	18 24	18 27
	11	17 44	17 48	17 54	17 59	18 2	18 6	18 10	18 15	18 18	18 20	18 23	18 26	18 29
	12	17 43	17 48	17 54	18 0	18 3	18 7	18 12	18 17	18 19	18 22	18 25	18 28	18 32
	13	17 43	17 48	17 54	18 0	18 4	18 8	18 13	18 18	18 21	18 24	18 27	18 30	18 34
	14	17 43	17 48	17 54	18 1	18 5	18 9	18 14	18 20	18 23	18 26	18 29	18 32	18 36
	15	17 43	17 49	17 55	18 2	18 6	18 10	18 16	18 22	18 24	18 28	18 31	18 35	18 39
	16	17 42	17 49	17 55	18 2	18 7	18 11	18 17	18 23	18 26	18 29	18 33	18 37	18 41
	17	17 42	17 49	17 56	18 3	18 8	18 12	18 18	18 25	18 28	18 31	18 35	18 39	18 44
	18	17 42	17 49	17 56	18 4	18 8	18 13	18 19	18 26	18 30	18 33	18 37	18 42	18 46
	19	17 42	17 49	17 56	18 4	18 9	18 14	18 21	18 28	18 31	18 35	18 39	18 44	18 49
	20	17 42	17 49	17 57	18 5	18 10	18 16	18 22	18 30	18 33	18 37	18 41	18 46	18 51
	21	17 41	17 49	17 57	18 6	18 11	18 17	18 23	18 31	18 35	18 39	18 43	18 48	18 54
	22	17 41	17 49	17 57	18 6	18 12	18 18	18 25	18 33	18 37	18 41	18 45	18 51	18 56
	23	17 41	17 49	17 58	18 7	18 13	18 19	18 26	18 35	18 38	18 43	18 48	18 53	18 59
	24	17 41	17 49	17 58	18 8	18 14	18 20	18 28	18 36	18 40	18 45	18 50	18 55	19 2
	25	17 41	17 50	17 59	18 9	18 14	18 21	18 29	18 38	18 42	18 47	18 52	18 58	19 4
	26	17 41	17 50	17 59	18 10	18 15	18 22	18 30	18 40	18 44	18 49	18 54	19 0	19 6
	27	17 41	17 50	17 59	18 10	18 16	18 23	18 32	18 41	18 46	18 51	18 56	19 2	19 9
	28	17 40	17 50	18 0	18 11	18 17	18 24	18 33	18 43	18 47	18 53	18 58	19 4	19 12
	29	17 40	17 50	18 0	18 12	18 18	18 26	18 34	18 44	18 49	18 55	19 0	19 7	19 14
	30	17 40	17 50	18 1	18 12	18 19	18 27	18 36	18 46	18 51	18 56	19 2	19 9	19 17
Nov.	31	17 40	17 50	18 1	18 13	18 20	18 28	18 37	18 48	18 53	18 58	19 5	19 12	19 19
	1	17 40	17 51	18 2	18 14	18 21	18 29	18 38	18 50	18 55	19 0	19 7	19 14	19 22
	2	17 40	17 51	18 2	18 15	18 22	18 30	18 40	18 51	18 56	19 2	19 9	19 16	19 24
	3	17 40	17 51	18 2	18 16	18 23	18 31	18 41	18 53	18 58	19 4	19 11	19 18	19 27
	4	17 40	17 51	18 3	18 16	18 24	18 32	18 42	18 54	19 0	19 6	19 13	19 21	19 30
	5	17 40	17 52	18 4	18 17	18 25	18 34	18 44	18 56	19 2	19 8	19 15	19 23	19 32
	6	17 40	17 52	18 4	18 18	18 26	18 35	18 45	18 58	19 4	19 10	19 17	19 26	19 35
	7	17 40	17 52	18 4	18 19	18 27	18 36	18 47	19 0	19 6	19 12	19 20	19 28	19 37
	8	17 40	17 52	18 5	18 19	18 28	18 37	18 48	19 1	19 7	19 14	19 22	19 30	19 40
	9	17 40	17 53	18 6	18 20	18 29	18 38	18 49	19 3	19 9	19 16	19 24	19 32	19 42
	10	17 41	17 53	18 6	18 21	18 30	18 39	18 51	19 4	19 11	19 18	19 26	19 35	19 45
	11	17 41	17 53	18 6	18 22	18 31	18 40	18 52	19 6	19 13	19 20	19 28	19 37	19 48
	12	17 41	17 54	18 7	18 23	18 32	18 42	18 53	19 8	19 14	19 22	19 30	19 39	19 50
	13	17 41	17 54	18 8	18 24	18 33	18 43	18 55	19 9	19 16	19 24	19 32	19 42	19 53
	14	17 41	17 54	18 8	18 24	18 34	18 44	18 56	19 11	19 18	19 26	19 34	19 44	19 55
	15	17 41	17 55	18 9	18 25	18 34	18 45	18 58	19 13	19 20	19 28	19 36	19 46	19 58
	16	17 41	17 55	18 10	18 26	18 35	18 46	18 59	19 14	19 22	19 29	19 38	19 48	20 0

TABLE VIII.

717

LOCAL ASTRONOMICAL MEAN TIME OF SUNSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunset in southern latitudes see page 720.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Oct.	2	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	3	5 53	5 50	5 48	5 46	5 44	5 43	5 41	5 39	5 38	5 37	5 36	5 34	5 33
	4	5 52	5 50	5 47	5 44	5 43	5 41	5 39	5 36	5 35	5 34	5 33	5 32	5 30
	5	5 52	5 49	5 46	5 43	5 42	5 39	5 37	5 34	5 33	5 32	5 30	5 29	5 27
	6	5 52	5 49	5 46	5 42	5 40	5 38	5 35	5 32	5 31	5 29	5 28	5 26	5 24
	7	5 52	5 48	5 45	5 41	5 39	5 36	5 33	5 30	5 28	5 27	5 25	5 23	5 21
	8	5 51	5 48	5 44	5 40	5 37	5 35	5 32	5 28	5 26	5 24	5 22	5 20	5 18
	9	5 51	5 47	5 43	5 38	5 36	5 33	5 30	5 26	5 24	5 22	5 20	5 18	5 15
	10	5 51	5 46	5 42	5 37	5 34	5 31	5 28	5 24	5 22	5 20	5 17	5 15	5 12
	11	5 50	5 46	5 41	5 36	5 33	5 30	5 26	5 22	5 20	5 17	5 15	5 12	5 9
	12	5 50	5 45	5 40	5 35	5 32	5 28	5 24	5 19	5 17	5 15	5 12	5 9	5 6
	13	5 50	5 44	5 39	5 33	5 29	5 25	5 21	5 15	5 13	5 10	5 7	5 4	5 0
	14	5 50	5 44	5 38	5 32	5 28	5 24	5 19	5 13	5 11	5 8	5 5	5 1	4 57
	15	5 49	5 43	5 37	5 30	5 27	5 22	5 17	5 11	5 8	5 5	5 2	4 58	4 54
	16	5 49	5 43	5 37	5 29	5 25	5 21	5 15	5 9	5 6	5 3	5 0	4 56	4 51
	17	5 49	5 42	5 36	5 28	5 24	5 19	5 14	5 7	5 4	5 1	4 57	4 53	4 48
	18	5 49	5 42	5 35	5 27	5 23	5 18	5 12	5 5	5 2	4 58	4 55	4 50	4 46
	19	5 48	5 42	5 34	5 26	5 22	5 16	5 10	5 3	5 0	4 56	4 52	4 48	4 43
	20	5 48	5 41	5 34	5 25	5 20	5 15	5 8	5 1	4 58	4 54	4 50	4 45	4 40
	21	5 48	5 41	5 33	5 24	5 19	5 13	5 7	4 59	4 56	4 52	4 47	4 42	4 37
	22	5 48	5 40	5 32	5 23	5 18	5 12	5 5	4 57	4 53	4 49	4 45	4 40	4 34
	23	5 48	5 40	5 32	5 22	5 17	5 11	5 4	4 55	4 51	4 47	4 42	4 37	4 31
	24	5 48	5 39	5 31	5 21	5 16	5 9	5 2	4 53	4 49	4 45	4 40	4 35	4 28
	25	5 48	5 39	5 30	5 20	5 14	5 8	5 0	4 51	4 47	4 43	4 38	4 32	4 26
	26	5 47	5 39	5 30	5 19	5 13	5 7	4 59	4 50	4 45	4 40	4 35	4 30	4 23
	27	5 47	5 38	5 29	5 18	5 12	5 5	4 57	4 48	4 43	4 38	4 33	4 27	4 20
	28	5 47	5 38	5 28	5 17	5 11	5 4	4 56	4 46	4 41	4 36	4 31	4 24	4 18
	29	5 47	5 38	5 28	5 16	5 10	5 3	4 54	4 44	4 39	4 34	4 28	4 22	4 15
	30	5 47	5 37	5 27	5 16	5 9	5 2	4 53	4 42	4 38	4 32	4 26	4 20	4 12
	31	5 47	5 37	5 27	5 15	5 8	5 0	4 51	4 40	4 36	4 30	4 24	4 17	4 10
Nov.	1	5 47	5 37	5 26	5 14	5 7	4 59	4 50	4 39	4 34	4 28	4 22	4 15	4 7
	2	5 47	5 37	5 26	5 13	5 6	4 58	4 48	4 37	4 32	4 26	4 20	4 12	4 4
	3	5 47	5 36	5 25	5 12	5 5	4 57	4 47	4 35	4 30	4 24	4 18	4 10	4 2
	4	5 47	5 36	5 25	5 12	5 4	4 56	4 46	4 34	4 28	4 22	4 15	4 8	3 59
	5	5 47	5 36	5 24	5 11	5 3	4 54	4 44	4 32	4 26	4 20	4 13	4 5	3 56
	6	5 47	5 36	5 24	5 10	5 2	4 53	4 43	4 30	4 25	4 18	4 11	4 3	3 54
	7	5 47	5 36	5 23	5 9	5 1	4 52	4 42	4 29	4 23	4 16	4 9	4 1	3 52
	8	5 47	5 35	5 23	5 9	5 0	4 51	4 40	4 27	4 21	4 15	4 7	3 59	3 49
	9	5 47	5 35	5 22	5 8	5 0	4 50	4 39	4 26	4 20	4 13	4 5	3 56	3 47
	10	5 48	5 35	5 22	5 7	4 59	4 49	4 38	4 24	4 18	4 11	4 3	3 54	3 44
	11	5 48	5 35	5 22	5 7	4 58	4 48	4 37	4 23	4 16	4 9	4 1	3 52	3 42
	12	5 48	5 35	5 21	5 6	4 57	4 47	4 36	4 21	4 15	4 8	3 59	3 50	3 40
	13	5 48	5 35	5 21	5 6	4 57	4 46	4 34	4 20	4 13	4 6	3 58	3 48	3 37
	14	5 48	5 35	5 21	5 5	4 56	4 46	4 33	4 19	4 12	4 4	3 56	3 46	3 35
	15	5 48	5 35	5 20	5 4	4 55	4 45	4 32	4 17	4 10	4 3	3 54	3 44	3 33
	16	5 48	5 35	5 20	5 4	4 55	4 44	4 31	4 16	4 9	4 1	3 52	3 42	3 31
	17	5 48	5 35	5 20	5 4	4 54	4 43	4 30	4 15	4 8	4 0	3 51	3 40	3 28

LOCAL ASTRONOMICAL MEAN TIME OF SUNRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, subtract 12 hours, mark the result A. M., and add one to the day.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunrise in southern latitudes see page 720.

Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Date.													
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Nov. 16	17 41	17 55	18 10	18 26	18 35	18 46	18 59	19 14	19 22	19 29	19 38	19 48	20 0
17	17 42	17 56	18 10	18 27	18 36	18 47	19 0	19 16	19 23	19 31	19 40	19 51	20 3
18	17 42	17 56	18 11	18 28	18 37	18 48	19 2	19 18	19 25	19 33	19 42	19 53	20 5
19	17 42	17 56	18 11	18 28	18 38	18 50	19 3	19 19	19 27	19 35	19 44	19 55	20 8
20	17 42	17 57	18 12	18 29	18 39	18 51	19 4	19 21	19 28	19 37	19 46	19 57	20 10
21	17 42	17 57	18 13	18 30	18 40	18 52	19 6	19 22	19 30	19 39	19 48	20 0	20 12
22	17 43	17 58	18 13	18 31	18 41	18 53	19 7	19 24	19 32	19 40	19 50	20 2	20 15
23	17 43	17 58	18 14	18 32	18 42	18 54	19 8	19 25	19 33	19 42	19 52	20 4	20 17
24	17 43	17 58	18 14	18 33	18 43	18 55	19 9	19 27	19 35	19 44	19 54	20 6	20 20
25	17 44	17 59	18 15	18 34	18 44	18 56	19 11	19 28	19 37	19 46	19 56	20 8	20 22
26	17 44	17 59	18 16	18 34	18 45	18 57	19 12	19 30	19 38	19 47	19 58	20 10	20 24
27	17 44	18 0	18 16	18 35	18 46	18 58	19 13	19 31	19 40	19 49	20 0	20 12	20 26
28	17 44	18 0	18 17	18 36	18 47	19 0	19 14	19 33	19 41	19 51	20 2	20 14	20 29
29	17 45	18 1	18 18	18 37	18 48	19 1	19 16	19 34	19 43	19 52	20 3	20 16	20 31
30	17 45	18 1	18 18	18 38	18 49	19 2	19 17	19 35	19 44	19 54	20 5	20 18	20 33
Dec. 1	17 46	18 2	18 19	18 38	18 50	19 3	19 18	19 37	19 46	19 56	20 7	20 20	20 35
2	17 46	18 2	18 20	18 39	18 51	19 4	19 19	19 38	19 47	19 57	20 8	20 22	20 37
3	17 46	18 3	18 20	18 40	18 51	19 5	19 20	19 39	19 48	19 58	20 10	20 23	20 39
4	17 47	18 3	18 21	18 41	18 52	19 6	19 21	19 41	19 50	20 0	20 12	20 25	20 41
5	17 47	18 4	18 21	18 42	18 53	19 7	19 22	19 42	19 51	20 1	20 13	20 27	20 43
6	17 48	18 4	18 22	18 42	18 54	19 8	19 24	19 43	19 52	20 3	20 14	20 28	20 44
7	17 48	18 5	18 23	18 43	18 55	19 8	19 25	19 44	19 54	20 4	20 16	20 30	20 46
8	17 48	18 5	18 23	18 44	18 56	19 9	19 26	19 45	19 55	20 5	20 17	20 31	20 48
9	17 49	18 6	18 24	18 44	18 56	19 10	19 27	19 46	19 56	20 7	20 19	20 33	20 49
10	17 49	18 6	18 24	18 45	18 57	19 11	19 27	19 47	19 57	20 8	20 20	20 34	20 51
11	17 50	18 7	18 25	18 46	18 58	19 12	19 28	19 48	19 58	20 9	20 21	20 35	20 52
12	17 50	18 7	18 26	18 46	18 59	19 13	19 29	19 49	19 59	20 10	20 22	20 37	20 54
13	17 51	18 8	18 26	18 47	18 59	19 13	19 30	19 50	20 0	20 11	20 23	20 38	20 55
14	17 51	18 8	18 27	18 48	19 0	19 14	19 31	19 51	20 1	20 12	20 24	20 39	20 56
15	17 52	18 9	18 27	18 48	19 1	19 15	19 32	19 52	20 2	20 13	20 25	20 40	20 57
16	17 52	18 10	18 28	18 49	19 1	19 16	19 32	19 53	20 3	20 14	20 26	20 41	20 58
17	17 53	18 10	18 28	18 50	19 2	19 16	19 33	19 54	20 4	20 14	20 27	20 42	20 59
18	17 53	18 10	18 29	18 50	19 3	19 17	19 34	19 54	20 4	20 15	20 28	20 43	21 0
19	17 54	18 11	18 30	18 51	19 3	19 17	19 34	19 55	20 5	20 16	20 29	20 43	21 1
20	17 54	18 12	18 30	18 51	19 4	19 18	19 35	19 56	20 6	20 17	20 29	20 44	21 2
21	17 55	18 12	18 31	18 52	19 4	19 18	19 35	19 56	20 6	20 17	20 30	20 45	21 2
22	17 55	18 12	18 31	18 52	19 5	19 19	19 36	19 57	20 7	20 18	20 30	20 45	21 3
23	17 56	18 13	18 32	18 53	19 5	19 19	19 36	19 57	20 7	20 18	20 31	20 46	21 3
24	17 56	18 13	18 32	18 53	19 6	19 20	19 37	19 57	20 7	20 18	20 31	20 46	21 4
25	17 57	18 14	18 32	18 54	19 6	19 20	19 37	19 58	20 8	20 19	20 32	20 46	21 4
26	17 57	18 14	18 33	18 54	19 6	19 21	19 37	19 58	20 8	20 19	20 32	20 46	21 4
27	17 58	18 15	18 33	18 55	19 7	19 21	19 38	19 58	20 8	20 19	20 32	20 47	21 4
28	17 58	18 15	18 34	18 55	19 7	19 21	19 38	19 59	20 8	20 20	20 32	20 47	21 4
29	17 58	18 16	18 34	18 55	19 8	19 22	19 38	19 59	20 8	20 20	20 32	20 47	21 4
30	17 59	18 16	18 35	18 56	19 8	19 22	19 38	19 59	20 8	20 20	20 32	20 46	21 4
31	18 0	18 17	18 35	18 56	19 8	19 22	19 39	19 59	20 8	20 20	20 32	20 46	21 3

TABLE VIII.

719

LOCAL ASTRONOMICAL MEAN TIME OF SUNSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time.

To obtain the standard time at any station, increase the local time by the number of minutes the station is west of the standard meridian, or decrease the local time by the number of minutes the station is east of the standard meridian.

For sunset in southern latitudes see page 720.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Nov. 17	h m 5 48	h m 5 35	h m 5 20	h m 5 4	h m 4 54	h m 4 43	h m 4 30	h m 4 15	h m 4 8	h m 4 0	h m 3 51	h m 3 40	h m 3 28
18	5 49	5 35	5 20	5 3	4 53	4 42	4 29	4 14	4 6	3 58	3 49	3 38	3 26
19	5 49	5 35	5 20	5 3	4 53	4 42	4 28	4 12	4 5	3 57	3 47	3 37	3 24
20	5 49	5 35	5 20	5 2	4 52	4 41	4 28	4 11	4 4	3 55	3 46	3 35	3 22
21	5 49	5 35	5 20	5 2	4 52	4 40	4 27	4 10	4 2	3 54	3 44	3 33	3 20
22	5 50	5 35	5 19	5 2	4 51	4 40	4 26	4 9	4 1	3 53	3 43	3 32	3 19
23	5 50	5 35	5 19	5 1	4 51	4 39	4 25	4 8	4 0	3 51	3 41	3 30	3 17
24	5 50	5 35	5 19	5 1	4 50	4 39	4 24	4 7	3 59	3 50	3 40	3 28	3 15
25	5 51	5 35	5 19	5 1	4 50	4 38	4 24	4 6	3 58	3 49	3 39	3 27	3 13
26	5 51	5 35	5 19	5 1	4 50	4 38	4 23	4 6	3 57	3 48	3 38	3 26	3 12
27	5 51	5 36	5 19	5 0	4 50	4 37	4 22	4 5	3 56	3 47	3 36	3 24	3 10
28	5 51	5 36	5 19	5 0	4 49	4 37	4 22	4 4	3 55	3 46	3 35	3 23	3 8
29	5 52	5 36	5 19	5 0	4 49	4 36	4 21	4 3	3 54	3 45	3 34	3 22	3 7
30	5 52	5 36	5 19	5 0	4 49	4 36	4 21	4 2	3 54	3 44	3 33	3 20	3 5
Dec. 1	5 52	5 36	5 19	5 0	4 49	4 36	4 20	4 2	3 53	3 43	3 32	3 19	3 4
2	5 53	5 37	5 20	5 0	4 48	4 36	4 20	4 1	3 52	3 42	3 31	3 18	3 3
3	5 53	5 37	5 20	5 0	4 48	4 35	4 20	4 1	3 52	3 42	3 30	3 17	3 2
4	5 54	5 37	5 20	5 0	4 48	4 35	4 19	4 0	3 51	3 41	3 30	3 16	3 0
5	5 54	5 38	5 20	5 0	4 48	4 35	4 19	4 0	3 51	3 40	3 29	3 15	2 59
6	5 54	5 38	5 20	5 0	4 48	4 35	4 19	3 59	3 50	3 40	3 28	3 14	2 58
7	5 55	5 38	5 20	5 0	4 48	4 35	4 19	3 59	3 50	3 39	3 27	3 14	2 57
8	5 55	5 38	5 21	5 0	4 48	4 35	4 18	3 59	3 49	3 39	3 27	3 13	2 57
9	5 56	5 39	5 21	5 0	4 48	4 35	4 18	3 58	3 49	3 38	3 26	3 12	2 56
10	5 56	5 39	5 21	5 0	4 48	4 35	4 18	3 58	3 49	3 38	3 26	3 12	2 55
11	5 57	5 40	5 22	5 1	4 49	4 35	4 18	3 58	3 49	3 38	3 26	3 11	2 55
12	5 57	5 40	5 22	5 1	4 49	4 35	4 18	3 58	3 48	3 38	3 25	3 11	2 54
13	5 58	5 40	5 22	5 1	4 49	4 35	4 18	3 58	3 48	3 38	3 25	3 11	2 54
14	5 58	5 41	5 22	5 2	4 49	4 35	4 19	3 58	3 48	3 38	3 25	3 11	2 54
15	5 58	5 41	5 23	5 2	4 50	4 36	4 19	3 58	3 48	3 38	3 25	3 10	2 53
16	5 59	5 42	5 23	5 2	4 50	4 36	4 19	3 58	3 49	3 38	3 25	3 10	2 53
17	6 0	5 42	5 24	5 2	4 50	4 36	4 19	3 59	3 49	3 38	3 25	3 10	2 53
18	6 0	5 42	5 24	5 3	4 50	4 36	4 20	3 59	3 49	3 38	3 25	3 10	2 53
19	6 0	5 43	5 25	5 3	4 51	4 37	4 20	3 59	3 49	3 38	3 25	3 11	2 53
20	6 1	5 44	5 25	5 4	4 51	4 37	4 20	4 0	3 50	3 38	3 26	3 11	2 53
21	6 2	5 44	5 26	5 4	4 52	4 38	4 21	4 0	3 50	3 39	3 26	3 11	2 54
22	6 2	5 44	5 26	5 5	4 52	4 38	4 21	4 0	3 50	3 39	3 27	3 12	2 54
23	6 2	5 45	5 26	5 5	4 53	4 39	4 22	4 1	3 51	3 40	3 27	3 12	2 55
24	6 3	5 46	5 27	5 6	4 53	4 39	4 22	4 2	3 52	3 40	3 28	3 13	2 55
25	6 3	5 46	5 28	5 6	4 54	4 40	4 23	4 2	3 52	3 41	3 28	3 14	2 56
26	6 4	5 47	5 28	5 7	4 54	4 40	4 24	4 3	3 53	3 42	3 29	3 14	2 57
27	6 4	5 47	5 29	5 7	4 55	4 41	4 24	4 4	3 54	3 43	3 30	3 15	2 58
28	6 5	5 48	5 29	5 8	4 56	4 42	4 25	4 4	3 54	3 43	3 31	3 16	2 59
29	6 6	5 48	5 30	5 9	4 56	4 42	4 26	4 5	3 55	3 44	3 32	3 17	3 0
30	6 6	5 49	5 30	5 9	4 57	4 43	4 26	4 6	3 56	3 45	3 33	3 18	3 1
31	6 6	5 49	5 31	5 10	4 58	4 44	4 27	4 7	3 57	3 46	3 34	3 19	3 2
32	6 7	5 50	5 32	5 11	4 59	4 45	4 28	4 8	3 58	3 47	3 35	3 21	3 4

TABLE IX.

SUNRISE AND SUNSET FOR SOUTHERN LATITUDES, 1919.

In the case of a southern latitude the time of sunrise or sunset is taken from Table VIII, with the corresponding northern latitude, not for the given date but for a date about six months earlier or later, which is to be found in the following table. The time taken from Table VIII, whether of sunrise or of sunset, must be corrected by the quantity given in Table IX on the same line with the given date.

Example.—May 10, 1919, civil date, in latitude -38° , required the time of sunrise and sunset.

The astronomical date is May 9 for sunrise and May 10 for sunset; Table IX gives November 11 and 12 as the corresponding dates, northern latitude, while the correction is $+12^m$ in each case.

	Sunrise. d h m	Sunset. d h m
Table VIII, Lat. $+38^{\circ}$	Nov. 11 18 36	Nov. 12 4 51
Table IX	May 9 + 12	May 10 + 12
Local astronomical mean time	May 9 18 48	May 10 5 3
Civil time	May 10 6 48 A. M	May 10 5 3 P. M.

Given Date.	Corresponding Date, Northern Latitude.	Correc- tion.	Given Date.	Corresponding Date, Northern Latitude.	Correc- tion.	Given Date.	Corresponding Date, Northern Latitude.	Correc- tion.	Given Date.	Corresponding Date, Northern Latitude.	Correc- tion.
Jan. 0	July 2	-1^m	Feb. 5	Aug. 9	$+9^m$	Mar. 13	Sept. 15	$+14^m$	Apr. 18	Oct. 21	$+15^m$
1	3	0		10	9		16	14		22	15
2	4	0		11	9		17	14		23	14
3	5	0		12	9		18	15		24	14
4	6	0		13	10		19	15		25	14
5	7	$+1$		14	$+10$		20	$+15$		26	$+14$
6	8	1		15	10		21	15		27	14
7	9	1		16	10		22	15		28	14
8	10	2		17	10		23	15		29	14
9	11	2		18	11		24	15		30	14
10	12	$+2$		19	$+11$		25	$+15$		31	$+14$
11	13	2		20	11		26	15		Nov. 1	14
12	14	3		21	11		27	15		2	14
13	15	3		22	11		28	15	May	3	13
14	16	3		23	12		29	15		4	13
15	18	$+4$		24	$+12$		30	$+15$		5	$+13$
16	19	4		25	12		Oct. 2	15		6	13
17	20	4		26	12		3	16		7	13
18	21	4		27	12		4	16		8	13
19	22	5		28	12	Apr. 1	5	16		9	13
20	23	$+5$		29	$+13$		6	$+16$		10	$+12$
21	24	5		30	13		7	16		11	12
22	25	5		Sept. 1	13		8	15		12	12
23	26	6		2	13		9	15		13	12
24	27	6	Mar. 1	3	13		10	15		14	12
25	28	$+6$		4	$+13$		11	$+15$		15	$+12$
26	29	6		5	13		12	15		16	11
27	30	7		6	13		13	15		17	11
28	31	7		7	14		14	15		18	11
29	Aug. 1	7		8	14		15	$+15$		19	$+11$
30	2	$+7$		9	$+14$		16	15		20	11
31	4	8		10	14		17	15		21	10
Feb. 1	5	8		11	14		18	15		22	10
2	6	8		12	14		19	15		23	10
3	7	8		13	14		20	$+15$		24	$+10$
4	8	$+9$		14	$+14$						

TABLE IX.

721

SUNRISE AND SUNSET FOR SOUTHERN LATITUDES, 1919.

Given Date.	Corresponding Date, Northern Latitude.	Correc-tion.	Given Date.	Corresponding Date, Northern Latitude.	Correc-tion.	Given Date.	Corresponding Date, Northern Latitude.	Correc-tion.	Given Date.	Corresponding Date, Northern Latitude.	Correc-tion.
May 24	Nov. 25	+10	July 19	Jan. 16	-4	Sept. 13	Mar. 11	-14	Nov. 8	May 6	-13
25	26	9	20	17	4	14	12	14	9	7	13
26	27	9	21	18	4	15	13	14	10	8	12
27	28	9	22	19	5	16	14	14	11	9	12
28	29	9	23	20	5	17	15	14	12	10	12
29	30	+8	24	21	-5	18	16	-15	13	11	-12
30	Dec. 1	8	25	22	5	19	17	15	14	12	12
31	2	8	26	23	6	20	18	15	15	13	12
June 1	3	8	27	24	6	21	19	15	16	15	11
2	4	8	28	25	6	22	20	15	17	16	11
3	5	+7	29	26	-6	23	21	-15	18	17	-11
4	5	7	30	27	7	24	22	15	19	18	11
5	6	7	31	28	7	25	23	15	20	19	11
6	7	7	Aug. 1	29	7	26	24	15	21	20	10
7	8	7	2	30	7	27	25	15	22	21	10
8	9	+6	3	30	-7	28	26	-15	23	22	-10
9	10	6	4	31	8	29	27	15	24	23	10
10	11	6	5	Feb. 1	8	30	28	15	25	24	10
11	12	6	6	2	8	Oct. 1	29	15	26	25	9
12	13	5	7	3	8	2	29	15	27	26	9
13	14	+5	8	4	-9	3	30	-16	28	27	-9
14	15	5	9	5	9	4	31	16	29	28	9
15	16	4	10	6	9	5	Apr. 1	16	30	29	8
16	17	4	11	7	9	6	2	16	Dec. 1	30	8
17	18	4	12	8	9	7	3	16	2	31	8
18	19	+4	13	9	-10	8	4	-15	3	June 1	-8
19	20	4	14	10	10	9	5	15	4	2	8
20	20	4	15	11	10	10	7	15	5	4	7
21	21	3	16	12	10	11	8	15	6	5	7
22	22	3	17	13	10	12	9	15	7	6	7
23	23	+3	18	14	-11	13	10	-15	8	7	-7
24	24	2	19	15	11	14	11	15	9	8	6
25	25	2	20	16	11	15	12	15	10	9	6
26	26	2	21	17	11	16	13	15	11	10	6
27	27	2	22	18	11	17	14	15	12	11	6
28	28	+1	23	18	-11	18	15	-15	13	12	-5
29	29	1	24	19	12	19	16	15	14	13	5
30	30	1	25	20	12	20	17	15	15	14	5
July 1	Dec. 31	1	26	21	12	21	18	15	16	15	4
2	Jan. 0	+1	27	22	12	22	19	15	17	16	4
3	1	0	28	23	-12	23	20	-14	18	17	-4
4	2	0	29	24	12	24	21	14	19	18	4
5	3	0	30	25	13	25	22	14	20	19	4
6	4	0	31	26	13	26	23	14	21	21	3
7	5	-1	Sept. 1	27	13	27	24	14	22	22	3
8	6	-1	2	28	-13	28	25	-14	23	23	-3
9	7	1	3	Mar. 1	13	29	26	14	24	24	2
10	8	2	4	2	13	30	27	14	25	25	2
11	9	2	5	3	13	31	28	14	26	26	2
12	10	2	6	4	13	Nov. 1	29	14	27	27	2
13	11	-2	7	5	-14	2	30	-14	28	28	-1
14	12	3	8	6	14	3	May 1	13	29	29	1
15	13	3	9	7	14	4	2	13	30	30	1
16	14	3	10	8	14	5	3	13	31	July 1	-1
17	15	4	11	9	14	6	4	13	32	2	0
18	15	-4	12	10	-14	7	5	-13			

TABLE X.

723

LOCAL ASTRONOMICAL MEAN TIME OF MOONSET, MERIDIAN OF GREENWICH,
1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Jan.	1	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	2	5 31	5 14	4 56	4 36	4 24	4 10	3 53	3 33	3 23	3 12	3 0	2 45	2 28
	3	6 24	6 8	5 52	5 34	5 23	5 11	4 56	4 38	4 30	4 20	4 10	3 57	3 43
	4	7 15	7 3	6 50	6 34	6 25	6 15	6 3	5 49	5 42	5 34	5 26	5 16	5 5
	5	8 6	7 57	7 47	7 36	7 29	7 22	7 13	7 2	6 58	6 52	6 46	6 39	6 32
	6	8 56	8 50	8 44	8 38	8 34	8 29	8 24	8 18	8 15	8 12	8 8	8 4	8 0
	7	9 45	9 43	9 42	9 40	9 38	9 37	9 36	9 34	9 33	9 32	9 31	9 30	9 29
	8	10 34	10 36	10 39	10 42	10 44	10 46	10 48	10 50	10 52	10 53	10 55	10 56	10 58
	9	11 24	11 31	11 38	11 45	11 50	11 55	12 1	12 8	12 11	12 15	12 19	12 23	12 28
	10	12 16	12 27	12 38	12 50	12 57	13 5	13 14	13 26	13 32	13 38	13 44	13 52	14 0
	11	13 11	13 24	13 39	13 55	14 5	14 16	14 29	14 44	14 52	15 0	15 9	15 20	15 32
	12	14 8	14 24	14 41	15 1	15 12	15 25	15 41	16 0	16 9	16 19	16 30	16 44	16 59
	13	15 7	15 24	15 43	16 4	16 16	16 31	16 48	17 8	17 18	17 30	17 42	17 57	18 15
	14	16 7	16 24	16 42	17 3	17 16	17 30	17 47	18 7	18 17	18 28	18 41	18 55	19 12
	15	17 5	17 21	17 38	17 57	18 9	18 22	18 37	18 56	19 4	19 14	19 25	19 38	19 53
	16	18 0	18 14	18 28	18 45	18 55	19 6	19 18	19 34	19 41	19 49	19 58	20 8	20 20
	17	18 52	19 3	19 14	19 27	19 34	19 43	19 53	20 4	20 10	20 16	20 22	20 29	20 38
	18	19 41	19 48	19 56	20 5	20 10	20 15	20 22	20 30	20 33	20 37	20 41	20 46	20 52
	19	20 27	20 31	20 34	20 39	20 42	20 44	20 48	20 51	20 53	20 55	20 57	21 0	21 2
	20	21 11	21 11	21 11	21 11	21 11	21 11	21 12	21 12	21 12	21 12	21 12	21 12	21 12
	21	21 53	21 50	21 47	21 43	21 40	21 38	21 35	21 31	21 30	21 28	21 26	21 24	21 21
	22	22 36	22 29	22 22	22 14	22 10	22 4	21 58	21 51	21 48	21 44	21 40	21 36	21 31
	23	23 19	23 9	22 59	22 47	22 40	22 33	22 24	22 13	22 8	22 3	21 57	21 50	21 42
	24	23 3	23 51	23 38	23 22	23 14	23 4	22 52	22 38	22 31	22 24	22 16	22 7	21 56
	25	0 3	...	...	...	23 50	23 38	23 24	23 7	22 59	22 50	22 40	22 29	22 15
	26	0 49	0 35	0 19	0 1	...	...	...	23 43	23 34	23 23	23 11	22 58	22 42
	27	1 37	1 21	1 4	0 43	0 32	0 18	0 2	...	...	...	23 52	23 38	23 20
	28	2 28	2 10	1 52	1 31	1 18	1 4	0 47	0 26	0 16	0 5	...	...	...
	29	3 20	3 2	2 44	2 23	2 11	1 57	1 40	1 19	1 9	0 58	0 46	0 31	0 13
	30	4 12	3 56	3 40	3 20	3 9	2 56	2 40	2 21	2 12	2 2	1 50	1 36	1 21
	31	5 5	4 52	4 37	4 20	4 10	3 59	3 46	3 29	3 22	3 13	3 4	2 53	2 40
Feb.	1	5 57	5 47	5 35	5 22	5 15	5 6	4 56	4 44	4 38	4 31	4 24	4 16	4 7
	2	6 49	6 42	6 34	6 25	6 20	6 15	6 8	6 0	5 56	5 54	5 48	5 42	5 36
	3	7 39	7 36	7 33	7 29	7 27	7 24	7 21	7 18	7 16	7 15	7 12	7 10	7 8
	4	8 30	8 31	8 32	8 33	8 34	8 35	8 35	8 36	8 37	8 37	8 38	8 39	8 39
	5	9 21	9 26	9 32	9 38	9 41	9 45	9 50	9 55	9 58	10 1	10 4	10 8	10 11
	6	10 14	10 22	10 32	10 43	10 49	10 56	11 4	11 14	11 19	11 25	11 30	11 37	11 44
	7	11 7	11 20	11 33	11 48	11 57	12 7	12 19	12 33	12 40	12 47	12 56	13 5	13 16
	8	12 4	12 19	12 35	12 53	13 4	13 16	13 31	13 49	13 58	14 7	14 18	14 30	14 44
	9	13 1	13 18	13 36	13 56	14 8	14 22	14 39	14 59	15 9	15 19	15 32	15 46	16 3
	10	13 59	14 16	14 35	14 56	15 8	15 22	15 39	16 0	16 10	16 21	16 34	16 48	17 5
	11	14 56	15 13	15 30	15 50	16 2	16 15	16 31	16 51	17 0	17 10	17 22	17 35	17 51
	12	15 51	16 6	16 21	16 39	16 49	17 1	17 15	17 32	17 39	17 48	17 58	18 9	18 22
	13	16 44	16 56	17 8	17 22	17 31	17 40	17 51	18 4	18 11	18 17	18 25	18 33	18 43
	14	17 33	17 42	17 51	18 1	18 7	18 14	18 22	18 32	18 36	18 41	18 46	18 52	18 59
	15	18 20	18 25	18 30	18 37	18 41	18 45	18 49	18 55	18 58	19 0	19 4	19 7	19 11
	16	19 4	19 6	19 8	19 10	19 12	19 13	19 14	19 16	19 17	19 18	19 19	19 20	19 21
	17	19 48	19 46	19 44	19 42	19 41	19 39	19 38	19 36	19 35	19 34	19 33	19 32	19 31
	18	20 30	20 25	20 20	20 14	20 10	20 6	20 2	19 58	19 54	19 51	19 48	19 44	19 4

LOCAL ASTRONOMICAL MEAN TIME OF MOONRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours: if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Feb. 16	h m 7 27	h m 7 27	h m 7 27	h m 7 27	h m 7 27	h m 7 27	h m 7 27	h m 7 27	h m 7 27	h m 7 27	h m 7 27	h m 7 27	h m 7 27
17	8 10	8 13	8 17	8 21	8 24	8 26	8 30	8 33	8 35	8 37	8 39	8 42	8 44
18	8 52	8 59	9 6	9 15	9 20	9 25	9 31	9 39	9 43	9 46	9 51	9 56	10 1
19	9 36	9 46	9 56	10 8	10 15	10 23	10 32	10 44	10 49	10 55	11 1	11 9	11 17
20	10 20	10 33	10 46	11 2	11 10	11 21	11 33	11 48	11 54	12 2	12 11	12 20	12 32
21	11 6	11 21	11 37	11 55	12 6	12 18	12 32	12 50	12 58	13 8	13 18	13 30	13 44
22	11 54	12 10	12 28	12 48	13 0	13 13	13 29	13 49	13 58	14 9	14 21	14 35	14 51
23	12 44	13 1	13 19	13 40	13 52	14 6	14 23	14 44	14 54	15 5	15 17	15 32	15 50
24	13 35	13 51	14 9	14 30	14 42	14 56	15 12	15 33	15 42	15 53	16 5	16 19	16 36
25	14 27	14 42	14 59	15 18	15 29	15 42	15 56	16 15	16 23	16 33	16 44	16 56	17 11
26	15 19	15 32	15 46	16 2	16 12	16 23	16 36	16 51	16 58	17 6	17 15	17 25	17 36
27	16 11	16 20	16 32	16 45	16 52	17 1	17 11	17 22	17 28	17 34	17 40	17 47	17 56
28	17 3	17 10	17 17	17 25	17 30	17 36	17 42	17 49	17 53	17 56	18 1	18 5	18 11
Mar. 1	17 54	17 58	18 1	18 4	18 6	18 9	18 12	18 15	18 16	18 18	18 19	18 22	18 24
2	18 47	18 46	18 44	18 43	18 42	18 41	18 40	18 39	18 39	18 38	18 38	18 37	18 36
3	19 40	19 34	19 29	19 22	19 19	19 15	19 10	19 5	19 2	18 59	18 56	18 53	18 49
4	20 34	20 25	20 15	20 4	19 58	19 51	19 42	19 32	19 28	19 23	19 18	19 11	19 4
5	21 30	21 18	21 5	20 49	20 40	20 30	20 19	20 5	19 58	19 51	19 43	19 34	19 24
6	22 28	22 13	21 57	21 38	21 28	21 15	21 1	20 43	20 35	20 26	20 16	20 4	19 51
7	23 27	23 10	22 52	22 32	22 20	22 6	21 50	21 30	21 21	21 10	20 58	20 45	20 28
8	....	....	23 50	23 29	23 17	23 3	22 46	22 26	22 16	22 5	21 53	21 39	21 22
9	0 25	0 8	....	....	....	....	23 48	23 29	23 20	23 10	22 59	22 45	22 30
10	1 21	1 5	0 48	0 28	0 17	0 4	....	....	....	....	....	....	23 47
11	2 15	2 1	1 46	1 29	1 19	1 7	0 54	0 37	0 30	0 21	0 11	0 0	....
12	3 6	2 54	2 42	2 28	2 20	2 11	2 0	1 47	1 41	1 34	1 27	1 18	1 9
13	3 53	3 45	3 36	3 27	3 21	3 14	3 7	2 57	2 53	2 49	2 43	2 37	2 31
14	4 39	4 34	4 29	4 23	4 20	4 16	4 12	4 6	4 4	4 1	3 58	3 55	3 51
15	5 23	5 22	5 20	5 18	5 18	5 16	5 16	5 14	5 13	5 13	5 12	5 11	5 10
16	6 6	6 8	6 10	6 13	6 14	6 16	6 18	6 20	6 22	6 23	6 24	6 26	6 27
17	6 48	6 54	7 0	7 6	7 10	7 15	7 20	7 26	7 29	7 32	7 35	7 39	7 44
18	7 32	7 40	7 49	8 0	8 6	8 13	8 21	8 31	8 35	8 40	8 46	8 52	8 59
19	8 16	8 27	8 40	8 53	9 2	9 11	9 22	9 35	9 41	9 48	9 56	10 4	10 14
20	9 1	9 15	9 30	9 47	9 57	10 8	10 21	10 38	10 45	10 54	11 4	11 15	11 27
21	9 48	10 4	10 20	10 40	10 51	11 4	11 19	11 38	11 46	11 56	12 8	12 21	12 36
22	10 36	10 53	11 11	11 31	11 43	11 57	12 13	12 34	12 43	12 54	13 6	13 20	13 37
23	11 26	11 43	12 1	12 21	12 33	12 47	13 4	13 24	13 34	13 44	13 56	14 11	14 27
24	12 16	12 32	12 49	13 9	13 20	13 34	13 49	14 8	14 17	14 27	14 38	14 51	15 6
25	13 7	13 21	13 38	13 54	14 4	14 16	14 29	14 46	14 53	15 2	15 12	15 22	15 35
26	13 58	14 10	14 22	14 36	14 45	14 54	15 5	15 18	15 24	15 31	15 39	15 47	15 57
27	14 49	14 57	15 6	15 17	15 23	15 30	15 37	15 47	15 51	15 56	16 1	16 7	16 14
28	15 40	15 44	15 50	15 56	15 59	16 3	16 8	16 13	16 15	16 18	16 21	16 24	16 28
29	16 31	16 32	16 33	16 34	16 35	16 36	16 37	16 38	16 38	16 39	16 40	16 40	16 41
30	17 24	17 21	17 18	17 14	17 12	17 9	17 7	17 3	17 2	17 0	16 58	16 56	16 54
31	18 19	18 12	18 4	17 56	17 51	17 45	17 39	17 31	17 27	17 23	17 19	17 15	17 9
Apr. 1	19 16	19 5	18 54	18 41	18 33	18 24	18 14	18 2	17 57	17 50	17 44	17 36	17 28
2	20 16	20 2	19 47	19 30	19 20	19 8	18 55	18 39	18 32	18 24	18 14	18 4	17 52
3	21 16	21 0	20 43	20 24	20 12	19 59	19 44	19 25	19 18	19 6	18 55	18 42	18 31

TABLE X.

725

LOCAL ASTRONOMICAL MEAN TIME OF MOONSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Feb. 16	h m 19 48	h m 19 46	h m 19 44	h m 19 42	h m 19 41	h m 19 39	h m 19 38	h m 19 36	h m 19 35	h m 19 34	h m 19 33	h m 19 32	h m 19 31
17	20 30	20 25	20 20	20 14	20 10	20 6	20 2	19 56	19 54	19 51	19 48	19 44	19 41
18	21 13	21 5	20 56	20 46	20 41	20 34	20 26	20 17	20 13	20 8	20 3	19 58	19 52
19	21 57	21 46	21 34	21 21	21 13	21 4	20 54	20 41	20 35	20 29	20 22	20 14	20 5
20	22 42	22 29	22 14	21 58	21 48	21 37	21 24	21 8	21 1	20 53	20 44	20 34	20 22
21	23 29	23 14	22 57	22 38	22 27	22 14	21 59	21 41	21 32	21 23	21 12	20 59	20 45
22	.....	.....	23 43	23 23	23 11	22 57	22 40	22 20	22 11	22 0	21 48	21 34	21 17
23	0 18	0 1	.....	.....	.....	23 46	23 29	23 8	22 58	22 47	22 34	22 20	22 2
24	1 8	0 51	0 33	0 12	0 0	.....	.....	.....	23 55	23 44	23 32	23 18	23 2
25	2 0	1 43	1 26	1 6	0 54	0 40	0 24	0 4	.....	.....	.....	.....	.....
26	2 52	2 37	2 21	2 3	1 53	1 41	1 26	1 9	1 0	0 51	0 40	0 29	0 15
27	3 44	3 32	3 19	3 4	2 55	2 45	2 34	2 20	2 13	2 6	1 57	1 48	1 37
28	4 36	4 27	4 17	4 7	4 0	3 53	3 45	3 34	3 30	3 24	3 19	3 12	3 5
Mar. 1	5 27	5 22	5 17	5 11	5 7	5 3	4 58	4 53	4 50	4 47	4 44	4 40	4 36
2	6 19	6 18	6 17	6 16	6 15	6 14	6 13	6 12	6 12	6 11	6 10	6 10	6 9
3	7 12	7 15	7 18	7 22	7 24	7 27	7 30	7 33	7 35	7 37	7 39	7 41	7 43
4	8 5	8 12	8 20	8 29	8 34	8 40	8 47	8 55	8 59	9 3	9 8	9 13	9 19
5	9 1	9 12	9 24	9 37	9 45	9 54	10 4	10 17	10 23	10 29	10 37	10 45	10 54
6	9 58	10 12	10 27	10 44	10 54	11 6	11 19	11 36	11 44	11 53	12 2	12 14	12 27
7	10 56	11 12	11 29	11 49	12 1	12 14	12 30	12 49	12 58	13 9	13 20	13 34	13 50
8	11 53	12 12	12 30	12 51	13 3	13 17	13 33	13 54	14 4	14 15	14 27	14 42	14 58
9	12 52	13 8	13 26	13 47	13 58	14 12	14 28	14 48	14 57	15 8	15 20	15 33	15 49
10	13 47	14 2	14 18	14 36	14 47	14 59	15 14	15 31	15 39	15 48	15 58	16 10	16 24
11	14 40	14 52	15 6	15 21	15 30	15 40	15 52	16 6	16 13	16 20	16 28	16 37	16 48
12	15 29	15 39	15 49	16 1	16 8	16 15	16 24	16 35	16 40	16 45	16 51	16 58	17 5
13	16 16	16 22	16 29	16 37	16 41	16 46	16 52	16 59	17 2	17 6	17 10	17 14	17 19
14	17 0	17 4	17 7	17 10	17 12	17 15	17 18	17 21	17 22	17 24	17 25	17 27	17 30
15	17 44	17 43	17 43	17 43	17 42	17 42	17 42	17 41	17 41	17 41	17 40	17 40	17 40
16	18 27	18 23	18 19	18 14	18 12	18 9	18 6	18 1	18 0	17 57	17 55	17 53	17 50
17	19 10	19 3	18 55	18 47	18 42	18 36	18 30	18 22	18 19	18 15	18 11	18 6	18 1
18	19 53	19 43	19 32	19 20	19 13	19 6	18 56	18 45	18 40	18 34	18 28	18 21	18 14
19	20 38	20 25	20 12	19 57	19 48	19 38	19 26	19 12	19 5	18 57	18 49	18 40	18 29
20	21 24	21 9	20 54	20 36	20 25	20 13	19 59	19 42	19 34	19 25	19 15	19 4	18 50
21	22 12	21 55	21 38	21 18	21 7	20 53	20 38	20 19	20 9	19 59	19 47	19 34	19 19
22	23 0	22 44	22 26	22 5	21 53	21 39	21 22	21 2	20 52	20 42	20 29	20 15	19 58
23	23 50	23 34	23 16	22 56	22 44	22 30	22 14	21 54	21 44	21 34	21 21	21 7	20 51
24	.....	.....	.....	23 50	23 39	23 27	23 12	22 53	22 44	22 35	22 24	22 11	21 56
25	0 41	0 26	0 9	.....	.....	.....	.....	23 59	23 52	23 44	23 34	23 24	23 12
26	1 32	1 18	1 4	0 48	0 38	0 28	0 15	.....	.....	.....	.....	.....	.....
27	2 22	2 12	2 0	1 48	1 41	1 32	1 22	1 10	1 5	0 58	0 51	0 44	0 35
28	3 13	3 6	2 59	2 50	2 45	2 40	2 33	2 25	2 22	2 18	2 13	2 8	2 2
29	4 4	4 1	3 58	3 54	3 52	3 49	3 47	3 43	3 42	3 40	3 38	3 36	3 33
30	4 56	4 57	4 58	5 0	5 1	5 1	5 2	5 3	5 4	5 4	5 5	5 6	5 6
31	5 50	5 55	6 1	6 7	6 11	6 15	6 20	6 26	6 28	6 32	6 34	6 38	6 42
Apr. 1	6 46	6 55	7 5	7 16	7 23	7 30	7 39	7 50	7 54	8 0	8 6	8 12	8 20
2	7 44	7 57	8 10	8 26	8 35	8 45	8 58	9 12	9 19	9 27	9 36	9 46	9 57
3	8 44	9 0	9 16	9 35	9 46	9 58	10 13	10 31	10 40	10 50	11 1	11 13	11 17

LOCAL ASTRONOMICAL MEAN TIME OF MOONRISE, MERIDIAN OF GREENWICH,
1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours, if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Date.													
Apr.	1	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	2	19 16	19 5	18 54	18 41	18 33	18 24	18 14	18 2	17 57	17 50	17 44	17 38
	3	20 16	20 2	19 47	19 30	19 20	19 8	18 55	18 39	18 32	18 24	18 14	18 4
	4	21 16	21 0	20 43	20 24	20 12	19 59	19 44	19 25	19 16	19 6	18 55	18 42
	5	22 17	22 0	21 42	21 21	21 9	20 56	20 39	20 19	20 9	19 59	19 47	19 32
	6	23 15	22 59	22 42	22 22	22 10	21 57	21 41	21 22	21 13	21 2	20 51	20 37
	7	...	23 56	23 41	23 23	23 13	23 1	22 47	22 30	22 22	22 13	22 2	21 51
	8	0 11	...	...	...	...	...	23 54	23 40	23 33	23 26	23 18	23 9
	9	1 3	0 51	0 38	0 23	0 15	0 5	...	...	...	...	...	...
	10	1 52	1 42	1 33	1 22	1 16	1 8	1 0	0 50	0 45	0 39	0 34	0 27
	11	2 38	2 32	2 26	2 18	2 14	2 10	2 5	1 58	1 55	1 52	1 48	1 40
	12	3 21	3 19	3 16	3 14	3 12	3 10	3 8	3 5	3 4	3 3	3 2	3 0
	13	4 4	4 5	4 6	4 8	4 8	4 9	4 10	4 11	4 12	4 13	4 13	4 14
	14	4 47	4 51	4 56	5 1	5 4	5 8	5 12	5 16	5 19	5 21	5 24	5 27
	15	5 29	5 37	5 45	5 54	5 59	6 5	6 12	6 21	6 25	6 29	6 34	6 40
	16	6 13	6 24	6 35	6 47	6 55	7 3	7 13	7 25	7 31	7 37	7 44	7 52
	17	6 58	7 11	7 25	7 41	7 50	8 0	8 13	8 28	8 36	8 44	8 53	9 3
	18	7 44	7 59	8 15	8 34	8 44	8 57	9 11	9 29	9 38	9 47	9 58	10 10
	19	8 32	8 48	9 6	9 26	9 37	9 51	10 7	10 27	10 36	10 46	10 58	11 12
	20	9 21	9 38	9 56	10 16	10 28	10 42	10 58	11 18	11 28	11 39	11 51	12 5
	21	10 11	10 27	10 44	11 4	11 16	11 29	11 44	12 4	12 13	12 23	12 35	12 48
	22	11 0	11 15	11 31	11 49	12 0	12 12	12 26	12 43	12 51	13 0	13 11	13 22
	23	11 50	12 2	12 16	12 31	12 40	12 50	13 2	13 17	13 23	13 31	13 39	13 48
	24	12 39	12 49	12 59	13 11	13 18	13 26	13 35	13 46	13 51	13 57	14 3	14 10
	25	13 28	13 34	13 41	13 49	13 54	13 59	14 5	14 12	14 16	14 19	14 23	14 27
	26	14 18	14 20	14 24	14 27	14 29	14 31	14 34	14 37	14 38	14 40	14 42	14 43
	27	15 9	15 8	15 6	15 5	15 4	15 3	15 3	15 1	15 1	15 0	15 0	14 59
	28	16 2	15 57	15 51	15 45	15 41	15 37	15 33	15 27	15 25	15 22	15 19	15 16
	29	16 57	16 48	16 39	16 28	16 22	16 14	16 6	15 56	15 52	15 47	15 42	15 36
	30	17 56	17 44	17 30	17 15	17 7	16 56	16 45	16 31	16 24	16 17	16 9	15 50
	1	18 58	18 43	18 26	18 8	17 57	17 45	17 31	17 13	17 5	16 56	16 46	16 34
May	2	20 0	19 44	19 26	19 6	18 54	18 41	18 25	18 5	17 56	17 46	17 34	17 20
	3	21 2	20 46	20 28	20 8	19 56	19 42	19 26	19 6	18 57	18 47	18 34	18 21
	4	22 1	21 46	21 30	21 11	21 0	20 48	20 33	20 15	20 6	19 57	19 46	19 34
	5	22 56	22 44	22 30	22 14	22 5	21 54	21 42	21 27	21 20	21 12	21 3	20 53
	6	23 48	23 38	23 27	23 15	23 8	23 0	22 50	22 39	22 34	22 28	22 21	22 14
	7	...	...	...	...	...	...	23 57	23 49	23 46	23 42	23 38	23 33
	8	0 35	0 28	0 21	0 13	0 8	0 3	...	...	...	...	...	...
	9	1 20	1 17	1 13	1 9	1 7	1 4	1 1	0 58	0 56	0 54	0 52	0 50
	10	2 3	2 3	2 3	2 3	2 3	2 3	2 3	2 4	2 4	2 4	2 4	2 4
	11	2 46	2 49	2 53	2 57	2 59	3 2	3 5	3 8	3 10	3 12	3 14	3 17
	12	3 28	3 35	3 42	3 50	3 54	4 0	4 6	4 13	4 17	4 20	4 24	4 29
	13	4 11	4 21	4 31	4 42	4 49	4 57	5 6	5 17	5 22	5 28	5 34	5 41
	14	4 56	5 8	5 21	5 36	5 45	5 54	6 6	6 20	6 27	6 34	6 43	6 52
	15	5 42	5 56	6 11	6 29	6 39	6 51	7 5	7 22	7 30	7 39	7 49	8 1
	16	6 29	6 45	7 2	7 21	7 33	7 46	8 1	8 21	8 30	8 40	8 51	9 5
	17	7 18	7 34	7 52	8 12	8 24	8 38	8 54	9 15	9 24	9 35	9 47	10 1
	18	8 7	8 24	8 41	9 1	9 13	9 27	9 42	10 2	10 12	10 22	10 34	10 47

TABLE X.

727

LOCAL ASTRONOMICAL MEAN TIME OF MOONSET, MERIDIAN OF GREENWICH,
1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Apr. 1	h m 6 46	h m 6 55	h m 7 5	h m 7 16	h m 7 23	h m 7 30	h m 7 39	h m 7 50	h m 7 54	h m 8 0	h m 8 6	h m 8 12	h m 8 20
2	7 44	7 57	8 10	8 26	8 35	8 45	8 58	9 12	9 19	9 27	9 36	9 46	9 57
3	8 44	9 0	9 16	9 35	9 46	9 58	10 13	10 31	10 40	10 50	11 1	11 13	11 28
4	9 45	10 2	10 20	10 40	10 52	11 6	11 22	11 42	11 52	12 2	12 14	12 28	12 45
5	10 45	11 2	11 19	11 40	11 52	12 5	12 22	12 42	12 51	13 2	13 14	13 27	13 43
6	11 42	11 57	12 14	12 33	12 44	12 57	13 11	13 29	13 38	13 47	13 58	14 10	14 24
7	12 36	12 50	13 4	13 20	13 29	13 40	13 52	14 7	14 14	14 22	14 31	14 41	14 52
8	13 27	13 37	13 48	14 1	14 8	14 17	14 26	14 38	14 43	14 49	14 56	15 3	15 11
9	14 14	14 21	14 29	14 38	14 43	14 49	14 56	15 4	15 7	15 11	15 16	15 21	15 26
10	14 59	15 3	15 7	15 12	15 15	15 18	15 22	15 26	15 28	15 30	15 32	15 35	15 38
11	15 42	15 43	15 44	15 44	15 45	15 45	15 46	15 47	15 47	15 47	15 48	15 48	15 48
12	16 25	16 22	16 19	16 16	16 14	16 12	16 10	16 7	16 5	16 4	16 2	16 1	15 58
13	17 7	17 2	16 55	16 48	16 44	16 39	16 34	16 28	16 24	16 21	16 18	16 14	16 9
14	17 51	17 42	17 32	17 21	17 15	17 8	17 0	16 50	16 45	16 40	16 35	16 28	16 22
15	18 35	18 23	18 11	17 56	17 48	17 39	17 28	17 15	17 9	17 2	16 54	16 46	16 36
16	19 20	19 7	18 52	18 35	18 25	18 13	18 0	17 44	17 37	17 28	17 19	17 8	16 56
17	20 7	19 52	19 35	19 16	19 5	18 52	18 37	18 19	18 10	18 0	17 49	17 37	17 22
18	20 56	20 39	20 22	20 2	19 50	19 36	19 20	19 0	18 50	18 40	18 28	18 14	17 58
19	21 45	21 29	21 11	20 51	20 39	20 25	20 9	19 49	19 39	19 28	19 16	19 2	18 46
20	22 35	22 19	22 2	21 43	21 32	21 19	21 3	20 45	20 36	20 26	20 14	20 1	19 46
21	23 24	23 10	22 55	22 38	22 28	22 17	22 3	21 47	21 39	21 30	21 20	21 9	20 56
22	...	...	23 50	23 36	23 27	23 18	23 7	22 54	22 47	22 41	22 33	22 24	22 14
23	0 13	0 2	...	...	...	...	...	...	...	23 55	23 50	23 44	23 37
24	1 2	0 54	0 45	0 35	0 29	0 22	0 14	0 5	0 0	...	...	...	...
25	1 52	1 47	1 42	1 36	1 32	1 28	1 24	1 19	1 16	1 13	1 10	1 7	1 3
26	2 42	2 41	2 40	2 39	2 38	2 37	2 36	2 35	2 34	2 34	2 33	2 32	2 32
27	3 33	3 36	3 40	3 44	3 46	3 48	3 51	3 54	3 56	3 58	4 0	4 2	4 4
28	4 28	4 34	4 42	4 51	4 56	5 2	5 8	5 17	5 20	5 25	5 29	5 34	5 40
29	5 25	5 36	5 48	6 1	6 8	6 18	6 28	6 40	6 46	6 53	7 0	7 8	7 18
30	6 25	6 39	6 54	7 11	7 21	7 33	7 46	8 3	8 11	8 20	8 29	8 40	8 54
May 1	7 27	7 43	8 1	8 20	8 32	8 45	9 1	9 20	9 29	9 40	9 51	10 4	10 20
2	8 30	8 46	9 4	9 25	9 37	9 51	10 7	10 27	10 37	10 47	10 59	11 13	11 30
3	9 31	9 47	10 4	10 23	10 35	10 48	11 3	11 22	11 31	11 40	11 52	12 4	12 19
4	10 28	10 42	10 57	11 14	11 24	11 36	11 49	12 5	12 12	12 21	12 30	12 41	12 53
5	11 23	11 33	11 45	11 59	12 7	12 16	12 26	12 39	12 45	12 52	12 59	13 7	13 16
6	12 11	12 19	12 28	12 38	12 44	12 50	12 58	13 7	13 11	13 16	13 21	13 26	13 32
7	12 57	13 2	13 8	13 14	13 17	13 21	13 26	13 31	13 33	13 36	13 39	13 42	13 46
8	13 41	13 43	13 45	13 47	13 48	13 49	13 50	13 52	13 53	13 53	13 54	13 56	13 57
9	14 24	14 22	14 20	14 18	14 17	14 16	14 14	14 12	14 12	14 11	14 10	14 8	14 7
10	15 7	15 1	14 56	14 50	14 47	14 43	14 38	14 33	14 30	14 28	14 25	14 22	14 18
11	15 49	15 41	15 32	15 23	15 17	15 11	15 3	14 55	14 51	14 46	14 41	14 36	14 30
12	16 33	16 22	16 10	15 57	15 50	15 41	15 31	15 19	15 13	15 7	15 0	14 52	14 44
13	17 18	17 5	16 50	16 34	16 25	16 14	16 2	15 46	15 39	15 32	15 23	15 13	15 1
14	18 5	17 50	17 33	17 15	17 4	16 51	16 37	16 19	16 11	16 2	15 51	15 39	15 25
15	18 53	18 36	18 19	17 59	17 48	17 34	17 18	16 59	16 49	16 39	16 27	16 14	15 58
16	19 42	19 25	19 8	18 47	18 35	18 22	18 5	17 45	17 36	17 25	17 12	16 58	16 45
17	20 31	20 15	19 58	19 39	19 27	19 14	18 58	18 39	18 30	18 20	18 8	17 54	17 41

LOCAL ASTRONOMICAL MEAN TIME OF MOONRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
May	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	17 8 7	8 24	8 41	9 1	9 13	9 27	9 42	10 2	10 12	10 22	10 34	10 47	11 3
	18 8 57	9 12	9 28	9 47	9 58	10 11	10 25	10 43	10 52	11 1	11 12	11 24	11 38
	19 9 46	9 59	10 14	10 30	10 40	10 50	11 3	11 18	11 26	11 34	11 42	11 52	12 4
	20 10 34	10 45	10 57	11 10	11 18	11 26	11 36	11 48	11 54	12 0	12 7	12 14	12 23
	21 11 22	11 30	11 38	11 48	11 53	11 59	12 6	12 13	12 19	12 23	12 28	12 33	12 39
	22 12 10	12 14	12 19	12 24	12 27	12 31	12 34	12 39	12 41	12 43	12 46	12 49	12 52
	23 12 59	13 0	13 0	13 1	13 1	13 2	13 2	13 3	13 3	13 3	13 4	13 4	13 4
	24 13 49	13 46	13 42	13 38	13 36	13 33	13 30	13 27	13 25	13 24	13 22	13 19	13 17
	25 14 42	14 34	14 27	14 18	14 13	14 8	14 1	13 53	13 50	13 46	13 42	13 37	13 32
	26 15 38	15 27	15 15	15 2	14 55	14 46	14 36	14 24	14 19	14 13	14 6	13 59	13 50
	27 16 37	16 23	16 8	15 51	15 42	15 30	15 17	15 2	14 54	14 46	14 37	14 27	14 1
	28 17 39	17 23	17 6	16 47	16 35	16 22	16 7	15 48	15 40	15 30	15 19	15 6	14 5
	29 18 42	18 26	18 8	17 47	17 35	17 22	17 6	16 46	16 36	16 25	16 13	16 0	15 43
	30 19 44	19 28	19 11	18 52	18 40	18 27	18 12	17 52	17 44	17 33	17 22	17 9	16 53
	31 20 43	20 29	20 14	19 57	19 47	19 35	19 22	19 5	18 57	18 49	18 39	18 28	18 14
June	1 21 38	21 27	21 14	21 1	20 53	20 44	20 33	20 20	20 14	20 9	20 0	19 51	19 42
	2 22 29	22 20	22 12	22 2	21 56	21 50	21 43	21 33	21 29	21 25	21 19	21 14	21 7
	3 23 16	23 11	23 6	23 0	22 57	22 54	22 49	22 44	22 42	22 39	22 36	22 33	22 29
	4	23 59	23 58	23 57	23 56	23 55	23 54	23 53	23 52	23 51	23 51	23 50	23 49
	5 0 0	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .
	6 0 44	0 46	0 48	0 51	0 52	0 54	0 56	0 59	1 0	1 1	1 3	1 4	1 6
	7 1 26	1 32	1 38	1 44	1 48	1 52	1 58	2 4	2 7	2 10	2 14	2 17	2 22
	8 2 9	2 18	2 27	2 37	2 43	2 50	2 58	3 8	3 13	3 18	3 23	3 30	3 37
	9 2 53	3 4	3 16	3 30	3 38	3 48	3 58	4 12	4 18	4 25	4 32	4 41	4 51
	10 3 38	3 52	4 7	4 24	4 33	4 44	4 58	5 14	5 22	5 30	5 40	5 51	6 3
	11 4 25	4 41	4 57	5 16	5 27	5 40	5 55	6 14	6 23	6 33	6 44	6 57	7 12
	12 5 14	5 30	5 48	6 8	6 20	6 34	6 50	7 10	7 19	7 30	7 42	7 56	8 12
	13 6 4	6 20	6 38	6 58	7 10	7 24	7 40	8 0	8 10	8 20	8 32	8 46	9 2
	14 6 54	7 9	7 26	7 46	7 57	8 10	8 25	8 44	8 52	9 2	9 14	9 26	9 41
	15 7 43	7 57	8 12	8 30	8 40	8 51	9 4	9 21	9 28	9 37	9 46	9 57	10 9
	16 8 32	8 44	8 56	9 11	9 19	9 28	9 39	9 52	9 59	10 5	10 13	10 21	10 31
	17 9 20	9 29	9 38	9 49	9 55	10 2	10 10	10 20	10 24	10 29	10 34	10 41	10 47
	18 10 8	10 13	10 19	10 26	10 29	10 34	10 39	10 44	10 47	10 50	10 53	10 57	11 1
	19 10 55	10 57	10 59	11 1	11 3	11 4	11 6	11 8	11 9	11 10	11 11	11 12	11 13
	20 11 44	11 42	11 40	11 37	11 36	11 35	11 33	11 31	11 30	11 29	11 28	11 26	11 25
	21 12 34	12 28	12 22	12 15	12 11	12 7	12 2	11 56	11 53	11 50	11 46	11 43	11 38
	22 13 26	13 17	13 7	12 56	12 49	12 42	12 33	12 23	12 18	12 13	12 8	12 1	11 54
	23 14 22	14 10	13 56	13 41	13 32	13 22	13 10	12 56	12 50	12 43	12 34	12 25	12 15
	24 15 21	15 6	14 50	14 32	14 21	14 9	13 54	13 37	13 29	13 20	13 9	12 57	12 44
	25 16 23	16 6	15 49	15 28	15 17	15 3	14 47	14 28	14 18	14 8	13 56	13 42	13 26
	26 17 25	17 8	16 51	16 30	16 19	16 5	15 49	15 29	15 20	15 9	14 57	14 43	14 27
	27 18 26	18 11	17 54	17 36	17 25	17 12	16 58	16 40	16 31	16 22	16 11	15 58	15 44
	28 19 23	19 11	18 57	18 41	18 32	18 22	18 10	17 55	17 48	17 40	17 31	17 21	17 10
	29 20 17	20 7	19 57	19 45	19 38	19 31	19 22	19 10	19 5	19 0	18 53	18 46	18 38
	30 21 7	21 1	20 54	20 47	20 42	20 37	20 31	20 24	20 21	20 18	20 14	20 9	20 4
July	1 21 54	21 51	21 48	21 45	21 43	21 41	21 38	21 36	21 34	21 33	21 31	21 29	21 27
	2 22 39	22 40	22 40	22 41	22 42	22 42	22 43	22 44	22 45	22 45	22 46	22 46	22 47

TABLE X.

729

LOCAL ASTRONOMICAL MEAN TIME OF MOONSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
May 17	h m 20 31	h m 20 15	h m 19 58	h m 19 39	h m 19 27	h m 19 14	h m 18 58	h m 18 39	h m 18 30	h m 18 20	h m 18 8	h m 17 54	h m 17 39
18	21 21	21 6	20 51	20 33	20 22	20 10	19 56	19 39	19 31	19 22	19 11	19 0	18 46
19	22 10	21 57	21 44	21 29	21 20	21 10	20 58	20 44	20 37	20 30	20 21	20 12	20 1
20	22 58	22 48	22 38	22 27	22 20	22 12	22 3	21 52	21 47	21 42	21 36	21 28	21 21
21	23 45	23 39	23 33	23 25	23 21	23 16	23 10	23 3	23 0	22 56	22 52	22 48	22 43
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
23	0 33	0 31	0 28	0 25	0 23	0 21	0 19	0 16	0 15	0 14	0 12	0 10	0 8
24	1 22	1 24	1 26	1 27	1 28	1 29	1 30	1 32	1 32	1 33	1 34	1 35	1 36
25	2 14	2 19	2 24	2 31	2 35	2 39	2 44	2 50	2 52	2 56	2 59	3 2	3 6
26	3 8	3 17	3 27	3 38	3 44	3 51	4 0	4 10	4 15	4 20	4 26	4 33	4 41
27	4 5	4 18	4 31	4 47	4 56	5 6	5 18	5 32	5 39	5 47	5 56	6 5	6 16
28	5 6	5 21	5 36	5 56	6 7	6 19	6 34	6 52	7 1	7 10	7 21	7 34	7 48
29	6 9	6 26	6 43	7 4	7 16	7 29	7 45	8 5	8 15	8 25	8 37	8 51	9 8
30	7 12	7 29	7 46	8 6	8 18	8 32	8 48	9 7	9 17	9 27	9 39	9 52	10 8
31	8 13	8 28	8 44	9 2	9 13	9 25	9 40	9 57	10 6	10 14	10 25	10 37	10 50
June 1	9 10	9 22	9 36	9 51	10 0	10 10	10 22	10 37	10 43	10 50	10 59	11 8	11 18
2	10 3	10 12	10 23	10 34	10 41	10 49	10 57	11 8	11 13	11 18	11 24	11 31	11 38
3	10 52	10 58	11 5	11 12	11 17	11 22	11 27	11 34	11 37	11 41	11 45	11 49	11 53
4	11 38	11 40	11 44	11 47	11 49	11 51	11 54	11 57	11 58	12 0	12 2	12 4	12 6
5	12 22	12 21	12 20	12 20	12 19	12 19	12 18	12 18	12 17	12 17	12 16	12 16	12 16
6	13 4	13 0	12 56	12 52	12 49	12 46	12 42	12 38	12 36	12 34	12 32	12 29	12 26
7	13 47	13 40	13 33	13 24	13 19	13 14	13 7	13 0	12 56	12 52	12 48	12 43	12 38
8	14 30	14 20	14 10	13 58	13 51	13 43	13 34	13 22	13 17	13 12	13 6	12 59	12 51
9	15 15	15 2	14 49	14 34	14 25	14 15	14 3	13 49	13 42	13 35	13 27	13 18	13 7
10	16 1	15 47	15 31	15 13	15 3	14 51	14 37	14 20	14 12	14 3	13 53	13 42	13 29
11	16 49	16 33	16 16	15 56	15 45	15 32	15 16	14 57	14 48	14 38	14 27	14 14	13 58
12	17 38	17 22	17 4	16 44	16 31	16 18	16 1	15 41	15 32	15 21	15 9	14 55	14 38
13	18 28	18 12	17 54	17 34	17 22	17 9	16 53	16 33	16 24	16 13	16 1	15 47	15 31
14	19 18	19 3	18 47	18 28	18 17	18 5	17 50	17 32	17 23	17 14	17 3	16 50	16 36
15	20 7	19 54	19 40	19 24	19 15	19 4	18 51	18 36	18 29	18 21	18 12	18 1	17 49
16	20 56	20 45	20 34	20 21	20 14	20 6	19 56	19 44	19 38	19 32	19 25	19 17	19 8
17	21 43	21 36	21 28	21 20	21 14	21 9	21 2	20 54	20 50	20 46	20 41	20 36	20 30
18	22 31	22 27	22 23	22 18	22 16	22 13	22 9	22 5	22 3	22 1	21 59	21 56	21 53
19	23 18	23 18	23 18	23 18	23 18	23 18	23 18	23 18	23 18	23 18	23 18	23 18	23 18
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21	0 7	0 11	0 15	0 20	0 22	0 25	0 29	0 33	0 35	0 37	0 40	0 42	0 45
22	0 58	1 6	1 14	1 23	1 29	1 34	1 42	1 50	1 54	1 58	2 3	2 8	2 15
23	1 52	2 3	2 15	2 29	2 37	2 46	2 56	3 9	3 15	3 22	3 29	3 37	3 47
24	2 50	3 4	3 19	3 36	3 46	3 57	4 11	4 28	4 35	4 44	4 54	5 5	5 18
25	3 50	4 6	4 23	4 43	4 54	5 8	5 23	5 42	5 52	6 2	6 13	6 26	6 42
26	4 52	5 9	5 27	5 48	6 0	6 13	6 30	6 50	6 59	7 10	7 22	7 36	7 52
27	5 54	6 10	6 27	6 47	6 58	7 11	7 27	7 46	7 54	8 4	8 16	8 28	8 43
28	6 54	7 8	7 23	7 40	7 50	8 1	8 14	8 30	8 38	8 46	8 55	9 6	9 18
29	7 50	8 1	8 13	8 26	8 34	8 43	8 54	9 6	9 12	9 18	9 25	9 33	9 42
30	8 41	8 49	8 58	9 7	9 13	9 19	9 26	9 35	9 39	9 43	9 48	9 53	9 59
July 1	9 30	9 34	9 39	9 44	9 48	9 51	9 55	10 0	10 2	10 4	10 7	10 10	10 13
2	10 16	10 17	10 18	10 19	10 19	10 20	10 21	10 22	10 22	10 23	10 23	10 24	10 27

LOCAL ASTRONOMICAL MEAN TIME OF MOONRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours, if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Date.													
July	1	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	2	21 54	21 51	21 48	21 45	21 43	21 41	21 38	21 36	21 34	21 33	21 31	21 29
	3	22 39	22 40	22 40	22 41	22 42	22 42	22 43	22 44	22 45	22 45	22 46	22 47
	4	23 22	23 26	23 30	23 36	23 39	23 42	23 46	23 51	23 53	23 56	23 58	.....
	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0 1	0 4
	6	0 5	0 13	0 21	0 30	0 35	0 41	0 48	0 56	1 0	1 4	1 9	1 15
	7	0 49	1 0	1 11	1 23	1 30	1 39	1 49	2 0	2 6	2 12	2 19	2 27
	8	1 34	1 47	2 1	2 16	2 26	2 36	2 48	3 4	3 11	3 18	3 28	3 38
	9	2 20	2 35	2 51	3 9	3 20	3 32	3 47	4 4	4 13	4 22	4 33	4 45
	10	3 8	3 24	3 42	4 2	4 13	4 27	4 42	5 2	5 11	5 22	5 33	5 47
	11	3 58	4 14	4 32	4 52	5 4	5 18	5 34	5 55	6 4	6 15	6 27	6 41
	12	4 48	5 4	5 21	5 41	5 53	6 6	6 22	6 41	6 50	7 0	7 12	7 25
	13	5 38	5 53	6 9	6 27	6 38	6 50	7 4	7 21	7 29	7 38	7 48	8 0
	14	6 28	6 41	6 54	7 10	7 19	7 29	7 41	7 55	8 2	8 9	8 18	8 27
	15	7 18	7 27	7 38	7 50	7 57	8 4	8 14	8 25	8 30	8 35	8 41	8 48
	16	8 6	8 12	8 19	8 28	8 32	8 37	8 43	8 50	8 54	8 57	9 1	9 6
	17	8 54	8 57	9 0	9 4	9 6	9 8	9 11	9 14	9 16	9 18	9 19	9 21
	18	9 42	9 41	9 40	9 40	9 39	9 39	9 38	9 37	9 37	9 37	9 36	9 36
	19	10 31	10 26	10 22	10 16	10 14	10 10	10 6	10 1	9 59	9 57	9 54	9 52
	20	11 22	11 14	11 5	10 56	10 50	10 44	10 36	10 28	10 24	10 19	10 14	10 9
	21	12 15	12 4	11 52	11 38	11 30	11 21	11 10	10 58	10 52	10 46	10 38	10 30
	22	13 12	12 57	12 42	12 25	12 15	12 4	11 50	11 34	11 27	11 18	11 9	10 58
	23	14 10	13 54	13 37	13 18	13 6	12 53	12 38	12 19	12 10	12 0	11 49	11 36
	24	15 10	14 54	14 36	14 16	14 4	13 50	13 34	13 14	13 5	12 54	12 42	12 28
	25	16 11	15 55	15 38	15 18	15 7	14 54	14 38	14 19	14 10	14 0	13 49	13 36
	26	17 9	16 55	16 40	16 23	16 13	16 1	15 48	15 31	15 24	15 15	15 5	14 54
	27	18 4	17 53	17 41	17 27	17 19	17 10	16 59	16 46	16 40	16 33	16 26	16 17
	28	18 56	18 48	18 40	18 30	18 24	18 18	18 10	18 1	17 57	17 53	17 47	17 42
	29	19 45	19 40	19 36	19 30	19 27	19 24	19 19	19 15	19 12	19 10	19 7	19 4
	30	20 31	20 30	20 29	20 28	20 28	20 27	20 26	20 25	20 25	20 24	20 24	20 23
	31	21 16	21 19	21 21	21 24	21 26	21 28	21 31	21 34	21 35	21 37	21 38	21 40
Aug.	1	22 0	22 6	22 12	22 20	22 24	22 28	22 34	22 41	22 44	22 48	22 51	22 56
	2	22 44	22 53	23 2	23 14	23 20	23 27	23 36	23 46	23 51	23 56	.....	.....
	3	23 29	23 40	23 53	.....	.....	.....	.....	.....	.....	.....	0 2	0 9
	4	.....	.....	.....	0 7	0 16	0 25	0 36	0 50	0 56	1 4	1 12	1 20
	5	0 14	0 28	0 43	1 0	1 10	1 22	1 35	1 52	2 0	2 8	2 18	2 29
	6	1 2	1 17	1 34	1 53	2 4	2 17	2 32	2 51	3 0	3 10	3 21	3 34
	7	1 50	2 7	2 24	2 44	2 56	3 10	3 26	3 46	3 55	4 6	4 18	4 32
	8	2 40	2 56	3 14	3 34	3 45	3 59	4 15	4 35	4 44	4 54	5 6	5 20
	9	3 30	3 46	4 2	4 21	4 32	4 45	4 59	5 17	5 26	5 36	5 46	5 58
	10	4 21	4 34	4 48	5 5	5 15	5 26	5 39	5 54	6 1	6 9	6 18	6 29
	11	5 11	5 22	5 34	5 47	5 54	6 4	6 14	6 26	6 32	6 38	6 45	6 53
	12	6 0	6 8	6 16	6 26	6 31	6 38	6 45	6 54	6 58	7 2	7 7	7 12
	13	6 49	6 54	6 58	7 4	7 7	7 10	7 14	7 19	7 21	7 24	7 26	7 29
	14	7 38	7 39	7 40	7 40	7 41	7 42	7 42	7 43	7 44	7 44	7 45	7 45
	15	8 28	8 25	8 22	8 18	8 16	8 13	8 11	8 7	8 6	8 4	8 2	8 0
	16	9 19	9 12	9 5	8 57	8 52	8 47	8 40	8 33	8 30	8 26	8 22	8 18
	17	10 12	10 2	9 51	9 38	9 31	9 23	9 14	9 2	8 57	8 51	8 45	8 38
	18	11 7	10 54	10 40	10 24	10 14	10 4	9 52	9 36	9 30	9 22	9 13	9 4

TABLE X.

731

LOCAL ASTRONOMICAL MEAN TIME OF MOONSET, MERIDIAN OF GREENWICH,
1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
July	1	9 30	9 34	9 39	9 44	9 48	9 51	9 55	10 0	10 2	10 4	10 7	10 10	10 13
	2	10 16	10 17	10 18	10 19	10 19	10 20	10 21	10 22	10 22	10 23	10 23	10 24	10 24
	3	11 0	10 57	10 55	10 52	10 50	10 48	10 46	10 43	10 42	10 40	10 39	10 37	10 35
	4	11 43	11 37	11 31	11 24	11 20	11 16	11 10	11 4	11 2	10 58	10 55	10 51	10 47
	5	12 27	12 18	12 9	11 58	11 52	11 45	11 36	11 27	11 22	11 17	11 13	11 6	10 58
	6	13 11	12 59	12 47	12 33	12 25	12 16	12 5	11 52	11 46	11 39	11 32	11 24	11 14
	7	13 56	13 43	13 28	13 11	13 1	12 50	12 37	12 21	12 14	12 5	11 56	11 46	11 33
	8	14 44	14 28	14 12	13 53	13 42	13 29	13 14	12 56	12 47	12 37	12 26	12 14	12 0
	9	15 32	15 16	14 58	14 38	14 26	14 13	13 57	13 37	13 28	13 17	13 5	12 51	12 35
	10	16 22	16 6	15 48	15 28	15 16	15 2	14 46	14 26	14 16	14 6	13 54	13 40	13 23
	11	17 12	16 57	16 40	16 21	16 10	15 57	15 41	15 22	15 14	15 4	14 52	14 39	14 24
	12	18 3	17 49	17 34	17 17	17 7	16 56	16 42	16 25	16 18	16 9	15 59	15 48	15 35
	13	18 52	18 41	18 29	18 15	18 6	17 57	17 46	17 33	17 27	17 20	17 12	17 3	16 54
	14	19 41	19 33	19 24	19 13	19 8	19 1	18 53	18 43	18 39	18 34	18 29	18 23	18 16
	15	20 29	20 24	20 19	20 13	20 9	20 5	20 1	19 55	19 53	19 50	19 47	19 43	19 39
	16	21 17	21 16	21 14	21 13	21 12	21 11	21 10	21 8	21 8	21 7	21 6	21 5	21 4
	17	22 5	22 8	22 11	22 14	22 15	22 17	22 20	22 23	22 24	22 25	22 27	22 29	22 31
	18	22 55	23 1	23 8	23 16	23 20	23 25	23 31	23 38	23 41	23 45	23 49	23 53	23 58
	19	23 47	23 57	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	20	.....	.....	0 7	0 19	0 26	0 34	0 43	0 55	1 0	1 6	1 12	1 20	1 28
	21	0 42	0 55	1 8	1 24	1 33	1 44	1 56	2 11	2 19	2 26	2 35	2 46	2 57
	22	1 39	1 54	2 11	2 29	2 40	2 53	3 8	3 26	3 34	3 44	3 55	4 8	4 22
	23	2 39	2 55	3 13	3 33	3 45	3 58	4 15	4 34	4 44	4 54	5 6	5 20	5 36
	24	3 39	3 56	4 13	4 33	4 45	4 58	5 14	5 34	5 43	5 53	6 5	6 18	6 34
	25	4 39	4 54	5 10	5 28	5 39	5 51	6 5	6 23	6 31	6 40	6 50	7 2	7 15
	26	5 36	5 48	6 2	6 17	6 26	6 36	6 48	7 2	7 9	7 16	7 24	7 34	7 44
	27	6 29	6 39	6 49	7 1	7 8	7 15	7 24	7 34	7 39	7 44	7 50	7 57	8 4
	28	7 20	7 26	7 32	7 40	7 44	7 49	7 55	8 1	8 4	8 8	8 11	8 15	8 20
	29	8 7	8 10	8 13	8 16	8 18	8 20	8 22	8 25	8 26	8 27	8 29	8 31	8 33
	30	8 53	8 52	8 51	8 50	8 49	8 49	8 48	8 47	8 46	8 46	8 45	8 45	8 44
Aug.	31	9 37	9 33	9 29	9 23	9 20	9 17	9 13	9 9	9 6	9 4	9 2	8 59	8 56
	1	10 21	10 14	10 6	9 57	9 52	9 46	9 39	9 31	9 27	9 23	9 18	9 14	9 8
	2	11 6	10 55	10 44	10 32	10 24	10 16	10 7	9 55	9 50	9 44	9 37	9 30	9 22
	3	11 51	11 38	11 24	11 9	11 0	10 49	10 37	10 23	10 16	10 8	10 0	9 50	9 40
	4	12 37	12 22	12 7	11 49	11 38	11 26	11 12	10 54	10 47	10 37	10 27	10 16	10 2
	5	13 25	13 9	12 52	12 32	12 21	12 8	11 52	11 33	11 24	11 14	11 2	10 49	10 34
	6	14 14	13 58	13 40	13 20	13 8	12 54	12 38	12 18	12 9	11 58	11 46	11 32	11 16
	7	15 4	14 48	14 31	14 11	14 0	13 47	13 31	13 12	13 2	12 52	12 40	12 27	12 11
	8	15 55	15 40	15 24	15 6	14 56	14 44	14 30	14 12	14 4	13 54	13 44	13 32	13 18
	9	16 45	16 32	16 19	16 4	15 55	15 45	15 33	15 18	15 11	15 4	14 55	14 46	14 34
	10	17 35	17 25	17 15	17 3	16 56	16 48	16 39	16 28	16 23	16 17	16 11	16 3	15 55
	11	18 24	18 18	18 11	18 3	17 59	17 54	17 48	17 41	17 37	17 34	17 30	17 25	17 20
	12	19 13	19 10	19 7	19 4	19 2	19 0	18 58	18 55	18 53	18 52	18 50	18 48	18 46
	13	20 2	20 3	20 5	20 6	20 7	20 8	20 9	20 10	20 11	20 11	20 12	20 13	20 14
	14	20 52	20 57	21 3	21 9	21 12	21 16	21 21	21 26	21 29	21 32	21 35	21 39	21 43
	15	21 44	21 53	22 2	22 12	22 19	22 26	22 34	22 44	22 48	22 53	22 58	23 5	23 12
	16	22 36	22 50	23 3	23 17	23 26	23 35	23 47	.....	.....	.....	.....	.....	.....
	17	23 34	23 49	.....	.....	.....	.....	.....	0 0	0 7	0 14	0 22	0 31	0

LOCAL ASTRONOMICAL MEAN TIME OF MOONRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat. Date.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Aug. 16	h m 10 12	h m 10 2	h m 9 51	h m 9 38	h m 9 31	h m 9 23	h m 9 14	h m 9 2	h m 8 57	h m 8 51	h m 8 45	h m 8 38	h m 8 30
17	11 7	10 54	10 40	10 24	10 14	10 4	9 52	9 36	9 30	9 22	9 13	9 4	8 53
18	12 4	11 49	11 33	11 14	11 3	10 51	10 36	10 18	10 10	10 1	9 50	9 33	9 24
19	13 3	12 47	12 29	12 9	11 57	11 44	11 28	11 8	10 59	10 49	10 37	10 24	10 8
20	14 2	13 46	13 28	13 8	12 57	12 44	12 28	12 8	11 59	11 49	11 37	11 24	11 8
21	14 59	14 44	14 29	14 10	14 0	13 48	13 34	13 16	13 8	12 59	12 48	12 36	12 23
22	15 54	15 42	15 29	15 13	15 5	14 55	14 43	14 28	14 22	14 14	14 6	13 56	13 45
23	16 47	16 37	16 27	16 16	16 9	16 2	15 53	15 42	15 37	15 32	15 25	15 19	15 11
24	17 36	17 30	17 24	17 16	17 12	17 7	17 2	16 55	16 52	16 48	16 44	16 40	16 35
25	18 23	18 21	18 18	18 15	18 14	18 11	18 9	18 6	18 5	18 4	18 2	18 0	17 59
26	19 9	19 10	19 11	19 12	19 13	19 14	19 15	19 16	19 17	19 17	19 18	19 19	19 20
27	19 54	19 58	20 3	20 8	20 11	20 15	20 19	20 24	20 26	20 29	20 32	20 35	20 38
28	20 38	20 46	20 54	21 3	21 8	21 14	21 22	21 30	21 34	21 39	21 44	21 49	21 56
29	21 22	21 33	21 44	21 57	22 5	22 13	22 23	22 35	22 41	22 47	22 54	23 2	23 11
30	22 8	22 21	22 35	22 51	23 0	23 10	23 23	23 38	23 45	23 53	.....	.....	.....
Sept. 31	22 55	23 10	23 25	23 43	23 54	.....	.....	.....	.....	.....	0 2	0 12	0 24
1	23 42	23 58	.....	.....	.....	0 6	0 20	0 38	0 47	0 56	1 6	1 18	1 32
2	.....	.....	0 15	0 35	0 46	1 0	1 14	1 34	1 44	1 54	2 5	2 19	2 34
3	0 31	0 47	1 5	1 25	1 36	1 50	2 6	2 26	2 35	2 45	2 57	3 10	3 26
4	1 21	1 36	1 53	2 12	2 24	2 37	2 52	3 11	3 19	3 29	3 40	3 53	4 8
5	2 11	2 25	2 40	2 58	3 8	3 19	3 33	3 49	3 57	4 6	4 16	4 26	4 39
6	3 0	3 12	3 25	3 40	3 49	3 58	4 10	4 24	4 30	4 37	4 45	4 54	5 4
7	3 50	3 59	4 9	4 20	4 27	4 34	4 43	4 53	4 58	5 3	5 9	5 15	5 23
8	4 40	4 46	4 52	4 59	5 3	5 8	5 14	5 20	5 23	5 26	5 30	5 34	5 38
9	5 29	5 32	5 34	5 37	5 39	5 41	5 43	5 45	5 46	5 48	5 49	5 50	5 52
10	6 20	6 18	6 17	6 15	6 14	6 13	6 12	6 10	6 9	6 9	6 8	6 7	6 6
11	7 12	7 7	7 1	6 54	6 51	6 47	6 42	6 36	6 34	6 31	6 28	6 24	6 20
12	8 6	7 57	7 47	7 36	7 30	7 23	7 15	7 5	7 1	6 56	6 50	6 44	6 37
13	9 2	8 50	8 36	8 22	8 13	8 3	7 52	7 38	7 32	7 25	7 18	7 9	6 59
14	9 59	9 45	9 29	9 12	9 1	8 49	8 36	8 19	8 11	8 2	7 52	7 41	7 28
15	10 58	10 42	10 25	10 6	9 54	9 41	9 26	9 7	8 58	8 48	8 37	8 24	8 9
16	11 57	11 41	11 24	11 4	10 52	10 39	10 23	10 4	9 55	9 45	9 33	9 20	9 4
17	12 54	12 39	12 23	12 4	11 54	11 41	11 27	11 9	11 0	10 51	10 40	10 28	10 14
18	13 49	13 36	13 22	13 6	12 57	12 46	12 34	12 18	12 11	12 3	11 54	11 44	11 32
19	14 41	14 31	14 20	14 7	14 0	13 52	13 42	13 30	13 25	13 18	13 12	13 4	12 55
20	15 31	15 24	15 16	15 7	15 2	14 57	14 50	14 42	14 38	14 34	14 29	14 24	14 19
21	16 18	16 14	16 10	16 6	16 3	16 0	15 56	15 52	15 50	15 48	15 46	15 43	15 40
22	17 4	17 3	17 3	17 2	17 2	17 2	17 2	17 1	17 1	17 1	17 1	17 1	17 1
23	17 48	17 51	17 55	17 58	18 0	18 3	18 6	18 9	18 11	18 12	18 14	18 17	18 19
24	18 33	18 39	18 46	18 53	18 58	19 3	19 9	19 16	19 19	19 23	19 27	19 32	19 37
25	19 17	19 26	19 36	19 48	19 54	20 2	20 11	20 21	20 26	20 32	20 38	20 45	20 52
26	20 2	20 14	20 27	20 42	20 50	21 0	21 11	21 25	21 32	21 39	21 47	21 56	22 6
27	20 49	21 3	21 18	21 35	21 45	21 56	22 10	22 26	22 34	22 43	22 53	23 4	23 16
28	21 36	21 51	22 8	22 27	22 38	22 50	23 5	23 24	23 33	23 42	23 53	.....	.....
29	22 24	22 40	22 57	23 17	23 28	23 42	23 57	.....	.....	.....	.....	0 6	0 21
Oct. 30	23 12	23 28	23 45	.....	.....	.....	.....	0 16	0 28	0 38	0 47	1 1	1 16
1	.....	.....	.....	0 5	0 16	0 29	0 44	1 3	1 12	1 22	1 34	1 47	2 2
2	0 1	0 16	0 32	0 50	1 1	1 13	1 27	1 44	1 52	2 0	2 12	2 23	2 3

TABLE X.

733

LOCAL ASTRONOMICAL MEAN TIME OF MOONSET, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat. Data.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Aug. 16	22 38	22 50	23 3	23 17	23 26	23 35	23 47	.....	.....	.....	.....	.....	.....
17	23 34	23 49	.....	.....	.....	.....	.....	0 0	0 7	0 14	0 22	0 31	0 42
18	.....	.....	0 4	0 22	0 32	0 44	0 58	1 15	1 23	1 32	1 42	1 54	2 7
19	0 32	0 48	1 5	1 25	1 37	1 50	2 5	2 25	2 34	2 44	2 56	3 9	3 24
20	1 31	1 48	2 5	2 25	2 37	2 50	3 6	3 26	3 35	3 46	3 58	4 11	4 27
21	2 29	2 45	3 1	3 20	3 32	3 44	3 59	4 17	4 26	4 35	4 46	4 59	5 13
22	3 26	3 40	3 54	4 10	4 20	4 31	4 44	4 59	5 7	5 14	5 23	5 34	5 45
23	4 20	4 31	4 42	4 55	5 3	5 12	5 22	5 34	5 39	5 45	5 52	6 0	6 8
24	5 11	5 18	5 26	5 36	5 41	5 47	5 54	6 2	6 6	6 10	6 15	6 20	6 26
25	5 59	6 3	6 8	6 13	6 16	6 19	6 23	6 27	6 29	6 32	6 34	6 37	6 40
26	6 46	6 46	6 47	6 48	6 48	6 49	6 49	6 50	6 50	6 51	6 51	6 52	6 52
27	7 30	7 28	7 25	7 22	7 20	7 18	7 15	7 12	7 11	7 9	7 8	7 6	7 4
28	8 15	8 9	8 3	7 55	7 51	7 46	7 41	7 34	7 31	7 28	7 24	7 20	7 16
29	9 0	8 51	8 41	8 30	8 24	8 17	8 8	7 58	7 54	7 49	7 43	7 37	7 30
30	9 45	9 33	9 21	9 6	8 58	8 49	8 38	8 25	8 19	8 12	8 4	7 56	7 47
Sept. 31	10 31	10 17	10 2	9 45	9 35	9 24	9 11	8 55	8 48	8 39	8 30	8 20	8 8
1	11 18	11 2	10 46	10 27	10 16	10 4	9 49	9 31	9 22	9 12	9 2	8 49	8 35
2	12 6	11 50	11 33	11 13	11 1	10 48	10 32	10 13	10 4	9 53	9 42	9 28	9 12
3	12 55	12 39	12 22	12 2	11 50	11 37	11 21	11 2	10 52	10 42	10 30	10 17	10 1
4	13 45	13 30	13 13	12 55	12 44	12 31	12 16	11 58	11 50	11 40	11 29	11 17	11 2
5	14 35	14 21	14 7	13 50	13 41	13 30	13 17	13 1	12 54	12 45	12 36	12 25	12 13
6	15 24	15 13	15 2	14 48	14 41	14 32	14 21	14 9	14 3	13 56	13 49	13 41	13 32
7	16 14	16 6	15 58	15 48	15 43	15 36	15 29	15 20	15 16	15 12	15 6	15 1	14 54
8	17 3	16 59	16 55	16 49	16 46	16 43	16 39	16 34	16 32	16 29	16 27	16 24	16 20
9	17 53	17 53	17 52	17 52	17 52	17 51	17 51	17 50	17 50	17 50	17 49	17 49	17 49
10	18 44	18 48	18 52	18 56	18 58	19 1	19 4	19 8	19 10	19 12	19 14	19 16	19 19
11	19 37	19 44	19 52	20 1	20 6	20 12	20 19	20 27	20 31	20 35	20 40	20 45	20 51
12	20 32	20 43	20 54	21 7	21 15	21 24	21 34	21 46	21 52	21 58	22 5	22 13	22 22
13	21 29	21 42	21 57	22 14	22 23	22 34	22 47	23 3	23 11	23 19	23 28	23 39	23 52
14	22 27	22 43	22 59	23 18	23 30	23 42	23 57	.....	.....	.....	.....	.....	.....
15	23 26	23 43	.....	.....	.....	.....	.....	0 16	0 24	0 34	0 45	0 58	1 13
16	.....	.....	0 0	0 20	0 31	0 45	1 1	1 20	1 29	1 39	1 51	2 4	2 20
17	0 24	0 40	0 57	1 16	1 28	1 40	1 56	2 14	2 23	2 32	2 44	2 56	3 11
18	1 21	1 35	1 50	2 7	2 17	2 29	2 42	2 58	3 6	3 14	3 24	3 34	3 47
19	2 15	2 26	2 39	2 53	3 1	3 11	3 22	3 35	3 41	3 47	3 55	4 3	4 13
20	3 5	3 14	3 24	3 34	3 40	3 47	3 55	4 4	4 9	4 14	4 19	4 25	4 32
21	3 54	3 59	4 5	4 12	4 16	4 20	4 24	4 30	4 33	4 36	4 39	4 43	4 47
22	4 40	4 42	4 44	4 47	4 48	4 50	4 52	4 54	4 55	4 56	4 57	4 59	5 0
23	5 25	5 24	5 22	5 21	5 20	5 19	5 18	5 16	5 15	5 14	5 14	5 13	5 12
24	6 10	6 5	6 0	5 55	5 51	5 48	5 43	5 38	5 36	5 33	5 30	5 27	5 24
25	6 54	6 46	6 38	6 29	6 23	6 17	6 10	6 2	5 58	5 53	5 49	5 43	5 37
26	7 39	7 29	7 17	7 5	6 57	6 49	6 39	6 27	6 22	6 16	6 9	6 2	5 53
27	8 25	8 12	7 58	7 43	7 34	7 23	7 11	6 56	6 49	6 42	6 33	6 24	6 13
28	9 12	8 57	8 41	8 24	8 13	8 1	7 47	7 30	7 22	7 12	7 2	6 51	6 38
29	9 59	9 44	9 27	9 7	8 56	8 43	8 28	8 9	8 0	7 50	7 39	7 26	7 11
Oct. 30	10 48	10 32	10 14	9 55	9 43	9 30	9 14	8 55	8 48	8 38	8 24	8 11	7 55
1	11 36	11 21	11 4	10 45	10 34	10 21	10 6	9 48	9 39	9 29	9 18	9 6	8 4
2	12 25	12 11	11 56	11 39	11 28	11 17	11 3	10 46	10 39	10 30	10 20	10 9	9 4

LOCAL ASTRONOMICAL MEAN TIME OF MOONRISE, MERIDIAN OF GREENWICH, 1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours: if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Date	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
		h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Oct.	1	...	...	...	0 5	0 16	0 29	0 44	1 3	1 12	1 22	1 34	1 47	2 2
	2	0 1	0 16	0 32	0 50	1 1	1 13	1 27	1 44	1 52	2 0	2 12	2 23	2 37
	3	0 50	1 3	1 17	1 33	1 42	1 52	2 5	2 20	2 26	2 34	2 43	2 52	3 4
	4	1 39	1 49	2 1	2 13	2 21	2 29	2 39	2 51	2 56	3 2	3 9	3 16	3 25
	5	2 28	2 35	2 43	2 52	2 57	3 3	3 10	3 18	3 22	3 26	3 30	3 36	3 41
	6	3 17	3 21	3 25	3 30	3 33	3 36	3 40	3 44	3 46	3 49	3 51	3 54	3 56
	7	4 7	4 7	4 8	4 8	4 8	4 9	4 9	4 10	4 10	4 10	4 10	4 10	4 11
	8	4 58	4 55	4 51	4 47	4 45	4 42	4 39	4 35	4 34	4 32	4 30	4 28	4 25
	9	5 52	5 45	5 38	5 29	5 24	5 18	5 11	5 4	5 0	4 56	4 52	4 47	4 41
	10	6 49	6 38	6 27	6 14	6 6	5 58	5 48	5 36	5 31	5 25	5 18	5 11	5 2
	11	7 48	7 34	7 20	7 4	6 54	6 43	6 30	6 15	6 7	6 0	5 50	5 40	5 29
	12	8 49	8 33	8 17	7 58	7 47	7 34	7 20	7 1	6 53	6 44	6 33	6 21	6 7
	13	9 50	9 34	9 16	8 57	8 45	8 32	8 16	7 57	7 48	7 38	7 27	7 14	6 58
	14	10 49	10 33	10 17	9 58	9 47	9 34	9 20	9 1	8 53	8 43	8 32	8 20	8 5
	15	11 45	11 32	11 17	11 0	10 51	10 40	10 27	10 11	10 3	9 55	9 46	9 35	9 22
	16	12 39	12 28	12 16	12 2	11 54	11 45	11 35	11 22	11 16	11 10	11 2	10 54	10 44
	17	13 29	13 20	13 12	13 2	12 56	12 50	12 42	12 33	12 29	12 25	12 19	12 14	12 7
	18	14 16	14 11	14 6	14 0	13 57	13 53	13 48	13 43	13 41	13 38	13 35	13 32	13 28
	19	15 1	15 0	14 58	14 57	14 56	14 54	14 53	14 52	14 51	14 50	14 50	14 49	14 48
	20	15 46	15 48	15 50	15 52	15 53	15 55	15 56	15 59	16 0	16 1	16 2	16 4	16 5
	21	16 29	16 35	16 40	16 46	16 50	16 54	17 0	17 5	17 8	17 11	17 14	17 18	17 22
	22	17 14	17 22	17 31	17 41	17 46	17 53	18 1	18 10	18 15	18 19	18 25	18 31	18 38
	23	17 58	18 9	18 21	18 34	18 42	18 51	19 2	19 14	19 20	19 27	19 34	19 42	19 52
	24	18 44	18 58	19 12	19 28	19 37	19 48	20 1	20 16	20 24	20 32	20 41	20 51	21 3
	25	19 31	19 46	20 2	20 20	20 31	20 43	20 58	21 15	21 24	21 33	21 44	21 56	22 10
	26	20 19	20 35	20 52	21 11	21 22	21 35	21 51	22 10	22 19	22 29	22 40	22 53	23 9
	27	21 7	21 23	21 40	21 59	22 11	22 24	22 39	22 58	23 7	23 17	23 29	23 42	23 57
	28	21 55	22 10	22 27	22 45	22 56	23 8	23 23	23 41	23 49	23 58	...	...	...
	29	22 43	22 57	23 11	23 28	23 38	23 49	...	...	...	...	0 9	0 21	0 35
	30	23 31	23 42	23 54	...	...	...	0 2	0 18	0 25	0 33	0 42	0 53	1 5
Nov.	31	...	...	...	0 8	0 17	0 26	0 36	0 49	0 56	1 2	1 10	1 18	1 27
	1	0 18	0 27	0 36	0 47	0 53	1 0	1 8	1 18	1 22	1 27	1 32	1 38	1 45
	2	1 5	1 11	1 17	1 24	1 28	1 32	1 37	1 44	1 46	1 49	1 53	1 56	2 1
	3	1 54	1 56	1 58	2 0	2 2	2 4	2 6	2 8	2 9	2 10	2 12	2 13	2 14
	4	2 43	2 42	2 40	2 38	2 37	2 36	2 35	2 33	2 32	2 31	2 31	2 30	2 28
	5	3 35	3 30	3 24	3 18	3 14	3 10	3 5	3 0	2 57	2 54	2 51	2 48	2 44
	6	4 30	4 21	4 12	4 1	3 54	3 47	3 39	3 30	3 25	3 20	3 15	3 9	3 2
	7	5 29	5 16	5 4	4 49	4 40	4 30	4 19	4 5	3 59	3 52	3 44	3 35	3 26
	8	6 30	6 16	6 0	5 42	5 32	5 20	5 6	4 49	4 41	4 32	4 23	4 11	3 58
	9	7 33	7 17	7 0	6 41	6 30	6 17	6 1	5 43	5 34	5 24	5 13	5 0	4 45
	10	8 36	8 20	8 3	7 44	7 32	7 20	7 4	6 46	6 37	6 27	6 16	6 3	5 48
	11	9 36	9 22	9 6	8 49	8 38	8 27	8 13	7 56	7 48	7 39	7 29	7 18	7 4
	12	10 32	10 20	10 7	9 53	9 44	9 35	9 23	9 9	9 3	8 56	8 47	8 38	8 28
	13	11 25	11 16	11 6	10 55	10 49	10 41	10 33	10 23	10 18	10 12	10 7	10 0	9 52
	14	12 14	12 8	12 2	11 55	11 51	11 46	11 41	11 34	11 32	11 28	11 25	11 20	11 16
	15	13 0	12 58	12 56	12 52	12 51	12 48	12 46	12 44	12 43	12 41	12 40	12 38	12 36
	16	13 44	13 46	13 47	13 48	13 48	13 49	13 50	13 51	13 52	13 52	13 53	13 54	13 54

TABLE X.

735

LOCAL ASTRONOMICAL MEAN TIME OF MOONSET, MERIDIAN OF GREENWICH,
1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Date.	Lat.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Oct.	1	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	2	11 36	11 21	11 4	10 45	10 34	10 21	10 6	9 48	9 39	9 29	9 18	9 5	8 50
	3	12 25	12 11	11 56	11 39	11 28	11 17	11 3	10 46	10 39	10 30	10 20	10 9	9 56
	4	13 14	13 2	12 49	12 34	12 26	12 16	12 4	11 50	11 44	11 37	11 29	11 20	11 9
	5	14 2	13 53	13 43	13 32	13 25	13 18	13 9	12 59	12 54	12 48	12 42	12 35	12 28
	6	14 51	14 45	14 39	14 31	14 27	14 22	14 17	14 10	14 7	14 4	14 0	13 55	13 51
	7	15 40	15 38	15 36	15 33	15 31	15 29	15 27	15 25	15 23	15 22	15 21	15 19	15 17
	8	16 31	16 33	16 34	16 36	16 37	16 38	16 40	16 41	16 42	16 43	16 44	16 45	16 46
	9	17 24	17 29	17 35	17 42	17 46	17 50	17 55	18 1	18 4	18 7	18 10	18 14	18 18
	10	18 19	18 28	18 38	18 49	18 56	19 3	19 11	19 22	19 26	19 32	19 38	19 44	19 52
	11	19 17	19 29	19 42	19 58	20 6	20 16	20 28	20 42	20 49	20 57	21 5	21 15	21 26
	12	20 17	20 32	20 47	21 5	21 16	21 28	21 42	22 0	22 8	22 17	22 28	22 39	22 53
	13	21 18	21 34	21 51	22 10	22 22	22 35	22 50	23 9	23 18	23 28	23 40	23 53	....
	14	22 18	22 34	22 51	23 10	23 22	23 34	23 50	....	0 9	0 18	0 27	0 38	0 8
	15	23 18	23 31	23 46	....	....	....	....	0 9	0 18	0 27	0 38	0 51	1 6
	16	....	....	....	0 4	0 14	0 26	0 40	0 57	1 6	1 14	1 24	1 35	1 48
	17	0 11	0 24	0 37	0 52	1 0	1 10	1 22	1 36	1 42	1 50	1 58	2 6	2 17
	18	1 3	1 12	1 23	1 34	1 41	1 48	1 57	2 8	2 12	2 18	2 24	2 30	2 38
	19	1 52	1 58	2 5	2 13	2 17	2 22	2 28	2 35	2 38	2 41	2 45	2 49	2 54
	20	2 38	2 41	2 44	2 48	2 50	2 53	2 55	2 59	3 0	3 2	3 3	3 5	3 8
	21	3 23	3 22	3 22	3 22	3 22	3 22	3 21	3 21	3 21	3 20	3 20	3 20	3 20
	22	4 7	4 3	4 0	3 55	3 53	3 50	3 47	3 43	3 41	3 39	3 37	3 34	3 32
	23	4 51	4 44	4 37	4 29	4 24	4 19	4 13	4 6	4 2	3 59	3 55	3 50	3 45
	24	5 35	5 26	5 16	5 4	4 57	4 50	4 41	4 30	4 25	4 20	4 14	4 7	4 0
	25	6 21	6 9	5 56	5 41	5 33	5 23	5 12	4 58	4 52	4 45	4 37	4 28	4 18
	26	7 7	6 53	6 38	6 21	6 11	6 0	5 46	5 30	5 22	5 14	5 4	4 54	4 41
	27	7 54	7 39	7 23	7 4	6 53	6 40	6 26	6 7	5 59	5 49	5 38	5 26	5 12
	28	8 42	8 26	8 10	7 50	7 38	7 25	7 10	6 51	6 42	6 32	6 20	6 7	5 52
	29	9 31	9 15	8 58	8 39	8 28	8 14	8 0	7 41	7 32	7 22	7 10	6 58	6 42
	30	10 19	10 4	9 49	9 31	9 20	9 8	8 54	8 37	8 29	8 19	8 9	7 57	7 43
	31	11 6	10 54	10 40	10 24	10 15	10 5	9 52	9 38	9 30	9 23	9 14	9 4	8 52
Nov.	1	11 54	11 43	11 32	11 20	11 12	11 4	10 54	10 42	10 37	10 31	10 24	10 16	10 8
	2	12 41	12 34	12 26	12 17	12 12	12 6	11 59	11 50	11 46	11 42	11 37	11 32	11 26
	3	13 28	13 24	13 20	13 15	13 12	13 9	13 5	13 1	12 59	12 56	12 54	12 51	12 48
	4	14 17	14 16	14 16	14 16	14 16	14 15	14 15	14 14	14 14	14 14	14 14	14 14	14 13
	5	15 7	15 11	15 14	15 19	15 21	15 24	15 27	15 31	15 32	15 34	15 36	15 39	15 42
	6	16 1	16 8	16 16	16 24	16 30	16 35	16 42	16 50	16 54	16 58	17 3	17 8	17 14
	7	16 57	17 8	17 20	17 33	17 40	17 49	17 59	18 12	18 17	18 24	18 31	18 39	18 48
	8	17 58	18 11	18 26	18 42	18 52	19 3	19 16	19 32	19 40	19 48	19 58	20 9	20 21
	9	19 0	19 16	19 32	19 51	20 2	20 15	20 30	20 48	20 57	21 7	21 18	21 30	21 45
	10	20 3	20 19	20 36	20 56	21 7	21 20	21 36	21 55	22 4	22 14	22 25	22 38	22 54
	11	21 5	21 20	21 36	21 55	22 5	22 18	22 32	22 50	22 58	23 8	23 18	23 30	23 44
	12	22 3	22 16	22 31	22 47	22 56	23 7	23 19	23 34	23 41	23 49	23 58	....	....
	13	22 58	23 8	23 20	23 32	23 40	23 48	23 58	....	....	....	....	0 7	0 18
	14	23 49	23 56	....	....	....	....	....	0 9	0 15	0 20	0 27	0 34	0 43
	15	....	....	0 4	0 13	0 18	0 24	0 30	0 38	0 42	0 46	0 50	0 55	1 1
	16	0 36	0 40	0 44	0 50	0 52	0 56	0 59	1 3	1 5	1 8	1 10	1 12	1 15
	17	1 22	1 22	1 23	1 24	1 24	1 25	1 26	1 26	1 27	1 27	1 27	1 28	1 29

LOCAL ASTRONOMICAL MEAN TIME OF MOONRISE, MERIDIAN OF GREENWICH.
1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat. Date	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
Nov. 16	h m 13 44	h m 13 46	h m 13 47	h m 13 48	h m 13 48	h m 13 49	h m 13 50	h m 13 51	h m 13 52	h m 13 53	h m 13 53	h m 13 54	h m 13 54
17	14 28	14 32	14 37	14 42	14 45	14 48	14 52	14 57	15 0	15 2	15 4	15 8	15 11
18	15 12	15 19	15 27	15 36	15 41	15 47	15 54	16 2	16 6	16 10	16 15	16 21	16 27
19	15 56	16 6	16 17	16 30	16 37	16 45	16 54	17 6	17 11	17 17	17 24	17 32	17 40
20	16 41	16 54	17 7	17 23	17 32	17 42	17 54	18 9	18 16	18 23	18 32	18 41	18 53
21	17 28	17 42	17 58	18 15	18 26	18 38	18 52	19 9	19 17	19 26	19 36	19 47	20 1
22	18 15	18 31	18 48	19 7	19 18	19 31	19 46	20 5	20 13	20 23	20 35	20 48	21 2
23	19 4	19 20	19 36	19 56	20 8	20 21	20 36	20 55	21 4	21 14	21 26	21 39	21 54
24	19 52	20 7	20 24	20 43	20 54	21 7	21 21	21 40	21 49	21 58	22 9	22 22	22 36
25	20 40	20 54	21 9	21 26	21 37	21 48	22 2	22 18	22 26	22 35	22 44	22 55	23 8
26	21 27	21 39	21 52	22 7	22 16	22 26	22 38	22 52	22 58	23 5	23 13	23 22	23 32
27	22 14	22 23	22 34	22 46	22 52	23 0	23 9	23 30	23 35	23 41	23 57	23 44	23 51
28	23 0	23 6	23 14	23 22	23 27	23 32	23 39	23 46	23 50	23 53	23 57	...	...
29	23 46	23 50	23 53	23 58	...	...	...	...	...	...	...	0 2	0 7
30	...	...	...	...	0 0	0 3	0 6	0 10	0 12	0 14	0 16	0 18	0 21
Dec. 1	0 33	0 33	0 33	0 33	0 34	0 34	0 34	0 34	0 34	0 34	0 34	0 34	0 34
2	1 22	1 18	1 15	1 10	1 8	1 5	1 2	0 58	0 57	0 55	0 53	0 51	0 48
3	2 13	2 6	1 59	1 50	1 45	1 40	1 33	1 26	1 22	1 18	1 14	1 10	1 4
4	3 8	2 58	2 47	2 34	2 27	2 18	2 9	1 57	1 52	1 46	1 39	1 32	1 24
5	4 8	3 54	3 40	3 24	3 14	3 3	2 50	2 35	2 28	2 20	2 11	2 2	1 50
6	5 10	4 54	4 38	4 19	4 8	3 56	3 41	3 23	3 15	3 5	2 55	2 43	2 29
7	6 14	5 58	5 41	5 21	5 10	4 56	4 41	4 22	4 13	4 3	3 51	3 38	3 23
8	7 17	7 2	6 46	6 27	6 16	6 4	5 49	5 30	5 22	5 12	5 2	4 49	4 35
9	8 18	8 4	7 50	7 34	7 24	7 14	7 1	6 45	6 38	6 30	6 21	6 10	5 58
10	9 14	9 4	8 52	8 40	8 32	8 24	8 14	8 2	7 57	7 50	7 43	7 36	7 27
11	10 6	9 59	9 52	9 43	9 38	9 32	9 26	9 18	9 14	9 10	9 5	9 0	8 54
12	10 55	10 52	10 48	10 43	10 40	10 38	10 34	10 30	10 28	10 26	10 24	10 22	10 19
13	11 42	11 41	11 41	11 41	11 41	11 40	11 40	11 40	11 40	11 40	11 40	11 40	11 40
14	12 26	12 29	12 33	12 36	12 39	12 41	12 44	12 48	12 49	12 51	12 53	12 55	12 58
15	13 10	13 16	13 23	13 31	13 35	13 40	13 46	13 53	13 57	14 0	14 4	14 9	14 14
16	13 54	14 4	14 13	14 25	14 31	14 38	14 47	14 58	15 3	15 8	15 14	15 21	15 28
17	14 39	14 51	15 3	15 18	15 26	15 36	15 47	16 1	16 7	16 14	16 22	16 31	16 42
18	15 25	15 39	15 54	16 10	16 20	16 32	16 45	17 2	17 9	17 18	17 28	17 38	17 51
19	16 12	16 27	16 44	17 2	17 13	17 26	17 41	17 59	18 8	18 17	18 28	18 40	18 55
20	17 0	17 16	17 33	17 52	18 4	18 17	18 32	18 52	19 1	19 11	19 22	19 36	19 51
21	17 49	18 4	18 21	18 40	18 52	19 5	19 20	19 39	19 47	19 58	20 9	20 22	20 36
22	18 37	18 52	19 7	19 26	19 36	19 48	20 2	20 20	20 28	20 37	20 47	20 58	21 12
23	19 25	19 38	19 52	20 8	20 17	20 27	20 40	20 55	21 2	21 9	21 18	21 28	21 39
24	20 12	20 23	20 34	20 47	20 54	21 3	21 13	21 25	21 30	21 36	21 43	21 51	21 59
25	20 58	21 6	21 14	21 24	21 29	21 36	21 43	21 51	21 56	22 0	22 5	22 10	22 16
26	21 44	21 48	21 54	21 59	22 2	22 6	22 11	22 16	22 18	22 21	22 24	22 27	22 30
27	22 30	22 31	22 32	22 34	22 35	22 36	22 38	22 39	22 40	22 41	22 42	22 42	22 44
28	23 16	23 14	23 12	23 10	23 8	23 7	23 5	23 2	23 2	23 0	22 59	22 58	22 56
29	...	23 59	23 53	23 47	23 43	23 38	23 34	23 28	23 25	23 22	23 18	23 15	23 11
30	0 5	...	...	...	...	...	...	23 56	23 51	23 46	23 41	23 34	23 28
31	0 56	0 47	0 38	0 27	0 21	0 13	0 5	...	...	...	...	...	23 50
32	1 51	1 39	1 26	1 12	1 3	0 54	0 42	0 29	0 23	0 16	0 8	0 0	...

TABLE X.

737

CAL ASTRONOMICAL MEAN TIME OF MOONSET, MERIDIAN OF GREENWICH,
1919.

To obtain civil time, write P. M. after the astronomical time if it is less than twelve hours; greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one the day.

To obtain standard time, see directions on page 704.

For other longitudes and for southern latitudes see page 738.

Lat. to.	0°	+10°	+20°	+30°	+35°	+40°	+45°	+50°	+52°	+54°	+56°	+58°	+60°
v. 16	h m 1 22	h m 1 22	h m 1 23	h m 1 24	h m 1 24	h m 1 25	h m 1 26	h m 1 26	h m 1 27	h m 1 27	h m 1 27	h m 1 28	h m 1 28
17	2 6	2 4	2 0	1 57	1 56	1 54	1 51	1 48	1 47	1 46	1 44	1 42	1 40
18	2 49	2 44	2 38	2 30	2 27	2 22	2 17	2 11	2 8	2 5	2 1	1 57	1 53
19	3 33	3 25	3 16	3 5	2 59	2 52	2 44	2 34	2 30	2 25	2 20	2 14	2 7
20	4 18	4 7	3 55	3 41	3 33	3 24	3 14	3 1	2 55	2 48	2 41	2 33	2 24
21	5 4	4 51	4 36	4 20	4 10	3 59	3 46	3 31	3 23	3 16	3 7	2 57	2 45
22	5 51	5 36	5 20	5 2	4 51	4 39	4 24	4 7	3 58	3 49	3 39	3 27	3 13
23	6 39	6 23	6 6	5 47	5 35	5 22	5 7	4 48	4 39	4 29	4 18	4 5	3 50
24	7 27	7 11	6 54	6 35	6 24	6 11	5 55	5 36	5 27	5 17	5 6	4 53	4 37
25	8 15	8 0	7 44	7 26	7 15	7 3	6 48	6 30	6 22	6 12	6 2	5 49	5 35
26	9 3	8 50	8 35	8 19	8 9	7 58	7 45	7 29	7 22	7 14	7 4	6 54	6 41
27	9 50	9 38	9 26	9 13	9 5	8 56	8 45	8 32	8 26	8 19	8 12	8 3	7 54
28	10 36	10 27	10 18	10 8	10 2	9 55	9 47	9 38	9 33	9 28	9 23	9 16	9 10
29	11 22	11 17	11 11	11 4	11 1	10 56	10 51	10 45	10 42	10 39	10 36	10 32	10 28
30	12 8	12 6	12 4	12 2	12 1	11 59	11 57	11 55	11 54	11 53	11 52	11 50	11 49
c. 1	12 56	12 58	13 0	13 1	13 3	13 4	13 5	13 7	13 8	13 9	13 10	13 11	13 12
2	13 46	13 51	13 57	14 4	14 7	14 11	14 16	14 22	14 25	14 28	14 31	14 35	14 39
3	14 39	14 48	14 58	15 8	15 15	15 22	15 30	15 40	15 45	15 50	15 56	16 2	16 10
4	15 36	15 48	16 1	16 16	16 25	16 34	16 46	17 0	17 7	17 14	17 22	17 31	17 42
5	16 37	16 51	17 7	17 25	17 35	17 47	18 1	18 19	18 27	18 36	18 46	18 58	19 11
6	17 40	17 56	18 13	18 32	18 44	18 57	19 12	19 31	19 40	19 50	20 2	20 15	20 30
7	18 44	19 0	19 17	19 36	19 47	20 0	20 16	20 34	20 43	20 53	21 4	21 16	21 31
8	19 46	20 0	20 16	20 33	20 44	20 55	21 9	21 25	21 33	21 42	21 51	22 2	22 15
9	20 45	20 57	21 10	21 24	21 32	21 42	21 53	22 6	22 12	22 19	22 26	22 35	22 44
10	21 40	21 48	21 58	22 8	22 14	22 21	22 29	22 39	22 43	22 48	22 53	23 0	23 6
11	22 30	22 36	22 41	22 48	22 52	22 56	23 1	23 6	23 9	23 12	23 15	23 19	23 23
12	23 18	23 20	23 22	23 24	23 26	23 27	23 29	23 31	23 32	23 33	23 34	23 35	23 37
13	23 59	23 59	23 59	23 59	23 58	23 56	23 55	23 54	23 53	23 52	23 51	23 50	23 49
14	0 3	0 2	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
15	0 48	0 43	0 38	0 32	0 29	0 25	0 21	0 16	0 14	0 11	0 8	0 5	0 2
16	1 32	1 24	1 16	1 6	1 1	0 55	0 48	0 39	0 35	0 31	0 26	0 21	0 15
17	2 16	2 6	1 54	1 42	1 34	1 26	1 16	1 5	0 59	0 53	0 47	0 39	0 31
18	3 1	2 49	2 35	2 19	2 10	2 0	1 48	1 33	1 27	1 19	1 11	1 1	0 51
19	3 48	3 33	3 18	3 0	2 50	2 38	2 24	2 7	1 59	1 50	1 40	1 29	1 16
20	4 35	4 20	4 3	3 44	3 33	3 20	3 4	2 46	2 37	2 27	2 16	2 3	1 49
21	5 24	5 8	4 51	4 31	4 20	4 7	3 51	3 32	3 23	3 13	3 1	2 48	2 32
22	6 12	5 57	5 40	5 21	5 10	4 58	4 43	4 24	4 15	4 6	3 54	3 42	3 27
23	7 0	6 46	6 31	6 14	6 4	5 52	5 39	5 22	5 14	5 5	4 55	4 44	4 31
24	7 48	7 36	7 23	7 8	7 0	6 50	6 38	6 24	6 18	6 10	6 2	5 53	5 43
25	8 34	8 25	8 15	8 3	7 57	7 49	7 40	7 29	7 24	7 19	7 12	7 5	6 58
26	9 20	9 14	9 7	8 59	8 55	8 49	8 43	8 36	8 33	8 29	8 25	8 20	8 15
27	10 6	10 3	9 59	9 56	9 53	9 51	9 48	9 44	9 42	9 41	9 39	9 36	9 34
28	10 52	10 52	10 53	10 53	10 53	10 53	10 54	10 54	10 54	10 54	10 54	10 55	10 55
29	11 39	11 43	11 47	11 52	11 55	11 58	12 1	12 6	12 8	12 10	12 12	12 15	12 18
30	12 29	12 36	12 44	12 53	12 58	13 4	13 11	13 19	13 23	13 28	13 32	13 37	13 43
31	13 22	13 33	13 44	13 57	14 4	14 13	14 23	14 35	14 41	14 47	14 54	15 2	15 11
32	14 18	14 32	14 46	15 3	15 12	15 23	15 36	15 52	15 59	16 7	16 16	16 26	16 39

FOR NORTHERN STATIONS NOT ON THE MERIDIAN OF GREENWICH, AND FOR
SOUTHERN STATIONS.

For northern stations not on the meridian of Greenwich.—For longitudes twelve hours or less west from Greenwich obtain the data for the given latitude from Table X for the given date and for the date following; for longitudes twelve hours or less east from Greenwich obtain the data for the given latitude from Table X for the given date and for the date preceding. Subtract the time on the earlier date from the time on the later and multiply the difference by the twenty-fourth part of the longitude in hours and decimals of an hour, positive if west, negative if east. Apply the product as a correction to the time on the given date.

For southern stations.—The instant of moonrise or moonset for any station south of the equator is that of moonset or moonrise, respectively, at a place of the same latitude north of the equator whose longitude is twelve hours different from that at the southern station.

If the southern station be twelve hours or less west from Greenwich, and the phenomenon at that station occurs between noon and midnight, the local astronomical day will be the same at the southern and northern stations. If, however, the phenomenon at the southern station occurs between midnight and noon, the local astronomical day at the northern station will be one day later than at the southern.

If the southern station be twelve hours or less east from Greenwich, and the phenomenon at that station occurs between noon and midnight, the local astronomical day at the northern station will be one less than at the southern station. If, however, the phenomenon occurs between midnight and noon, the local astronomical day will be the same at the two stations.

Having thus determined the true astronomical day at the northern station, compute by the rule for northern latitudes. For the desired local time of moonrise at the southern station change the time of moonset at the northern station twelve hours. For the desired local time of moonset at the southern station change the time of moonrise at the northern station twelve hours.

Example.—December 20, 1919, civil date, find the time of moonrise and moonset in longitude $4^{\text{h}} 43^{\text{m}}$ west from Greenwich and in latitude $33^{\circ} 30'$ south.

The longitude of the northern station is $7^{\text{h}} 3'$ east from Greenwich and its latitude is $33^{\circ} 5' \text{ N.}$ Upon inspection of Table X it is seen that the astronomical day at the southern station is December 19 for moonrise and December 20 for moonset, the former phenomenon occurring between midnight and noon, the latter between noon and midnight. For the northern station, in accordance with the precepts given above, both phenomena are to be computed for December 20.

At northern station—

	Moonrise.			Moonset.		
	d	h	m	d	h	m
Table X, Lat. $+33^{\circ} 5'$	Dec. 19	17	10	Dec. 19	2	53
Table X, Lat. $+33^{\circ} 5'$		20	18 0		20	3 36
Difference			50			43
Product of Diff. by $-\frac{7.3}{24}$			-15			-13
Local astronomical mean time			17 45			3 23

At southern station—

	Moonset.			Moonrise.		
	d	h	m	d	h	m
Local astronomical mean time			5 45			15 23
Civil time	Dec. 20	5 45 P. M.		Dec. 20	3 23 A. M.	

ON THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

There are in general use three different kinds of time, True Solar Time—also called Apparent Solar Time—Mean Solar Time, and Sidereal Time.

True or Apparent Solar Time is measured by the diurnal motion of the Sun, the length of the day being the interval between two successive transits of the Sun over the same meridian, and the time of day being the hour-angle of the Sun westward from the meridian. Owing to the obliquity of the ecliptic and to the lack of uniformity of the motion of the Earth in its orbit, the rate of motion of the Sun in hour-angle and the length of the apparent solar day are not constant. Therefore clocks and chronometers can not be regulated to apparent solar time, which may, however, be determined by observations of the Sun when visible.

Mean Solar Time is measured by the motion of a fictitious body called the mean Sun, which is supposed to move uniformly in the celestial equator, completing the circuit in one tropical year. Since mean solar time is uniform and regular in its passage, clocks and watches may be regulated to it, and those in ordinary use are usually so regulated.

Mean solar time can not, of course, be determined by direct observation, but may be determined indirectly by correcting observations of the Sun for the equation of time, or by converting to mean time sidereal time determined by observations of fixed stars.

The Equation of Time is the difference in hour-angle between the true Sun and the mean Sun. The true Sun is sometimes before and sometimes behind the mean Sun by an amount which varies from zero to about 16 minutes. The equation of time is given for Greenwich mean noon on pages 2-16 and for Washington apparent noon on pages 514-521.

The Mean Solar Day is the unit of mean solar time and is equal in length to the mean or average of all the true or apparent solar days of the year. It may be otherwise defined as the interval of time elapsing between two successive transits of the mean Sun across the meridian of any place.

Sidereal Time or star time, in general terms, is measured by the diurnal motion of the fixed stars, or, speaking more precisely, by the diurnal motion of that point on the celestial equator called the vernal equinox, from which the right ascensions of the heavenly bodies are measured. Astronomical clocks regulated to sidereal time are called sidereal clocks. Sidereal time may be determined from observations of stars whose right ascensions are known.

A *Sidereal Day* is very nearly the length of time in which the Earth rotates on its axis and is accurately defined as the time interval between two successive transits of the vernal equinox over the same meridian. The sidereal day is shorter than the mean solar day by $3^m\ 56^s.555$ sidereal time or $3^m\ 55^s.906$ mean solar time, the tropical year of 365.2422 mean solar days contains

366.2422 sidereal days. Sidereal time and the length of the sidereal day are subject to slight irregularities on account of small differences between the positions of the true and mean equinoxes.

The mean solar and sidereal days are each divided into 24 hours. About March 23 (civil date) of each year, about two days after the vernal equinox, there is an instant when the face of a sidereal clock shows the same time as a mean time clock, and the former gains on the latter $3^m 56^s.555$ sidereal time per mean solar day, so that at the end of a year it will have gained one sidereal day and will again agree with the mean time clock.

The Civil Day begins at midnight and comprises 24 hours, the hours being counted from 0 to 12 in two series; the first marked A. M., running from midnight to noon, and the second, marked P. M., running from noon to midnight.

The Astronomical Day begins at noon on the civil day of the same date, the 24 hours being counted from 0 to 24, running from noon of one day to noon of the next following day. Astronomical time as well as civil time may be either apparent or mean. Astronomical time only is used throughout this volume.

The civil day begins twelve hours before the astronomical day; therefore the first half of the civil day coincides with the last half of the preceding astronomical day, and the last half of the civil day coincides with the first half of the astronomical day of the same date. Hence we have the following rules:

To convert Civil Time into Astronomical Time.—If the civil time is marked A. M., take one from the day and add twelve to the hours; if the civil time is marked P. M., take away the designation P. M. Thus, January 9, 2 o'clock, A. M., civil time, is January 8, 14^h, astronomical time; and January 9, 2 o'clock, P. M., civil time, is January 9, 2^h, astronomical time.

To convert Astronomical Time into Civil Time.—If the astronomical time is less than twelve hours, write P. M. after it; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the day.

To convert Solar or Sidereal Time of any meridian B to that of another meridian A, add the difference of longitude expressed in time when A is east of B, and subtract the difference of longitude when A is west of B.

Greenwich mean time, which at any fixed observatory is obtained by applying the longitude to the local mean time, on board ship is usually taken from the mean time chronometer set to Greenwich time.

Greenwich mean noon of any date means the noon at the beginning of the astronomical day.

PART I.—THE EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

Pages 2–17 contain for Greenwich mean noon of each day the *Sun's Apparent Right Ascension, Apparent Declination, Semidiameter, Horizontal Parallax, True Longitude, and Latitude*. They also contain the *Logarithm of the Radius Vector of the Earth, the Precession in Longitude, the Nutation in Longitude, the Aberration, the True Obliquity, the Equation of Time, the Sidereal Time or Right Ascension of Mean Sun, and the Mean Time of Sidereal Noon*. Adjoining columns contain, for each Greenwich mean noon, the Variation per

Hour for those of the quantities for which it seemed advisable to give a rate of motion. By multiplying any one of those variations by the hours and parts of an hour from Greenwich mean noon and adding the product algebraically to the corresponding quantity at noon, we obtain an approximate value of the quantity in question for any given Greenwich mean time. If great exactness is desired, the value of the hourly variation is found for the time halfway between Greenwich mean noon and the given Greenwich mean time before multiplying by the hours and parts of an hour from Greenwich mean noon.

It is to be noted that here, as elsewhere throughout the volume, the positive sign used with declinations or latitudes indicates north and the negative sign south.

The Sun's *Apparent Right Ascension* and *Declination* are affected both by aberration and by nutation, and therefore denote the *apparent* position of the *true* Sun. The Sun's *True Longitude* is the true geometric longitude not corrected for aberration; it is referred to the true equinox.

The Sun's *Latitude* is referred to the ecliptic of the date.

The Sun's *Declination* is required whenever that body is observed for the purpose of finding latitude, local time, or azimuth.

The Sun's *Semidiameter* is used in reducing the altitude of the upper or lower limb of the Sun to the altitude of the center; and in reducing the angular distance between the limb of the Sun and any other object to the distance from the center of the Sun.

The *Horizontal Parallax* is the angle subtended by the equatorial radius of the Earth, as seen from the center of the Sun.

The *Precession in Longitude* is the quantity to be applied to the longitude of the Sun referred to the mean equinox of the beginning of the Besselian fictitious year, i. e., the instant when the Sun's mean longitude is 280° , in order to refer it to the mean equinox of date.

The *Nutation in Longitude* is the quantity to be applied to the longitude of a body referred to the mean equinox of date in order to refer it to the true equinox, short-period terms being neglected.

The *Aberration* is the quantity to be subtracted from the true longitude of the Sun in order to obtain its apparent longitude.

The *True Obliquity* is the inclination of the Earth's equator to the ecliptic, short-period terms being neglected.

The corrections to the values of the nutation and the obliquity here given, to take account of the short-period terms, may be found on pages 215-216.

The *Equation of Time* is the apparent time of Greenwich mean noon, or the hour angle of the true Sun at that instant. When interpolated to any given Greenwich mean time, it is the correction to be applied to mean time in order to obtain apparent time.

The *Sidereal Time of Mean Noon* is the right ascension of the mean Sun at Greenwich mean noon. It may be reduced for the longitude or to any Greenwich mean time by using the hourly variation, $+9^s.8565$; or by Table III, page 687 of this volume, for reducing intervals of mean time to sidereal time. It is useful in converting mean time to sidereal time. We first find the Greenwich mean time, then the right ascension of the mean Sun for that time

and this being added to the local astronomical mean time, i. e., the hour angle of the mean Sun, will give the hour angle of the vernal equinox, or the sidereal time required.

The sidereal time of mean noon, reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time gives the interval of sidereal time past noon, and that is converted into the required mean time by subtracting from it the corresponding reduction of a sidereal interval to a mean-time interval, taken from Table II, page 684 of this volume. If the sidereal interval is less than $3^{\text{h}} 56^{\text{m}}.555$, there are two mean times corresponding to the given sidereal time, one a few minutes after the preceding noon, and the other a few minutes before the following noon, the mean-time interval between these two mean times being $23^{\text{h}} 56^{\text{m}} 4^{\text{s}}.09$. The mean time, approximately known, will always show which one is to be taken. Instead of using Table II the reduction of a sidereal to a mean-time interval may be found by multiplying $-9^{\text{s}}.8296$ by the hours and parts of an hour of the sidereal interval.

The *Mean Time of Sidereal Noon* is the number of hours, minutes, and seconds after Greenwich mean noon when the vernal equinox passes the meridian of Greenwich; it may be reduced to any other meridian by using the hourly variation, $-9^{\text{s}}.8296$, to effect the necessary interpolation, or the reduction may be taken directly from Table II. In the same way the reduction may be made to any Greenwich sidereal time, and the result will then represent 24^{h} — Right Ascension of the Mean Sun. This column may be conveniently used for converting sidereal to mean time, or—which is the same problem—for finding the time of meridian passage of a star whose right ascension is known, by adding to the mean time of the *preceding* local sidereal noon, the mean time equivalent of the given sidereal time.

As examples of the use of pages 2-17:

1. Let the Sun's declination be required for April 14, 1919, $2^{\text{h}} 5^{\text{m}} 20^{\text{s}}$, P. M., at a place whose longitude is $58^{\circ} 20'$, or $3^{\text{h}} 53^{\text{m}} 20^{\text{s}}$ west from Greenwich:

Local mean time	April 14,	$2^{\text{h}} 5^{\text{m}} 20^{\text{s}}$
Longitude from Greenwich (additive)		$3^{\text{h}} 53^{\text{m}} 20^{\text{s}}$
Greenwich mean time	April 14,	$5^{\text{h}} 58^{\text{m}} 40^{\text{s}}$

Reducing the minutes and seconds to decimals of an hour, we find that this moment is $5^{\text{h}}.978$ after Greenwich mean noon on April 14, or $18^{\text{h}}.022$ before Greenwich mean noon on April 15.

On page 6 of the Ephemeris we find that the variation of declination per hour is:

At Greenwich mean noon, April 14	$+54.28''$
At Greenwich mean noon, April 15	$+53.89''$
Difference for one day	$- 0.39''$

If great exactness is desired, we find the amount of this hourly variation for the time halfway between Greenwich noon and the time of observation: that is, for 3 hours after Greenwich noon of the 14th, this being half of 6 hours. *Three hours is 0.125 of a day; so the calculation is as follows:*

Variation at Greenwich mean noon, April 14	+	54.28	''
Change in 0.125 of a day	-	0''.39×0.125	- 0.05
Variation at 3 hours after noon	+	54.23	''
Declination at Greenwich noon, April 14	+	9 7 29.6	''
Change in 5.978 hours	+	54''.23×5.978	+ 5 24.2
Sun's declination at time of observation	+	9 12 53.8	

With equal facility the computation might have been made backward from the succeeding noon. Thus in the example just given the time is 18^h.022 before Greenwich noon of April 15; half this interval is about 0.375 of a day, and the hourly motion for the middle of the interval is +54''.04. Then we find:

Declination at Greenwich noon, April 15	+	9 29 7.7	''
Change in -18.022 hours	+	54''.04×-18.022	- 16 13.9
Sun's declination at time of observation	+	9 12 53.8	

It will always be well to make the calculation in both ways, as a check; but if the results differ slightly the one derived from the nearest noon should be regarded as the more accurate.

2. Let the Sun's right ascension and the equation of time be required for July 13, 1919, 10^h 3^m 30^s, A. M., mean time, at a place whose longitude is 85° 15', or 5^h 41^m west from Greenwich.

Local astronomical mean time	July 12,	22 3 30	^h ^m ^s
Longitude from Greenwich (additive)		5 41 0	
Greenwich mean time	July 13,	3 44 30-3.7417	^h
<i>Sun's Right Ascension.</i>			
Greenwich noon, July 13		7 28 41.42	^h ^m ^s
Change in 3.7417 hours	10°.166×3.7417	+38.04	-0°.310×3.7417
		7 27 19.46	-5 26.37
<i>Equation of Time.</i>			
			^m ^s

In this case the hourly variations interpolated to half the interval, or 1^h.87 after noon, have been used.

3. If the sidereal time is required for the same time and place, we have:

Sidereal time at Greenwich mean noon, July 13	7 21 16.21	^h ^m ^s
Reduction for 3 ^h 44 ^m 30 ^s from Table III, or 9°.8565×3.7417	+ 36.88	
Add the local astronomical mean time	22 3 30.00	
The required sidereal time (rejecting 24 ^h)	5 25 23.09	

4. On July 13, 1919, A. M., at a place whose longitude is 85° 15' W., suppose the sidereal time to be 5^h 25^m 23^s.09 and that the corresponding mean time is required.

The astronomical day is July 12; the longitude in time, $+5^h 41^m 0^s$, or $+5^h.6833$.

First solution.

Sidereal time at Greenwich mean noon	July 12,	^h ^m ^s 7 17 19.65
Reduction for $5^h 41^m 0^s$ from Table III, or $9^s.8565 \times 5.6833$		+56.02
The sidereal time at local mean noon, July 12		7 18 15.67
The given sidereal time ($+24^h$, if necessary for the following subtraction)		29 25 23.09
Subtracting the first from the second gives the sidereal interval from noon		22 7 7.42 = $22^h.1187$
Reduction for $22^h 7^m 7^s.42$ from Table II, or $-9^s.8296 \times 22.1187$		-3 37.42
The required astronomical mean time	July 12,	22 3 30.00

Second solution.

Mean time at Greenwich sidereal noon	July 12,	^h ^m ^s 16 39 56.08
Reduction for longitude from Table II, or $-9^s.8296 \times 5.6833$		-55.86
Mean time of <i>preceding</i> local sidereal noon	July 12,	16 39 0.22
Add the given sidereal time		5 25 23.09
Reduction for $5^h 25^m 23^s.09$ from Table II, or $-9^s.8296 \times 5.4231$		-53.31
The required astronomical mean time	July 12,	22 3 30.00

If there is any doubt about the mean time of the *preceding* local sidereal noon, the first solution is to be preferred.

Pages 18-25 contain the rectangular coordinates of the Sun, referred to the center of the Earth as the origin, and to the true equator and equinox as the plane and point of reference. Each coordinate is given for every Greenwich mean noon and midnight. The columns *Reduc. to Mean Eq'x of 1919.0* give the corrections to be applied to the coordinates for noon in order to obtain the corresponding coordinates referred to the mean equator and equinox of the beginning of the Besselian fictitious year.

Pages 26-117 contain *The Moon's Right Ascension and Declination* for each day and hour of Greenwich mean time, referred to the true equator and equinox. They are accompanied by columns of *Variations per Minute*, by means of which interpolation may be conveniently made to any moment of Greenwich mean time. The right ascension or declination is taken out for the given day and hour of Greenwich mean time; the *Var. per Min.* is multiplied by the minutes and parts of a minute of the Greenwich time, and the product is added numerically in case of the right ascension and algebraically in case of the declination.

Thus, suppose the Moon's right ascension and declination are required for January 25, 1919, $10^h 10^m 30^s$, astronomical mean time at Greenwich:

	<i>Right Ascension.</i>	<i>Declination.</i>
January 25, 10^h	^h ^m ^s 15 23 37.37	[°] ['] ["] -20 14 44.3
Change in 10.5 minutes	$2^s.0994 \times 10.5$ 22.04 $-5''.016 \times 10.5$	-52.7
January 25, $10^h 10^m 30^s$	15 23 59.41	-20 15 37.0

For the sake of precision the differences here employed have been interpolated for $5^m.2 = 0^h.09$.

Page 117 contains also the Phases of the Moon and the dates of the Moon's *Apogee* and *Perigee*, or greatest and least distances from the Earth.

Pages 118–133 contain for every Greenwich mean noon and midnight the *Moon's Longitude* and *Latitude* referred to the true equinox and the ecliptic, its *Semidiameter*, and its *Equatorial Horizontal Parallax*. The column adjoining that of the horizontal parallax gives the variation of that quantity per hour, by means of which it can be reduced to any other Greenwich mean time in the manner shown in the preceding examples. When allowing for change in the variation itself, note must be taken of the fact that the tabular interval is here 12 hours instead of 24. The quantity thus obtained is the equatorial horizontal parallax; to obtain the horizontal parallax at any given place, the correction for the latitude of the place must be applied. The reduction of the Moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.2725 (see page xi), or by simply computing the proportional part.

If, for example, the semidiameter of the Moon is to be taken out for March 10, 1919, 7^h, P. M., Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of March 10 is 4''.8; then,

$$12^h: 7^h-4''.8: 2''.8$$

which is the correction to be subtracted from the semidiameter at noon, because the semidiameter is decreasing. The Moon's semidiameter for March 10, 7^h, is therefore 15' 43''.9.

The Moon's semidiameter and horizontal parallax are required for all observations of the Moon.

Pages 118–133 contain also: The *Moon's Age*, or the time elapsed since the preceding new Moon, given to tenths of a day; the mean time of the *Moon's Transit, Upper and Lower*, at Greenwich, given to tenths of a minute; and the *Variation per Hour* of the latter quantity, that is, the variation for one hour of longitude, by means of which the local time of an upper or lower transit of the Moon may be computed for any place whose longitude is known.

Pages 134–198 contain for each of the seven major planets the geocentric ephemeris followed immediately by the heliocentric ephemeris.

The geocentric ephemeris gives the planet's *Apparent Right Ascension* and *Apparent Declination* with the respective *Variations per Hour* or *per Day*. The positions thus given are referred to the true equator and equinox, and are corrected for aberration. The geocentric ephemeris gives also the *Logarithm of Distance from Earth* with the *Variation per Hour* or *per Day*, the planet's *Semidiameter* and *Horizontal Parallax*, and, to tenths of a minute, the time of *Transit Meridian of Greenwich*. All the data, except the last named, are given for Greenwich mean noon.

The right ascension and declination of a planet are required whenever it is observed for time, latitude, or azimuth. The mode of reducing the ephemeris positions of planets to other instants of Greenwich mean time is the same as that already given for the Sun. The local mean time of meridian transit of any planet at any place can be found by dividing the proper daily difference of the ephemeris times by 24, multiplying the quotient by the longitude of the place expressed in hours and fractions, and applying the product with its proper sign to the time of Greenwich transit.

The *heliocentric* ephemeris gives the *Heliocentric Longitude*, *Mean Equinox of Date*; the *Heliocentric Latitude*; and the *Logarithm of Radius Vector*; with

their respective *Variations per Day*. The heliocentric longitude may be referred to the true equinox by applying nutation. The variations are given for the instant of Greenwich mean noon. The column *Reduction to Orbit* contains the correction to be applied to the heliocentric longitude in order to obtain the longitude measured along the orbit of the planet. This orbit longitude is equal to the distance from the mean equinox to the node, plus the distance from the node to the planet. The heliocentric latitude is referred to the ecliptic of the date. The *Logarithm of Radius Vector* is the logarithm of the distance of the center of the planet from that of the Sun.

PART II.—THE EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

Pages 200–201 contain formulæ for reducing mean positions of stars to apparent positions, including expressions for the Besselian star-numbers and star-constants, and for the independent star-numbers; the whole based upon the constants of the Paris Conference of May, 1896, and expressed in the notation of BESSEL.

Pages 202–205 contain the logarithms of the *Besselian Star-Numbers*, A , B , C , D , for each Washington mean midnight, with the values of E appended at the bottoms of the pages. The terms of short period have been included. These numbers serve to reduce the mean place of a star at the beginning of the Besselian fictitious year to its apparent place at any of the dates for which the numbers are given, and in ordinary cases four-figure logarithms suffice; but where extreme accuracy is desired the logarithms of A , C , and D are sometimes needed to five places of decimals. Along with the solar day, the first column contains the sidereal hour of Washington mean midnight for certain dates, and by interpolation among them it is easy to find the sidereal time for which any set of quantities is given.

The following is an example of the reduction of a star to apparent place by the Besselian star-numbers:

Computation of the apparent place of α Aquilæ, May 26, 1919, for the upper transit at Washington.

$\log a$	0.5165	$\log b$	7.2458 n	$\log c$	8.0452	$\log d$	8.8235 n
$\log A$	9.8375	$\log B$	0.6351	$\log C$	0.9002 n	$\log D$	1.2683 n
$\log a'$	0.5178	$\log b'$	9.9940	$\log c'$	9.4341	$\log d'$	8.4164 n
$\log Aa$	0.3540	$\log Bb$	7.8809 n	$\log Cc$	8.9454 n	$\log Dd$	0.0918
$\log Aa'$	0.3553	$\log Bb'$	0.6291	$\log Cc'$	0.3343 n	$\log Dd'$	9.6847
Mean Place, 1919.0		α_0	^h 18 ^m 37 ^s 50.390	δ_0	[°] -9 ['] 7 ["] 52.09		
		Aa	+2.259	Aa'	+2.27		
		Bb	-0.008	Bb'	+4.26		
		Cc	-0.088	Cc'	-2.16		
		Dd	+1.235	Dd'	+0.48		
		E	+0.002	$\tau\mu'$	0.00		
		$\tau\mu$	+0.001				
Apparent Place, May 26,		α	18 37 53.791	δ	-9 7 47.24		

Pages 206–213 contain the *Independent Star-Numbers*, which can frequently be advantageously used instead of the *Besselian Star-Numbers*. The terms of short period have been included. These quantities are connected with those of Bessel by the relations given on page 200, which also contains the formulæ

and precepts for the application of both systems of numbers. In order to use the Besselian numbers, it is necessary to have the values of the star-constants, $a, b, c, d, a', b', c', d'$, while the independent star-numbers render it possible to determine the apparent place of a star without computing these star-constants. Four-figure logarithms usually suffice, but where extreme accuracy is desired the logarithms of g and h are needed to five places of decimals, and G and H are needed to one-tenth of a minute of arc. The column τ gives the fraction of a year, counted from the beginning of the Besselian fictitious year to each date.

The following is an example of the reduction of a star to apparent place by the independent star-numbers:

Computation of the apparent place of α Aquilæ, May 26, 1919, for the upper transit at Washington.

$G =$	$\overset{h}{1} \overset{m}{9.6}$	$\delta_0 =$	$\overset{\circ}{-9} \overset{'}{7.9}$		
$\alpha_0 =$	18 37.8	$G + \alpha_0 =$	19 ^h 47 ^m .4		
$H =$	13 32.7	$H + \alpha_0 =$	8 10.5		
$\log \frac{1}{r}$	8.8239	$\log \frac{1}{r}$	8.8239	α_0	$\overset{h}{18} \overset{m}{37} \overset{s}{50.390}$
$\log g$	1.1598	$\log h$	1.3049	$f + f'$	+2.116
$\log \sin (G + \alpha_0)$	9.9505 <i>n</i>	$\log \sin (H + \alpha_0)$	9.9254	(g)	+0.138
$\log \tan \delta_0$	9.2061 <i>n</i>	$\log \sec \delta_0$	0.0055	(h)	+1.147
$\log (g)$	9.1403	$\log (h)$	0.0597	$\tau \mu$	+0.001
				α	18 37 53.792
$\log g$	1.1598	$\log h$	1.3049	δ_0	$\overset{\circ}{-9} \overset{'}{7} 52.09$
$\log \cos (G + \alpha_0)$	9.6548	$\log \cos (H + \alpha_0)$	9.7317 <i>n</i>	(g')	+6.53
$\log (g')$	0.8146	$\log \sin \delta_0$	9.2006 <i>n</i>	(h')	+1.73
		$\log (h')$	0.2372	(i)	-3.40
$\log i$	0.5374 <i>n</i>			$\tau \mu'$	0.00
$\log \cos \delta_0$	9.9945			δ	- 9 7 47.23
$\log (i)$	0.5319 <i>n</i>				

Page 214 contains for every tenth sidereal day the *Besselian* and *Independent Star-Numbers*, exclusive of all short-period terms. They are useful in computing ephemerides of stars, similar to those on pages 316-513, for which data containing short-period terms should not be employed.

Pages 215-216 contain for Washington mean midnight of each day the short-period terms of the nutation in longitude and obliquity, for use in connection with the formulæ on page 201, and the coefficients mentioned later, which are given for each star on pages 316-513.

Pages 217-230 contain the *Mean Places of Ten-day Stars* for the beginning of the Besselian fictitious year. These pages give also the magnitude, spectral type, annual variations, and proper motions for each star. The annual variations are to be considered as the differential coefficients of each coordinate with respect to the time at the beginning of the year.

Page 231 contains, for the *Circumpolar Stars*, the same data as the immediately preceding pages do for the ten-day stars.

Pages 232-315 contain for every upper transit at Washington the apparent positions of seventeen northern and eighteen southern circumpolar stars arranged in the order of their right ascensions. The mean solar time of transit is given in the column *Washington Mean Time*, in order that each transit above

and below the pole may be readily identified. Suppose, for example, that the transit of Polaris below the pole on January 26 is to be found, and we wish to know whether it precedes or follows the upper transit of the same date. On page 232 we find that the upper transit occurs January 26.2; the lower transit, therefore, occurs January 26.7. But the lower transit of July 1 precedes the upper one, which occurs July 1.8. A transit occurring very nearly at noon may also be identified without a computation to ascertain the actual mean date, by simply noting the tenth of a day in the column *Washington Mean Time*.

The secant and tangent of the apparent declination for the 15th of each month and the mean place in right ascension and declination for the beginning of the year are given for each star at the foot of the page.

Pages 316-513 contain, for every tenth upper transit at Washington, the apparent places of 790 stars, being all those given in the list of mean places of ten-day stars. The *Washington Mean Time* in the left-hand column of each page gives the day and tenth of the transit, so that intermediate transits may be readily identified; and to facilitate interpolation, the differences of each coordinate are given for every ten days.

In connection with the ephemeris of each ten-day star there are given at the foot of the page (1) the seconds of the mean place in both right ascension and declination for the beginning of the year, (2) the secant and the tangent of the mean of the star's greatest and least apparent declinations during the year, and (3) the coefficients of the short-period terms of the nutation, the use of which is explained on page 201.

Pages 514-521 contain, for Washington apparent noon, the *Apparent Right Ascension* and *Declination* of the Sun, the *Equation of Time*, and the *Variation per Hour* of these quantities; the *Semidiameter* of the Sun, and the *Sidereal Time of Semidiameter Passing Meridian*. The last column on each page contains the *Sidereal Time of Mean Noon*.

The *Equation of Time, Mean-App.* is the correction to be applied to apparent time in order to obtain mean time. Each number as given is the mean time of transit of the Sun's center over the meridian of Washington counted from the nearest noon.

Pages 522-537 contain the *Right Ascension of Center*, the *Geocentric Declination of Center*, the *Sidereal Time of Semidiameter Passing Meridian*, the *Geocentric Semidiameter*, and the *Equatorial Horizontal Parallax* of the Moon, and the *Washington Mean Time* at the moment of each upper and lower transit over the meridian of Washington.

The *Variation per Hour of Longitude* is the correction to be applied in each case to the quantity in the preceding column to obtain its value for the time of transit over the meridian one hour west of Washington, supposing the rate of change to be uniform and equal to what it is at the instant of transit over the meridian of Washington. The quantities in the third column, when corrected for another longitude by the hourly variations, give the local mean time of transit for that longitude. By means of the variations per hour of longitude any one of the quantities under consideration can be computed with great exactness for the moment of transit over any meridian not more than one hour

distant from Washington. To obtain the same accuracy for more distant meridians, we may proceed as follows: Let *F* represent either the *Washington Mean Time*, the *Right Ascension of Center*, or the *Geocentric Declination of Center*, and let *V* represent the corresponding *Variation per Hour of Longitude*. Write down three successive values of *F*, together with the corresponding values of *V*, and difference the latter as in the following scheme, where the middle values, *F*₀ and *V*₀, belong to the culmination from which is to be derived the value of *F* for the culmination on the meridian whose longitude is λ:—

Function.	Var. per Hour of Longitude.	Δ'	Δ''
$\frac{F_{-1}}{F_0}$ $\frac{F_0}{F_{+1}}$	$\frac{V_{-1}}{V_0}$ $\frac{V_0}{V_{+1}}$	α' α''	b

Then, for the culmination at the meridian λ

$$F_{\lambda}=F_0+\lambda V_0+\frac{\lambda^2}{48}(\alpha'+\alpha'')+\frac{\lambda^3b}{864}$$

where λ must be expressed in hours and decimals of an hour, and reckoned from Washington or from 180° from Washington according as the upper or lower culmination is used for the middle value (*F*₀). Adding twelve hours to the Washington time of lower transit at Washington gives the local time of upper transit at places whose longitude is 180° from Washington.

The column *Bright Limbs* is given to indicate to the observer which limbs are illuminated. When one limb is full and the terminator is within 1'' of the opposite limb, both can be well observed, and in such cases both are indicated, the defective limb being indicated by an italic letter or numeral, and the correction for defective illumination (as seen from Washington) being given in a footnote.

Pages 538–553 contain for six of the major planets, the geocentric *Apparent Right Ascension* and *Declination*, the *Horizontal Parallax*, *Semidiameter*, *Sidereal Time of Semidiameter Passing Meridian*, and the *Washington Mean Time*, for the moments of all transits which it is usually desirable to observe over the meridian of Washington. The stellar magnitude at opposition for Jupiter, Saturn, Uranus, and Neptune, respectively, is given at the bottom of the page containing the ephemeris of the planet.

PART III.—PHENOMENA.

This part gives the dates of the principal astronomical phenomena of the year, expressed in Greenwich mean time, except in the case of the occultations visible at Washington, where Washington time is used.

Pages 556–563 contain all necessary data respecting the solar and lunar eclipses which occur during the year.

The eclipse elements are given for the moment of conjunction of the Sun and Moon in right ascension, but the subsequent tables and results are computed from the exact positions of these bodies at the several instants referred to. The times and angles designated as the circumstances of a lunar eclipse

remain the same throughout all parts of the Earth, and require no explanation beyond a mere statement of the fact that in computing them the geometrical diameter of the Earth's shadow has been augmented in the proportion of 51:50. The principal circumstances of each total and annular eclipse of the Sun are stated in five lines, as follows:—

The line entitled "Eclipse begins" gives the Greenwich mean time at which the Moon's penumbra first touches the Earth, together with the latitude and longitude of the point of contact.

The line entitled "Central eclipse begins" gives the time when the axis of the Moon's shadow first touches the Earth, together with the latitude and longitude of the point of contact.

The line entitled "Central eclipse at local apparent noon" gives the time when the axes of the Earth and of the shadow cone lie in the same plane, together with the latitude and longitude of the point where the axis of the shadow cone then cuts the Earth's surface.

The lines entitled "Central eclipse ends" and "Eclipse ends" give, respectively, the times when and the localities where these events occur, the phenomena being the converse of those denoted by the similar phrases for the beginning.

In the case of partial solar eclipses the axis of the Moon's shadow does not come into contact with the Earth, and the three lines entitled, respectively, "Central eclipse begins," "Central eclipse at local apparent noon," and "Central eclipse ends," are replaced by a single line entitled "Greatest eclipse," whereon are given the time when and the latitude and longitude where the eclipse attains its greatest magnitude. The latter phenomenon necessarily occurs with the Sun in the horizon.

Maps of the Eclipses.—The regions in which each eclipse is visible are shown upon the map relating to it, from which may be taken approximately, for any place, both the times of the beginning and ending of the eclipse and its magnitude. The dotted curves show the outline of the shadow for each hour of Greenwich mean time, and therefore pass through all places where the eclipse begins or ends at the hour indicated. To find the instant of beginning at any place, we determine by inspection between what pair of these curved lines the place is situated. The eclipse will then begin between the corresponding hours of Greenwich mean time; and the fraction of the hour may be determined by dividing the hour in the same proportion as the space representing it on the map is divided by the place in question. This division may be made a little more exact by allowing for changes in the spaces as indicated by their varying width. The Greenwich mean time thus found must be reduced to local mean time by applying the longitude.

As an example, suppose we wish to find the times at which the eclipse of November 22, 1919, begins and ends at the place whose latitude is -10° and whose longitude is $+50^\circ$.

For the beginning we compare the distance of the place from the curves of 1^h and 2^h and find it to correspond to about 35 minutes from the former, thus giving for the approximate time of beginning $1^h 35^m$; for the end we compare the distance of the place from the curves of 5^h and 6^h and find it to

correspond to about 13 minutes from the former, thus giving for the approximate time of ending, 5^h 13^m; and both of these results are probably correct to within 3 or 4 minutes.

Changing to local mean time, we shall have—

		Beginning.			Ending.		
		d	h	m	d	h	m
Greenwich mean time	November	22	1	35	22	5	13
Longitude west			3	20		3	20
Local Mean Time	November	21	22	15	22	1	53

In the case of total and annular eclipses, a fair estimate of the magnitude of the eclipse at any place may be obtained from the position thereof relative to the central line and to the limit. On the central line the eclipse is annular or total, while between the central line and the limit the maximum magnitude of the eclipse is given by the quotient of the distance of the place from the limit divided by the distance of the central line from the limit, the measurements being made upon a line drawn through the place perpendicularly to the central line.

More Accurate Computations.—A more accurate determination of the phases, as visible at any point of the Earth's surface, may be obtained from the Besselian elements which are given for every 10 minutes of Greenwich mean time. Their geometric signification is as follows:—

Let us imagine a plane passing through the center of the Earth, perpendicular to the right line joining the centers of the Sun and Moon. This latter line is the axis of the Moon's shadow, and the plane is called the *fundamental plane* or plane of *xy*. We take the intersection of this plane with that of the Earth's equator as the axis of *x*, and the center of the Earth as the origin of coordinates. The axis of *y* is perpendicular to that of *x*, and directed toward the north; *x* and *y* are then the coordinates of the point in which the axis of the shadow intersects the fundamental plane, and they are here expressed in terms of the Earth's equatorial radius as unity. The angle *d*, of which the sine and cosine are both given, is the declination of that point of the celestial sphere toward which the axis of the shadow is directed; or, in other words, it is the declination of the center of the Sun as seen from the center of the Moon. The angle *u* is the Greenwich hour-angle of this same point of the celestial sphere.

The quantities *l*₁ and *l*₂ are the radii of the shadow cones upon the fundamental plane, *l*₁ corresponding to the penumbra, and *l*₂ to the umbra. The notation is that of CHAUVENET'S *Spherical and Practical Astronomy*, in which *l*₂ is regarded as positive for an annular and negative for a total eclipse.

The angles *f*₁ and *f*₂, the tangents of which are given, are the angles which the elements of the respective shadow cones make with the axis of the shadow; or, they are the semiangles of the two cones.

In order to facilitate interpolation to any required moment, the logarithms of *x'*, *y'*, and *μ'*, which are the changes of *x*, *y*, and *μ*, in one minute of time, are given at the bottom of the table.

The method of computing an eclipse from its Besselian elements is based on the fact that the distance of the observer from the axis of the shadow cones is equal to the radius of the penumbra at the point of observation for the beginning and ending of the eclipse, and is equal to the radius of the umbra at

point of observation for the beginning and ending of totality or of the annul phase. To find this distance and radius in each case we proceed as follows:

(1) The coordinates of the observer, ξ , η , and ζ , together with their variations in one minute, are computed for some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase.

(2) The coordinates x and y of the axis of the shadow, together with the variations in one minute, are taken for the same moment from the tables elements.

(3) From (1) and (2) the position and motion of the observer relative to the axis of the shadow are found.

(4) The radius of the penumbra or umbra at a distance from the fundamental plane equal to that of the observer is also computed.

(5) Then, assuming the motions to be uniform, we determine the time required for the observer to be brought to a distance from the axis of the shadow equal to this radius.

The formulæ and directions for the several steps in the computation are as follows:—

(1) Find $\rho \cos \varphi'$ and $\rho \sin \varphi'$, which are the geocentric coordinates of the station referred to the Earth's equator, ρ being the distance from the center of the Earth and φ' the geocentric latitude. These coordinates may be computed from the following table based on the compression of the Earth adopted at the Paris Conference of 1911, $1/297$, by the formulæ—

$$\rho \cos \varphi' = F \cos \varphi$$
$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

φ being, as usual, the geographic latitude.

Table for Computing the Geocentric Coordinates of a Place.

φ	Log F .	Log G .
0°	0.00000	0.00293
5	0.00001	0.00292
10	0.00004	0.00289
15	0.00010	0.00283
20	0.00017	0.00276
25	0.00026	0.00267
30	0.00037	0.00256
35	0.00048	0.00245
40	0.00060	0.00232
45	0.00073	0.00220
50	0.00086	0.00207
55	0.00098	0.00195
60	0.00110	0.00183
65	0.00120	0.00173
70	0.00129	0.00164
75	0.00137	0.00156
80	0.00142	0.00151
85	0.00145	0.00148
90	0.00146	0.00146

For the assumed Greenwich mean time of computation, take from the table of elements the values of $\sin d$, $\cos d$, and μ . Then, with λ for the longitude west from Greenwich, the coordinates of the observer will be—

$$\begin{aligned}\xi &= \rho \cos \varphi' \sin (\mu - \lambda) \\ \eta &= \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (\mu - \lambda) = \eta_1 - \eta_2 \\ \zeta &= \rho \sin \varphi' \sin d + \rho \cos \varphi' \cos d \cos (\mu - \lambda) = \zeta_1 + \zeta_2\end{aligned}$$

and their variations in one minute of mean time will be—

$$\begin{aligned}\xi' &= [7.63992] \rho \cos \varphi' \cos (\mu - \lambda) \\ \eta' &= [7.63992] \rho \cos \varphi' \sin d \sin (\mu - \lambda) - [7.63992] \xi \sin d \\ \zeta' &\text{ is not needed.}\end{aligned}$$

(2) For the same assumed moment of Greenwich mean time, take from the tables of elements the coordinates x and y of the axis of the shadow, together with their variations for one minute, which are equal to one-tenth of the differences of two consecutive numbers. These variations are represented by x' and y' , and their logarithms are given beneath the tables of x and y .

(3) The distance m and position-angle M of the axis of the shadow relative to the observer, and the relative motions, n and N , are computed by the formulæ—

$$\begin{aligned}m \sin M &= x - \xi \\ m \cos M &= y - \eta \\ n \sin N &= x' - \xi' \\ n \cos N &= y' - \eta'\end{aligned}$$

(4) Both for the umbra and for the penumbra, the radius L at the distance ζ from the fundamental plane is computed by the formulæ—

$$L = l - \zeta \tan f$$

l and f being taken from the table of elements, and ζ computed in (1).

(5) If the time chosen for computation is exactly that of the beginning or ending of the eclipse, we shall have—

$$m = L$$

But, as this condition will rarely be fulfilled on a first trial, a correction τ to the assumed time is computed thus: Find the angle ψ from the equation—

$$\sin \psi = \frac{m \sin (M - N)}{L}$$

There will be two values for this angle; the one for which $\cos \psi$ is negative must be taken for the beginning of the eclipse, for the beginning of the annular phase, or for the ending of the total phase, but the one for which $\cos \psi$ is positive must be taken for the ending of the eclipse, for the ending of the annular phase, or for the beginning of the total phase. The correction τ to the assumed time will then be found, in minutes, from—

$$\tau = -\frac{m \cos (M - N)}{n} + \frac{L \cos \psi}{n}$$

However, only in case the value of τ does not exceed a few minutes can the time thus corrected be considered even fairly accurate. Therefore it is best to commence the computation by assuming times near the phenomena wanted. The times for the beginning and the ending of an eclipse may be

derived from the chart with sufficient exactness as previously explained; the time for the total or for the annular phase may then be assumed as midway between the times assumed for the beginning and the ending of the eclipse; or, in case of a partial eclipse, this time midway may be assumed as that of the maximum eclipse.

The more accurate times resulting from the computation as outlined above and as illustrated in the example below may now be taken in place of those originally assumed, and the whole computation may be repeated, thus leading to a value of τ in each case, which should be very small, and which should give a very accurate time of the phenomenon. Such a repetition of the computation will be advisable, moreover, for the reason that it will enable one to locate and eliminate any accidental numerical errors that may have occurred in the first computation.

As a result of this last approximation the computed times of contact will be theoretically exact within less than a second, but the uncertainties of the solar and lunar tables are such that an unavoidable error of several seconds may exist in the prediction.

Position-angle of Point of Contact.—The position-angle P , of the point of contact, reckoned from the north point of the Sun's limb toward the east, is found by the formula—

$$P = N + \psi$$

where the results of the last approximation are used.

The position-angle V , of the point of contact, reckoned from the vertex of the Sun's limb toward the east, is found by the formula—

$$V = P - C$$

where C is obtained from

$$\tan C = \frac{\xi}{\eta}$$

$\sin C$ having the same algebraic sign as ξ , and the results of the last approximation again being used.

Time of Maximum Eclipse.—For a partial eclipse, or for a central eclipse at a point at which the eclipse is only partial indicated by $\sin \psi$ greater than unity for the umbra, the correction to the assumed time to obtain the time of maximum eclipse is given by the formula—

$$\tau = -\frac{m \cos (M - N)}{n}$$

Magnitude of the Maximum Eclipse.—This is given by the formula—

$$D^* = \frac{L - \Delta}{2L - 0.5446}$$

where $\Delta = \pm m \sin (M - N)$, always taken positive, and L is the radius of the penumbra. D is, in all cases, the ratio to the Sun's diameter of the straight line passing through the centers of the two disks and having for its extremities the Sun's limb that is nearest to the Moon's center and the Moon's limb that is nearest to the Sun's center. In a partial eclipse D is the fraction of the Sun's diameter covered by the Moon.

*Since, in obtaining this formula, the angles of the two shadow cones are considered the same, the value obtained therefrom should be increased by $\frac{1}{140}$ th of itself.

Computation of the Solar Eclipse of November 22, 1919, for Havana, Cuba.

The position of Havana is—

Latitude, $\varphi = +23^{\circ} 9' 21''$
Longitude, $\lambda = +82^{\circ} 21' 30''$

and its geocentric coordinates are—

$$\rho \sin \varphi' = 9.59194$$

$$\rho \cos \varphi' = 9.96374$$

From the eclipse chart we find the approximate times of the phases to be—

Beginning Nov. 22 0 20					Greenwich Mean Time.			
Middle 22 1 50								
Ending 22 3 20								
					Beginning.	Middle.	Ending.	
T	Nov. 22	0 ^h 20 ^m	1 ^h 50 ^m	3 ^h 20 ^m	log <i>m</i> sin <i>M</i>	9.70948 ⁿ	8.85781	9.73813
μ		8 29 42	30 59 36	53 29 30	log sin or cos <i>M</i>	9.97765 ⁿ	9.96679	9.97353
λ		82 21 30	82 21 30	82 21 30	log <i>m</i> cos <i>M</i>	9.22707	8.46687 ⁿ	9.29451 ⁿ
μ-λ		-73 51 48	-51 21 54	-28 52 0	log tan <i>M</i>	0.48241 ⁿ	0.39094 ⁿ	0.44362 ⁿ
log ρ cos φ'		9.96374	9.96374	9.96374	log <i>n</i> sin <i>N</i>	7.85788	7.76492	7.68242
log sin (μ-λ)		9.98254 ⁿ	9.89273 ⁿ	9.68374 ⁿ	log sin or cos <i>N</i>	9.97878	9.97442	9.97604
log ξ		9.94628 ⁿ	9.85647 ⁿ	9.64748 ⁿ	log <i>n</i> cos <i>N</i>	7.36361 ⁿ	7.31345 ⁿ	7.21590 ⁿ
log cos <i>d</i>		9.97305	9.97301	9.97297	log tan <i>N</i>	0.49427 ⁿ	0.45147 ⁿ	0.46652 ⁿ
log ρ sin φ'		9.59194	9.59194	9.59194	<i>M</i>	288 13 36	112 7 18	109 48 8
log sin <i>d</i>		9.53359 ⁿ	9.53387 ⁿ	9.53415 ⁿ	<i>N</i>	107 46 1	109 28 27	108 51 31
log η ₁		9.56499	9.56495	9.56491	<i>M</i> - <i>N</i>	180 27 35	2 38 51	0 56 37
log ζ ₁		9.12553 ⁿ	9.12581 ⁿ	9.12609 ⁿ	log <i>m</i>	9.73183	8.89102	9.76460
log sin <i>d</i>		9.53359 ⁿ	9.53387 ⁿ	9.53415 ⁿ	log <i>n</i>	7.87910	7.79060	7.70638
log ρ cos φ'		9.96374	9.96374	9.96374	log ζ	9.02845	9.60869	9.79469
log cos (μ-λ)		9.44394	9.79544	9.94238	log tan <i>f</i>	7.67540	7.67324	7.67541
log cos <i>d</i>		9.97305	9.97301	9.97297	log ζ tan <i>f</i>	6.70385	7.28193	7.47010
log η ₂		8.94127 ⁿ	9.29305 ⁿ	9.44027 ⁿ	<i>l</i>	+0.57397	+0.02799	+0.57409
log ζ ₂		9.38073	9.73219	9.87909	ζ tan <i>f</i>	+0.00051	+0.00191	+0.00295
η ₁		+0.36727	+0.36724	+0.36721	<i>L</i>	+0.57346	+0.02608	+0.57114
-η ₂		+0.08735	+0.19636	+0.27559	log <i>m</i>	9.73183	8.89102	9.76460
ζ ₁		-0.13352	-0.13360	-0.13369	log sin (<i>M</i> - <i>N</i>)	7.90437 ⁿ	8.66456	8.21665
ζ ₂		+0.24029	+0.53975	+0.75698	colog <i>L</i>	0.24150	1.58369	0.24326
ζ'		+0.10677	+0.40615	+0.62329	log sin ψ	7.87770 ⁿ	9.13927	8.22451
log ρ cos φ'		9.96374	9.96374	9.96374	ψ	180 25 56	172 4 45	0 57 39
log cos (μ-λ)		9.44394	9.79544	9.94238	log <i>m</i> / <i>n</i>	1.85273	1.10052	2.05822
log const.		7.63992	7.63992	7.63992	log cos (<i>M</i> - <i>N</i>)	9.99999 ⁿ	9.99954	9.99994
log ξ		9.94628 ⁿ	9.85647 ⁿ	9.64748 ⁿ	log (1)	1.85272 ⁿ	1.10006	2.05816
log sin <i>d</i>		9.53359 ⁿ	9.53387 ⁿ	9.53415 ⁿ	log <i>L</i>	9.75850	8.41631	9.75674
log ξ'		7.04760	7.39910	7.54604	log cos ψ	9.99999 ⁿ (⁺)	9.99584	9.99994
log η'		7.11979	7.03026	6.82155	colog <i>n</i>	2.12090	2.20950	2.29362
<i>x</i>		-1.39590	-0.64649	+0.10307	log (2)	1.87939 ⁿ (⁺)	0.62165	2.05030
ξ		-0.88365	-0.71857	-0.44410	-(1)	+71.240	-12.591	-114.329
<i>x</i> -ξ		-0.51225	+0.07208	+0.54717	+(2)	-75.752	+4.185	+112.279
<i>y</i>		+0.62330	+0.53430	+0.44578				
η		+0.45462	+0.56360	+0.64280				
<i>y</i> -η		+0.16868	-0.02930	-0.19702				
<i>x</i> '		+0.008325	+0.008327	+0.008329	<i>τ</i>	-4.512	-16.776	-2.050
ξ'		+0.001116	+0.002507	+0.003516			-8.406	
<i>x</i> '-ξ'		+0.007209	+0.005820	+0.004813				
<i>y</i> '		-0.000992	-0.000986	-0.000981	<i>T</i>	22 0 20	22 1 50	22 3 20
η'		+0.001318	+0.001072	+0.000663				
<i>y</i> '-η'		-0.002310	-0.002058	-0.001644	<i>T</i> + <i>τ</i>	22 0 15.488	22 1 33.224	22 3 17.5

Taking the four times just found, we make a new computation in each case. The times resulting from the new computation are—

	November	Greenwich Mean Time.				Local Mean Time.			
		d	h	m	s	d	h	m	s
Beginning of the eclipse		22	0	15	30.2	21	18	46	4.2
Beginning of annular eclipse			1	33	30.8	20	4	4	8
Ending of annular eclipse			1	41	41.5	20	12	15.5	
Ending of the eclipse			3	17	57.4	21	48	31.4	

The values from the last approximation of the quantities needed in computing the position angles, and the computation of these position angles, are—

	1st Contact.	2d Contact.	3d Contact.	4th Contact.
$\log \xi$	9.94866 n	9.88004 n	9.86874 n	9.85446 n
$\log \eta$	9.65193	9.73647	9.74385	9.80715
$\log \tan C$	0.29673 n	0.14357 n	0.12489 n	9.84731 n
N	107.64	109.28	109.39	108.91
ψ	180.55	171.98	8.03	0.91
P	288.19	281.26	117.42	109.82
C	296.79	305.70	306.87	324.87
V	351.4	335.6	170.6	145.0

The quantities needed in computing the magnitude of the greatest eclipse, and the computation of that magnitude, are—

		2d Contact.	3d Contact.
$\log \xi$		9.55064	9.58093
$\log \Delta = \log m \sin (M-N)$		7.56490	7.56347
T	1 ^h 38 ^m	l	$L-\Delta$
$\log \xi$	9.5658	$\xi \tan f$	$2L-0.5446$
$\log \tan f$	7.6754	L	D
$\log \xi \tan f$	7.2412	Δ	$1/400 D$
			Magnitude
			0.95

Pages 564–567 contain the adopted mean places and annual proper motions of such stars, as bright as magnitude 6.5, as will be occulted during the year by the Moon.

Pages 568–605 contain the elements for the prediction of the times of occultations of stars and planets by the Moon during the current year. The system of coordinates employed is similar to that already described for eclipses, the fundamental plane passing through the center of the Earth, and being taken perpendicular to the line joining the star and the center of the Moon, but the cone circumscribing the Moon and star is regarded as a cylinder which intercepts the fundamental plane in a circle having the same linear diameter as the Moon.

In the columns referring to the star, those headed *Red'ns from 1919.0* give the quantities necessary to reduce the mean place of the star at the beginning of 1919 to its apparent place at the time of occultation. These reductions are sufficiently accurate to be definitive.

Under the general head, *At Conjunction in R. A.*, are five columns giving certain quantities for the moment of geocentric conjunction of the Moon and star in right ascension, as follows:

The *Greenwich Mean Time* is the moment, T , at which the two bodies are in geocentric conjunction in right ascension. At that moment the coordinate

of the axis of the cylinder on the fundamental plane has the value zero. The column *Hour Angle*, H , gives the common geocentric hour-angle of the Moon and star at the same moment, expressed in sidereal time and counted from the meridian of Greenwich—positive toward the west and negative toward the east. Column Y gives the coordinate y of the axis of the cylinder on the fundamental plane at the same moment. Columns x' and y' give the variations of x and y in one hour of mean time. The linear unit in these columns is the Earth's equatorial radius. The limiting parallels, north and south, show the extreme limits of latitude within which the occultation will be visible.

By the aid of these elements, the time of immersion and emersion of a star relative to the limb of the Moon may be computed for any part of the earth by a method nearly the same as that already explained for computing eclipses, but somewhat more simple.

Prediction of Occultations for a given Place.—When it is desired to predict the circumstances of one or more occultations at any place, the first step will be to select them from the general list given in the Ephemeris. The conditions of visibility are:—

1. The limiting parallels in the last columns must include the latitude of the place.
2. The quantity $H - \lambda$, taken without regard to sign, must be less than the semidiurnal arc of the star by at least one hour. On very rare occasions emersion might be seen in the east, or an immersion in the west, when this difference is a few minutes less than an hour.
3. The Sun must not be much more than an hour above the horizon at the local mean time $T - \lambda$, unless the star is bright enough to be seen in the daytime.

When many occultations are to be selected, the most convenient course will be to write the value of $-\lambda$ on the bottom of a slip of paper, and in passing through the list of occultations to pause over each one for which condition (1) is fulfilled, and examine by means of the slip whether conditions (2) and (3) are also fulfilled. If either fails, the computer passes on. Sometimes it will be difficult to determine whether $H - \lambda$ or $T - \lambda$ falls within the limits; and in such cases the computer may mark the occultation for trial and leave the decision for the subsequent operations. The whole list can be gone over in less than a day, and it will probably be found that about one-tenth of the occultations are marked for trial.

The next step will be to compute the local times of immersion and emersion from the elements, and to that end let—

- T —the instant of geocentric conjunction of Moon and star in right ascension, expressed in Greenwich mean time;
 H —the Greenwich west hour-angle of the two bodies at that moment;
 λ —the longitude west of Greenwich;
 $h_0 = H - \lambda$ —the local hour-angle of the star at the instant T ;
 δ —the star's declination.

The procedure for each occultation will then be as follows:—

- (1) The geocentric coordinates of the place, $\rho \sin \varphi'$ and $\rho \cos \varphi'$, are to be computed by the formulæ and table given in connection with eclipses page 752.

The next step will be to find the approximate instant of apparent conjunction of the Moon and star as seen from the place, and that may be deduced from the time of geocentric conjunction by the application of an approximate correction taken from DOWNES's table, printed in the volumes of the American Ephemeris for 1882 to 1899. This correction must be reckoned in mean solar hours, and will be designated by the symbol t . It will have the same sign as λ_0 .

When DOWNES's table is not available, the correction may be computed from the formulæ—

$$\begin{aligned}\xi_0 &= \rho \cos \varphi' \sin \lambda_0 \\ \xi' &= [9.4192] \rho \cos \varphi' \cos \frac{4}{3} \lambda_0 \\ t &= \frac{\xi_0}{\xi' - \xi}\end{aligned}$$

By applying t to the Greenwich mean time of geocentric conjunction, as given with the elements, we shall have the Greenwich mean time of local conjunction within a few minutes.

(2) Compute for the instant $T+t$ the following quantities, in which t is the sidereal equivalent of the mean time interval t :

$$\begin{aligned}\xi &= \rho \cos \varphi' \sin (\lambda_0 + t_0) \\ \eta &= \rho \sin \varphi' \cos \delta - \rho \cos \varphi' \sin \delta \cos (\lambda_0 + t_0) - \eta_1 - \eta_2 \\ \xi' &= [9.4192] \rho \cos \varphi' \cos (\lambda_0 + t_0) \\ \eta' &= [9.4192] \rho \cos \varphi' \sin \delta \sin (\lambda_0 + t_0) - [9.4192] \xi \sin \delta \\ x &= x't \\ y &= Y + y't\end{aligned}$$

Compute also m , M , n , N , and ψ from the equations—

$$\begin{aligned}m \sin M &= x - \xi \\ m \cos M &= y - \eta \\ n \sin N &= x' - \xi' \\ n \cos N &= y' - \eta' \\ \sin \psi &= [0.5646] m \sin (M - N)\end{aligned}$$

ψ being taken between the limits $\pm 90^\circ$. Finally compute,

$$\begin{aligned}\tau &= -\frac{[1.7782]m}{n} \cos (M - N) \mp \frac{[1.2135]}{n} \cos \psi \\ \delta\tau &= \frac{[6.7591]r^2}{n \cos \psi} [\eta_2 \cos (N \mp \psi) - \xi \sin (N \mp \psi)]\end{aligned}$$

where the double signs are to be taken negative for an immersion and positive for an emersion. Both τ and $\delta\tau$ thus have two values, which are expressed in minutes of time, and in order to distinguish them let those pertaining to immersion be designated, respectively, τ' and $\delta\tau'$, while those pertaining to emersion are designated τ'' and $\delta\tau''$. We then have for the Greenwich mean times of the phases,

$$\begin{aligned}\text{Instant of immersion} &= T + t + \tau' + \delta\tau' \\ \text{Instant of emersion} &= T + t + \tau'' + \delta\tau''\end{aligned}$$

These expressions are practically exact, as the corrections $\delta\tau$ seldom amount to so much as 1.5 minutes, and whenever an inaccuracy of that magnitude is permissible they may be omitted. As a check upon the results it will be advisable to compute ξ , η , x , and y for the times of immersion and emersion finally obtained. If these times are correct, the quantities in question will fulfill the condition,

$$\sqrt{(x - \xi)^2 + (y - \eta)^2} = 0.2725$$

If $\log m \sin (M-N) > 9.4354$, $\sin \psi$ will be numerically greater than unity, and no occultation is to be expected at the given place; but a very brief one may occur if the excess of the computed distance over the Moon's semi-diameter happens to be within the errors of the ephemerides of the Moon and star.

The position-angle of the line from the Moon's center to the star, at the time of contact, is reckoned from the north point toward the east, and designated by the symbol P . It is computed from the formulæ—

$$\begin{aligned} P &= N - \psi + \delta P && \text{for immersion,} \\ \text{or } P &= N + \psi + \delta P \pm 180^\circ && \text{for emersion,} \end{aligned}$$

where the angles $N - \psi$ and $N + \psi$ are taken directly from the computation of δr , and δP is found in degrees of arc from the expression,

$$\delta P = \mp \frac{[7.3038]r^2}{\cos \psi} [\eta_2 \sin N + \xi \cos N]$$

In the latter formula the double sign is to be taken negative for an immersion and positive for an emersion.

The angle from the vertex, V , is also reckoned in the direction from the north toward the east, and is found from the formula

$$V = P - C$$

where C is computed from the expression,

$$\tan C = \frac{\xi + [8.2218]r\xi' - [4.9810]r^2\xi}{\eta + [8.2218]r\eta' + [4.9810]r^2\eta_2}$$

C being taken less or greater than 180° , according as the numerator is positive or negative.

The value of r employed in the latter formula must be so taken as to correspond with the phase for which C is required.

In the volumes of the American Ephemeris for the years 1882 to 1901 instructions are given for constructing three special tables which greatly diminish the labor of computing occultations, but as these tables should contain from 4700 to 6300 quantities, and as they would apply only to the place for which they were computed, it will rarely be worth while to undertake the labor of forming them. Those who desire further information on the subject may consult any one of the volumes in question.

As an example of an isolated occultation, we will compute that of α Cancri on March 12, 1919, for Des Moines, Iowa, whose position is—

$$\begin{aligned} \varphi &= +41^\circ 36' 0'' \\ \lambda &= + 6^h 14^m 31^s \end{aligned}$$

and whose geocentric coordinates are—

$$\begin{aligned} \rho \sin \varphi' &= 9.8198 \\ \rho \cos \varphi' &= 9.8744 \end{aligned}$$

From the elements on page 575 we have,

$$\begin{aligned} T &= \begin{matrix} h & m \\ 18 & 13.4 \end{matrix} \\ H &= + 8 \ 38.6 \\ h_0 &= H - \lambda = + 2 \ 24.1 \end{aligned}$$

and

From the formulæ on page 758, we find the correction, t , to the Greenwich mean time of geocentric conjunction, T , to be about $+1^h 4^m.4$; therefore the Greenwich mean time of apparent conjunction is—

$$T+t=\text{March } 12^d 19^h 17^m.8$$

α Cancri.	Apparent Designation. +12 10.1	G. M. T. of \odot d h m Mar. 12 18 13.4	Hour Angle. h m +8 38.6	Y +0.5842	z' 0.5420	y' -0.1768
------------------	--------------------------------------	---	-------------------------------	----------------	----------------	-----------------

λ_0	h m +2 24.1	y/t	-0.1897	$\log m$	9.1890
t_0	+1 4.6	Y	+0.5842	$\log n$	9.6727
λ_0+t_0	+3 28.7	z	+0.5816	$\log \text{const.}$	0.5646
$\log (\rho \cos \varphi')$	9.8744	ξ	+0.5916	$\log m$	9.1890
$\log \sin (\lambda_0+t_0)$	9.8976	$z-\xi$	-0.0100	$\log \sin (M-N)$	9.9649
$\log \xi$	9.7720	y	+0.3945	$\log \sin \psi$	9.7185
$\log (\rho \sin \varphi')$	9.8198	η	+0.5487	ψ	+31° 32'
$\log \cos \delta$	9.9901	$y-\eta$	-0.1542	$\log \text{const.}$	1.7782
$\log \eta_1$	9.8099	z'	+0.5420	$\log m/n$	9.5163
$\log (\rho \cos \varphi')$	9.8744	ξ'	+0.1206	$\log \cos (M-N)$	9.5888
$\log \sin \delta$	9.3238	$z'-\xi'$	+0.4214	$\log (1)$	0.8813
$\log \cos (\lambda_0+t_0)$	9.7876	y'	-0.1768	$\log \text{const.}$	1.2135
$\log \eta_2$	8.9858	η'	+0.0327	$\text{colog } n$	0.3273
η_1	+0.6455	$y'-\eta'$	-0.2095	$\log \cos \psi$	9.9306
$-\eta_2$	-0.0968	$\log m \sin M$	8.0000 n	$\log (2)$	1.4714
$\log (\rho \cos \varphi')$	9.8744	$\log \cos M$	9.9991 n	m	- 7.61
$\log \cos (\lambda_0+t_0)$	9.7876	$\log m \cos M$	9.1881 n	$\mp(2)$	∓ 29.61
$\log \text{const.}$	9.4192	$\log \tan M$	8.8119	τ for immersion	-37.22
$\log \xi$	9.7720	$\log n \sin N$	9.6247	τ for emersion	+22.00
$\log \sin \delta$	9.3238	$\log \sin N$	9.9520		
$\log \xi'$	9.0812	$\log n \cos N$	9.3212 n		
$\log \eta'$	8.5150	$\log \tan N$	0.3035 n		
$\log z'$	9.7340	M	183 43		
$\log t$	0.0306	N	116 26		
$\log y'$	9.2475 n	$M-N$	67 17		
$\log z$	9.7646				
$\log y't$	9.2781 n				

The computation of $\delta\tau$ for the two contacts is as follows:

	Immersion.	Emersion.		Immersion.	Emersion.
$N\mp\psi$	84° 54'	147° 58'	$\log [(1)-(2)]$	9.7639 n	9.5976
$\log \cos (N\mp\psi)$	8.9489	9.9283 n	$\log \text{const.}$	6.7591	6.7591
$\log \eta_2$	8.9858	8.9858	$\log \tau^2$	3.1414	2.6848
$\log (1)$	7.9347	8.9141 n	$\text{colog } (n \cos \psi)$	0.3967	0.3967
$\log \sin (N\mp\psi)$	9.9983	9.7246	$\log \delta\tau$	0.0611 n	9.4382
$\log \xi$	9.7720	9.7720	$T+t$	d h m Mar. 12 19 17.8	h m 19 17.8
$\log (2)$	9.7703	9.4966	τ	-37.22	+22.00
(1)	+0.0086	-0.0821	$\delta\tau$	- 1.15	- 0.2
(2)	+0.5892	+0.3138	Greenwich M. T.,	Mar. 12 18 39.4	19 39.5
(1)-(2)	-0.5806	-0.3959	λ	+ 6 14.5	+6 14.5
			Des Moines M. T.,	Mar. 12 12 24.9	13 25.0

To find δP and P :

$\log \eta_2$	8.9858	$\log \xi$	9.7720	(3)	+0.0867
$\log \sin N$	9.9520	$\log \cos N$	9.6485 <i>n</i>	(4)	-0.2633
$\log (3)$	8.9378	$\log (4)$	9.4205 <i>n</i>	(3)+(4)	-0.1766
	Immersion.	Emersion.		Immersion.	Emersion.
$\log [(3)+(4)]$	9.2470 <i>n</i>	9.2470 <i>n</i>	δP	+ 0.6	- 0.2
$\log \text{const.}$	7.3038 <i>n</i>	7.3038	N	116.4	116.4
$\log \tau^2$	3.1414	2.6848	$\mp \psi$	-31.5	+31.5
$\text{colog } \cos \psi$	0.0694	0.0694	const.	0.0	180.0
$\log \delta P$	9.7616	9.3050 <i>n</i>	P	85.5	327.7

Pages 606-607 contain in detail all the data necessary for observing every occultation of the general list which is visible at Washington during the current year.

Page 608 contains the *Ephemeris for Physical Observations of the Sun*.

Page 609 contains certain elements referring to the Moon, its equator, and its orbit.

- i —the inclination of the Moon's mean equator to the Earth's true equator.
- Δ —the distance on the Moon's mean equator from its ascending node on the Earth's true equator to its ascending node on the ecliptic of date.
- Ω' —the distance along the Earth's true equator from the true equinox to the ascending node of the Moon's mean equator.
- Γ' —the longitude of the perigee of the Moon's orbit, referred to the mean equinox of date.
- Ω —the longitude of the ascending node of the Moon's orbit on the ecliptic, referred to the mean equinox of date.
- ζ —the Moon's mean longitude, referred to the mean equinox of date.

Pages 610-617 contain the *Ephemeris for Physical Observations of the Moon*. The selenographic longitudes are measured in the plane of the Moon's equator, the axis of reference being the radius of the Moon which passes through the mean center of the visible disk positive toward the west—i. e., toward Mare Crisium—and the latitudes are measured from the Moon's equator, positive toward the north—i. e., in the hemisphere containing Mare Serenitatis.

The optical and physical librations in longitude and latitude have been computed with elements and formulæ given on page xi, and their sums are given in the second and third columns, respectively, the physical libration being given separately in the fourth and fifth columns. The Sun's selenographic colongitude (90° —longitude) and latitude and the position-angle of the Moon's axis, C , in the sixth, seventh, and eighth columns, respectively, have all been corrected for the effect of physical libration.

When the libration in longitude is positive, the mean center of the disk is displaced toward the east—that is, the region thus exposed to view is on the west limb—and when the libration in latitude is positive the mean center of the disk is displaced toward the south—that is, the region thus exposed to view is on the north limb.

The altitude of the Sun, A , at any given time above the horizon of any point on the Moon whose selenographic longitude and latitude, λ and β , are known, may be computed from the following formula, the Sun's selenographic longitude and latitude being denoted by l_\odot and b_\odot , respectively:

$$\sin A = \sin b_\odot \sin \beta + \cos b_\odot \cos \beta \cos (l_\odot - \lambda)$$

Pages 618–619 contain the data with reference to the illuminated disks of Mercury and Venus. The angle θ is the angle which the arc of the great circle from the planet to the Sun makes with the arc from the planet toward the west, measured in the direction west, north, east, south. It is measured from 0° to 360° . We may also regard θ as expressing the angle which the line of cusps makes with the meridian, the positive direction of the meridian being toward the north, and the positive direction of the line of cusps that in which a person following this line would have the illuminated portion of the disk on his right.

Pages 620–621 contain the *Ephemeris for Physical Observations of Mars*. The quantities here given have been corrected for aberration, so that in using them they should be interpolated to the actual time of observation.

P —the position-angle of the axis of rotation measured eastward from the north point of the disk.

$A\oplus$, $A\odot$ —the planetocentric right ascensions of the Earth and Sun, respectively, measured in the plane of the planet's equator from its vernal equinox.

$D\oplus$, $D\odot$ —the planetocentric declinations of the Earth and Sun, respectively, referred to the planet's equator.

$\odot \sigma$ —the planetocentric longitude of the Sun measured in the plane of the planet's orbit from its vernal equinox.

k —the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i —the angle between the Sun and the Earth as seen from the planet.

g —the angular value of the greatest defect of illumination as seen from the Earth.

Q —the position-angle of the radius of the disk which passes through the point of greatest defect of illumination—that is, of the radius perpendicular to the line joining the cusps. It is measured eastward from the north point of the disk.

The column headed *Central Meridian* contains the longitude of the meridian which bisects the disk, measured from the adopted zero meridian.

The columns headed *Mean Time of Transit of Zero Meridian* contain the Greenwich Mean Time of every transit of the zero meridian across the actual center of the disk.

Pages 622–625 contain the *Ephemeris for Physical Observations of Jupiter*.

The columns headed *Central Meridian* contain the longitudes of the meridian which bisects the disk, measured from the adopted zero meridian of System I and System II, respectively.

The column headed *Correction for Phase* contains the corrections to be applied to the longitudes of the central meridian to obtain the longitudes of the meridian bisecting the illuminated disk.

The column headed *Transit of Zero Meridian* contains the Greenwich Mean Time of every fifth transit of the zero meridian across the center of the illuminated disk.

The quantities in the remaining columns on pages 622–625 are the same as those defined under the *Ephemeris for Physical Observations of Mars*.

Pages 626–651 contain, concerning the *Satellites of Jupiter*, the diagram of the orbits of Satellites I–V, the times of conjunction of Satellites I–IV, the times of elongation of Satellite V, the differences in right ascension and declination between Jupiter and Satellites VI and VII, and the phenomena of the Satellites I–IV together with their configurations.

Page 652 contains the *Magnitude of Saturn* and the *Elements of the Rings*.

a , b —the major axis and minor axis, respectively, of the outer ellipse of the outer ring.

P —the position-angle of the northern semi-minor axis of the rings, measured from the north, positive toward the east.

B —the Saturnicentric latitude of the Earth referred to the plane of the rings, positive toward the north.

$U+180^\circ$ —the Saturnicentric longitude of the Earth measured in the plane of the rings from their ascending node on the Earth's equator.

ω —the distance in the plane of the rings from their ascending node on the Earth's equator to their ascending node on the ecliptic.

B' —the Saturnicentric latitude of the Sun referred to the plane of the rings, positive toward the north.

$U'+180^\circ$ —the Saturnicentric longitude of the Sun measured in the plane of the rings from their ascending node on the ecliptic.

Pages 653–661 contain, concerning the *Satellites of Saturn*, the diagram of the orbits of the seven inner satellites, the times of elongation for the first eight satellites, the differences in right ascension and declination between Saturn and Phœbe, the ninth satellite, and tables for predicting the position-angles and distances from the center of the planet of the first eight satellites.

Page 662 contains the diagram of the orbits of the satellites of Uranus, together with the times of their elongations.

Pages 663–664 contain tables for predicting the position-angles and distances from the center of the planet of the satellites of Uranus and Neptune.

Page 665 contains the diagram of the orbit of the satellite of Neptune, together with the times of its elongations.

Pages 666–667 contain the *Phenomena*, or the configurations of the Sun, Moon, and planets, expressed in the symbols of page xviii. The predicted times of the conjunctions, quadratures, and oppositions of the planets with respect to the Sun are, respectively, the instants when the longitude of each planet differs from that of the Sun by 0° , $\pm 90^\circ$, or 180° . For the conjunction of the planets with the Moon and with each other, the predicted times are the instants when the two bodies have the same right ascension. In the case of conjunction the degrees and minutes to the right indicate the difference of declination. Thus, $\delta \ \varnothing \ \text{C} \ . \ . \ . \ \varnothing - 4^\circ 22'$ would be read "Conjunction of Mars with the Moon, Mars, $4^\circ 22'$ to the South."

These pages contain also the beginning of the seasons; the perihelia and aphelia of the planets, including the Earth; the passage of the planets through the nodes of their orbits upon the ecliptic; and the date of lunar and solar eclipses, with their aspect as seen from Washington.

Pages 668–677 contain the *Positions of Observatories*, together with a list of the authorities from which the positions are obtained. The tabular arrangement is self-explanatory.

Page 678 contains two examples in the computation of lunar distances, which are inserted because lunar distance tables are no longer published.

Pages 679–738 contain a series of tables numbered from I to X.

Table I—For Finding the Latitude by an Observed Altitude of Polaris.

Table II—For converting Sidereal into Mean Solar Time.

Table III—For converting Mean Solar into Sidereal Time.

Table IV—For finding the *Asimuth of Polaris at All Hour Angles.*

Table V—For finding the *Asimuth of Polaris at Elongation.*

Table VI—For Finding the *Times of Upper and Lower Culmination of Polaris.*

Table VII—For finding the *Apparent Place, Time of Upper Culmination, and Time Interval between Upper Culmination and Elongation, of Polaris.*

Table VIII—For finding the time of *Sunrise and Sunset* at any place between the equator and 60° north latitude.

Table IX—*Sunrise and Sunset for Southern Latitudes.*

Table X—For finding the time of *Moonrise and Moonset.*

INDEX TO APPARENT PLACES OF STARS, 1919. 765

Name. Page.	Name. Page.	Name. Page.	Name. Page.	Name. Page.	Name. Page.	Name. Page.
Andromedæ.	Aquarii.	Argus.	Boötis.	Can. Maj.	Cassio.	Ceti.
α 316	δ^1 507	ψ 395	f 429	ξ^2 372	36 H. 336	θ 326
β 324	c^2 504		11 426	o^2 376	38 327	i 317
γ 332	i^1 510	Arietis.	33 431		40 327	μ 338
δ 320		α 332		Can. Min.	50 332	ν 336
ϵ 320	Aquilæ.	β 331	Bradley.	α 381	55 333	ξ^1 333
ζ 321	α 476	δ 343	1147 385	β 380		ξ^2 336
i 509	β 477	ϵ 340	1672 235		Centauri.	o 335
κ 510	γ 475	ζ 344	2777 487	Can. Ven.	α^2 431	π 338
λ 509	δ 472	ν 337		α 420	β 426	σ 336
μ 323	ϵ 469	σ 339	Camelop.	2 415	γ 418	τ 329
o 503	ζ 469	τ 344	β 358	8 416	δ 413	ν 331
π 319	η 476	41 339	4 356	17 H. 423	ϵ 424	2 513
σ 317	θ 478		9 357	20 421	ζ 425	12 319
υ 327	κ 474	Aurigæ.	17 362		η 431	13 319
ψ 511	λ 470	α 361	43 374	Capricorni.	θ 427	20 322
22 317	μ 473	β 367	2 H. 346	α^2 479	i 422	67 334
	τ 478	δ 367	5 H. 348	β 479	λ 410	
Antliæ.	ω 472	ϵ 358	9 H. 349	γ 492	π 409	Chamæleon.
α 401	1 465	ζ 358	19 H. 360	δ 492	n 419	β 415
θ 396	2 466	η 359	22 H. 369	ζ 490		δ^2 404
i 405	6 467	θ 368	23 H. 372	θ 486	Cephei.	ζ 234
		i 357	25 H. 233	i 489	α 489	θ 387
Apodis.	Aræ.	λ 361	30 H. 234	μ 493	β 491	π 411
α 432	α 455	μ 360	32 H. 235	π 480	γ 510	
γ 447	β 454	ν 366		ρ 480	ζ 496	Cæli.
δ^1 444	δ 455	o 365	Cancri.	υ 482	η 484	α 356
θ 425	ϵ^1 451	χ 363	α 391	ψ 483	θ 481	
59 G. 236	θ 461	ψ^1 370	β 386		i 502	Columbæ.
		ψ^2 374	γ 389		κ 479	α 365
Aquarii.	Argus.	51 372	δ 389	Carinæ.	o 506	o 361
α 494	α 371	63 377	ζ 385	δ^1 391	π 504	
β 491	β 393		η 388		11 492	Comæ.
γ 497	γ 385	Boötis.	i 389	Cassio.	20 495	20 416
δ 502	δ 390	α 428	κ 392	α 320	24 496	24 417
ϵ 484	ϵ 386	β 435	σ^2 390	β 316		31 419
η 499	η 403	γ 430	ω 383	γ 323		43 421
θ 497	θ 403	δ 437	d^1 386	δ 326		
i 495	i 393	ϵ 432	83 393	ϵ 330		
λ 502	λ 392	η 425		ζ 319		
μ 485	μ 404	θ 429	Can. Maj.	η 322		Cor. Austr.
ν 487	ν 373	λ 428	α 374	i 335		α 470
ξ 491	ξ 382	μ 437	β 370	μ 324	Ceti.	Cor. Bor.
π 498	π 378	ν^1 439	γ 377	o 321	α 341	α 439
σ 498	ρ 384	ρ 430	δ 377	ρ 512	β 321	β 438
τ 501	σ 380	σ 431	ϵ 376	ω 328	γ 338	ϵ 443
υ 499	τ 375	τ 424	ζ 369	4 507	δ 337	ζ 440
φ 505	υ 396	ψ 435	η 379	5 H ¹ . 505	ζ 330	σ 445
ψ 505	φ 398	c 435	θ 376	21 321	η 324	
ω^2 510	χ 383	d 427				

766 INDEX TO APPARENT PLACES OF STARS, 1919

Name. Page.	Name. Page.	Name. Page.	Name. Page.	Name. Page.	Name. Page.	Name. P
Corvi.	Doradus.	Eridani.	Groombr.	Horologii.	Leonis.	Lupi
β 417	α 354	ν 355	1446 388	α 352	ϵ 396	β
γ 414	δ 366	σ^1 352	1450 387	μ 342	ζ 400	γ
δ 416		τ^2 340	1586 397	38 G. 344	η 398	ζ
ϵ 413	Draconis.	τ^3 341	1706 405		θ 408	
		τ^5 347	1830 412	Hydræ.	ι 409	Lynci
Crateris.	α 427	τ^6 348	2001 423		μ 397	
	β 456	ν^2 353	2164 433	α 394	ξ 395	2
α 406	γ 460	φ 334	2283 236	γ 422	σ 396	8
β 407	δ 471	ϵ 345	2320 444	δ 388	π 398	15
δ 408	ϵ 476	g 348	2377 450	ϵ 390	ρ 402	24
ζ 411	ζ 453	12 343	2533 463	ζ 390	σ 409	26
	η 447	53 355	3241 481	θ 392	τ 409	27
Crucis.	θ 443		4163 512	λ 399	ν 410	31
	ι 438	Fornacis.		μ 401	χ 407	40
α^1 415	κ 417			ν 404	d 406	
β 419	λ 410	β 339	Gruis.	ξ 410	l 404	Lyræ
γ 416	ξ 459	κ 335	α 495	π 426	p^A 407	
δ 414	σ 468	μ 334	β 500	σ 388	54 405	α
	τ 472		γ 493			β
Cygni.	χ 464	Geminor.	ϵ 501	Hydri.	Leo. Min.	γ
	ψ 458		ι 504			θ
α 483	ω 457	α^2 380		α 332	10 395	ι
β 473	A 448	β 382		β 318	19 398	R
γ 480	1 H. 234	γ 372	Herculis.	γ 349	31 401	
δ 475	3 411	δ 378		δ 335	41 403	Mens
ϵ 484	4 H. 414	ϵ 373	α 453	ϵ 337	42 403	δ
ζ 488	9 H. 402	ζ 376	β 448	θ 342	46 405	ζ
θ 474	12 H. 441	η 369	γ 446	ι 345		31 G.
ι 473	35 459	θ 375	δ 453	λ 322	Leporis.	
κ 472	36 463	ι 379	ϵ 452	μ 337		
ν 486	50 467	κ 381	ζ 450		α 363	
ξ 487	76 237	λ 378	η 450	Indi.	β 362	Microsc
σ 478	79 494	μ 370	θ 460		δ 366	
π^2 493	220 H ¹ . 485	ν 371	ι 457	α 482	ϵ 359	γ
σ 489		ξ 373	κ 444	β 485	ζ 365	θ^1
τ 488	Equulei.	ρ 380	λ 456	ϵ 494	η 367	
g 490		φ 382	μ 458	ρ 502	μ 360	Monoc
15 475	α 488	χ 384	ξ 460			
41 481		1 368	σ 462	Lacertæ.	Libræ.	S
61 487	Eridani.	51 377	π 454			8
74 491			σ 449	α 498	α 433	10
	α 328	Groombr.	τ 446	3 498	β 437	18
	β 359		φ 444	10 499	γ 439	25
Delphini.	γ 350	750 232	ω 447		δ 434	30
	δ 347	848 355	d 452	Leonis.	ι 436	
α 482	ϵ 346	944 232	w 451		λ 442	
β 482	ζ 344	966 363	49 451	α 399	ξ^2 434	Musc
γ 484	η 340	1119 234	89 459	β 412	2 429	
δ 483	θ 341	1308 379	109 464	γ 400	8 433	α
ϵ 481	μ 356	1374 383	110 466	δ 408	32 438	δ

INDEX TO APPARENT PLACES OF STARS, 1919. 767

Page.	Name. Page.	Name. Page.	Name. Page.	Name. Page.	Name. Page.	Name. Page.
Orionis.	Persei.	Puppis.	Scorpii.	Telescopii.	Urs. Min.	
445 π^s 357	ρ 342	1 G. 368	τ 449	α 464	α 232	
τ 361	τ 340	4 382	24 449		β 433	
antis. φ^1 364	v 328	20 385		Trianguli.	γ 437	
11 359	φ 329		Sculptoris.		δ 237	
486 c 351	Pyxidis.		α 323	α 330	ϵ 236	
238 Pavonis.	m 354	α 389	β 508	β 333	ζ 441	
238 6 333		θ 394	γ 506	γ 334	η 447	
236 α 480	Phoenicis.	Reticuli.	δ 511	Tri. Austr.	λ 237	
234 β 483	a 318	α 352	ϵ 330	α 450	4 428	
235 γ 490	β 324	δ 350	Serpentis.	β 442	5 430	
235 ϵ 477	γ 326		α 440	γ 436	19 445	
235 ζ 465	ϵ 316	Sagittæ.	β 440		Velorum.	
238 η 457	μ 320	β 474	γ 442	Tucanæ.	q 399	
236 λ 467	ψ 331	γ 477	ϵ 441	α 497	Virginis.	
237 Pegasi.	Piazz.	δ 476	η 463	γ 506	α 422	
238 α 503	221 434	Sagittarii.	θ 468	ϵ 513	β 412	
232 β 503	Pictoris.	γ 461	κ 440	ζ 318	γ 418	
233 γ 317	α 375	δ 463	μ 441	κ 325	δ 420	
iuchi. ϵ 492	Pisc. Austr.	ϵ 464	ξ 457	Urs. Maj.	ϵ 421	
456 η 500	ζ 469	ζ 469	τ^1 438	α 406	ζ 423	
458 θ 496	η 462	η 462	c 465	β 406	η 415	
459 ι 495	ι 477	ι 477	3 436	γ 412	θ 421	
445 λ 501	λ 465	λ 465	Sextantis.	δ 414	ι 428	
446 μ 501	μ 462	μ 462	6 397	ϵ 420	κ 427	
449 π 496	π 470	π 470	33 402	ζ^1 422	λ 429	
452 τ 507	σ 468	σ 468	Tauri.	η 424	μ 432	
454 v 507	φ 466	φ 466	α 354	θ 395	o 413	
451 φ 511	ψ 471	ψ 471	β 362	ι 391	π 413	
448 1 490	c 478	c 478	γ 353	κ 391	ρ 418	
460 16 493	d 471	d 471	δ 353	λ 400	τ 426	
455 20 494	f 475	f 475	ϵ 354	μ 400	φ 430	
455 31 497	h 473	h 473	ζ 364	ν 408	χ 418	
452 55 504	54 474	54 474	η 348	o 387	m 424	
461 59 505	Scorpii.		ι 358	σ^2 392	70 423	
461 70 508	α 448		λ 350	v 397	89 425	
462 72 509	β 443		μ 352	ψ 407	109 432	
onis. Persei.	γ 435		ν 351	χ 411	Volantis.	
367 α 345	δ 443		ξ 346	d 394	γ^2 378	
360 β 343	ϵ 451		τ 355	h 394	δ 379	
362 γ 342	η 453		A 351	3 H. 384		
363 δ 347	ι^1 458		f 346	30 H. 401	Vulpeculæ.	
364 ϵ 349	λ 456		i 357	32 399	24 479	
365 ζ 349	π 442		p 351	36 402	32 485	
364 η 339	σ 446			76 419		
366 θ 338						
368 ν 347						
356 ξ 350						

1. The first part of the document is a list of names and addresses.

GENERAL INDEX.

	Page.
ations	xviii
on, Constant of	xvi
of the Sun	8
(Alpha Eridani), Apparent Place	328
Place	217
Moon	118
(Eta Tauri), Apparent Place	348
Place	219
n (Alpha Tauri), Apparent Place	354
Place	219
sta Persei), Apparent Place	343
Place	218
psilon Ursæ Majoris), Apparent Place	420
Place	224
Eta Ursæ Majoris), Apparent Place	424
Place	224
nis Majoris (Sirius), Apparent Place	374
Place	221
t Position	x
llax	ix
nis Minoris (Procyon), Apparent Place	381
Place	221
t Position	x
llax	ix
ntauri, Apparent Place	431
Place	225
t Position	x
llax	ix
æ Minoris (Polaris), Apparent Place	232, 703
Place	231
is Tables	679
z (Alpha Andromedæ), Apparent Place	316
Place	217
lpha Aquilæ), Apparent Place	476
Place	228
llax	ix
aries and Festivals	xiv
Alpha Scorpïi), Apparent Place	448
Place	226
f Planets	666
f Moon	117
Place of 2 Aquilæ, Example of Reduction to	746
Places of 790 Standard Stars	316
of 35 Circumpolar Stars	232
of 825 Stars, Index to	765
(Alpha Boëtis), Apparent Place	428
Place	224
st Satellite of Uranus	662, 663, 664
1°—1916—49	769

Arrangement and Use of the American Ephemeris	
Aspects of the Planets	
Astronomical Constants	
Asimuth of Polaris at all Hour Angles, Table IV	
at Elongation, Table V	
Beginning of the Seasons	
Bellatrix (Gamma Orionis), Apparent Place	
Mean Place	
Besselian Elements of Solar Eclipses	554
Formule for Star Reductions	
Star Numbers	201
Example of Reduction with Exclusive of short-period Terms	
Betelgeux (Alpha Orionis), Apparent Place	
Mean Place	
Brilliancy of the Planets, greatest (see Stellar Magnitude under each planet).	
Canopus (Alpha Argus), Apparent Place	
Mean Place	
Capella (Alpha Aurigæ), Apparent Place	
Mean Place	
Castor (Alpha Geminorum), Apparent Place	
Mean Place	
Charts of Solar Eclipses	following pages 558
Chronological Eras and Cycles	
Circumpolar Stars, Apparent Places	
Mean Places	
Conjunctions of Planets	
Constants, Astronomical	
Culminations, Moon	
of Polaris, Table VI for finding times of Upper Culmination, Meridian of Greenwich, Table VII	
Cygni 61, Apparent Place	
Mean Place	
Parallax	
Day, Civil and Astronomical	
Length of	
of Julian Period	
Delta Cassiopeizæ, Apparent Place	
Mean Place	
Used for finding time of culmination of Polaris (Table VI)	
Deneb (Alpha Cygni), Apparent Place	
Mean Place	
Denebola (Beta Leonis), Apparent Place	
Mean Place	
Dione, Fourth Satellite of Saturn	653, 656, 651
Disk of Mercury	
of Venus	
Distance, Astronomical Unit of	
of the Moon	
of the Planets (see also reference under each planet)	
of the Sun	3
Dominical Letter	
Earth, Dimensions of	
Elements of Orbit of	
Earth's Radius Vector, Logarithm of	

GENERAL INDEX.

771

	Page.
ite of	xiv
ities of the Orbits of the Earth and Planets	xvii
Solar and Lunar, Elements and Circumstances of	556
Solar, Besselian Elements of	558, 560
Charts of	following pages 558, 560
Correction to Elements of	x
Example of the Computation of	755
Local Circumstances of	562
Obliquity of	3
Day, Date of	xiv
of Planetary Orbits	xvii
ns of Planets	666
1, Azimuth of Polaris at, Table V	696
of Polaris, Time Interval from Upper Culmination, Table VII	703
1, Second Satellite of Saturn	653, 655, 658, 660
.	xv
s for the Meridian of Greenwich (Part I)	1-198
of Washington (Part II)	199-553
of time for Greenwich Mean Noon	2
for Washington Apparent Noon	514
Moon's	609
s, Date of	666
.	vi
of the Computation of Lunar Distances	678
of Occultations	759
of Solar Eclipses	755
Reduction of Stars to Apparent Place	746
of the Sun	742
etc.	xiv
t (Alpha Piscis Australis), Apparent Place	508
Place	230
3 Ephemerides of the Planets	134
Latitude of Observatories, Reduction to	668
umber	xv
Acceleration due to	xvi
aussian, Constant of	xvi
1 Ephemeris (Part I)	1-198
Spheroid	xvi
ric Coordinates of the Planets	142
Seventh Satellite of Saturn	653, 656, 659, 661
Eighth Satellite of Saturn	653, 656, 659, 661
ent Star-Numbers	206, 214
Example of Reduction with	747
Exclusive of short-period Terms	214
Formulae for	200
1	xi
iod	xv
diameter, Apparent Equatorial	623
istance from Earth, logarithm of	174
lements of Orbit of	xvii
phemeris for Physical Observations of	622
Elements used	xii
reenwich, Transit of	174
eliocentric Longitude and Latitude of	182
orizontal Parallax of	174, 546

Jupiter, Radius Vector (Distance from Sun), logarithm of	
Reduction to Orbit	
Right Ascension and Declination at Greenwich Mean Noon	
at Washington Transit	
Satellites, Diagram of Apparent Orbits of	
Synodic Periods of	
I, II, III, and IV, Phenomena and Configurations of	
Times of Superior Conjunction of	
Satellite V, Greatest Elongation of	
Satellites VI and VII, Differential Coordinates of	
Semidiameter, Adopted Constant of	
Polar	
Sidereal Time of, Passing Meridian	
Stellar Magnitude of	
Washington Transit of	
Latitude, for finding, by an Observed Altitude of Polaris, Tables I, Ia	
Formula for Reduction to Geocentric	
Heliocentric, of the Planets	
of the Moon	
Corrections to	
of the Sun	
Length of the Day	
of the Month	
of the Seconds Pendulum	
of the Year	
Libration of the Moon	
Light, Velocity of	
Longitude, Heliocentric, of the Planets	
Mean, of the Moon	
Nutation in	
of the Sun	
of the Moon, Corrections to	
Precession in	
Short Period Terms of Nutation in	
True, of the Moon	
Lunar Distances, Examples in	
Magnitudes, Stellar, of Jupiter	5
of Mars	
of Mercury	
of Neptune	
of Saturn	6
of Uranus	
of Venus	
Maps of Solar Eclipses	following pages 6
Markab (Alpha Pegasi), Apparent Place	
Mean Place	
Mars, Distance from Earth, logarithm of	
Elements of Orbit of	
Ephemeris for Physical Observations of	
Elements used	
Greenwich Transit of	
Heliocentric Longitude and Latitude of	
Horizontal Parallax of	
Radius Vector (Distance from Sun), logarithm of	
Reduction to Orbit	
Right Ascension and Declination at Greenwich Mean Noon	

GENERAL INDEX.

773

	Page.
a , Semidiameter, Adopted Constant of	xvii
Apparent	162
Stellar Magnitude of	620
s of Planets	xvii
an Places of 790 Standard Stars	217
of 35 Circumpolars	231
of Stars Occulted by the Moon	564
an Solar into Sidereal Time, Table III	687
cury , Apparent Disk of	618
Distance from Earth, logarithm of	134
Elements of Orbit of	xvii
Greenwich Transit of	134
Heliocentric Longitude and Latitude of	142
Horizontal Parallax of	134, 538
Radius Vector (Distance from Sun), logarithm of	142
Reduction to Orbit	142
Right Ascension and Declination at Greenwich Mean Noon	134
at Washington Transit	538
Semidiameter, Adopted Constant of	xvii
Apparent	134, 538
Sidereal Time of, Passing Meridian	538
Stellar Magnitude of	618
Washington Transit of	538
idian Passage of Jupiter	174, 546
of Mars	162
of Mercury	134, 538
of Moon	118, 522
of Neptune	196, 552
of Saturn	184, 548
of Sun	514
of Uranus	193, 550
of Venus	150, 542
nas , First Satellite of Saturn	653, 654, 658, 660
a (Omicron Ceti), Apparent Place	335
Mean Place	218
ar (Zeta Ursæ Majoris), Apparent Place	422
Mean Place	224
Used for finding time of Culmination of Polaris (Table VI)	702
nth , Length of	xvi
n , Age of, Greenwich Mean Noon and Midnight	118
Apogee and Perigee	117
Bright Limbs	522
Corrections to the Long., Lat., and Hor. Parallax of the	x
Culminations, upper and lower, Meridian of Washington	522
Distance from Earth, Mean	xvi
Eclipses of, Elements and Circumstances	556
Ephemeris for Physical Observations of	610
Formula used	xi
Hourly	26
Equator, Position of	609
Libration, Formulæ for computing	xii
Longitude and Latitude of	118
Formulæ for	vii
Longitude, Mean	609
True	118
Motion of, in Mean Longitude	60

Moon, Node, Mean Longitude of	600
Parallax for Greenwich Noon and Midnight	110
for Washington, upper and lower transit	300
Mean Equatorial Horizontal	110
Perigee and Apogee	110
Perigee, Mean Longitude of	600
Phases of	110
Right Ascension and Declination for each Hour	60
for Washington upper and lower Transit	300
Semidiameter, Adopted Constant of	xi, xvi
Apparent	110, 300
Sidereal Time of, Passing Meridian	300
Transit, upper and lower, at Greenwich	110
at Washington	300
Moonrise and Moonset, Table X	720
Neptune, Distance from Earth, logarithm of	100
Elements of Orbit of	xvii
Greenwich Transit of	100
Heliocentric Longitude and Latitude of	100
Horizontal Parallax of	100, 300
Radius Vector (Distance from Sun), logarithm of	100
Reduction to Orbit	100
Right Ascension and Declination at Greenwich Mean Noon	100
at Washington Transit	300
Satellite, Apparent Apides of	600
Diagram of Apparent Orbit of	600
Sidereal Period of	600
Tables for Determining Position Angle and Distance of	600
Times of elongation of	600
Semidiameter, Adopted Constant of	xvii
Apparent	100, 552
Sidereal Time of, Passing Meridian	552
Stellar Magnitude of	552
Washington Transit of	552
Node, Mean Longitude of the Moon's	600
Nutation, Constant of	xvi
Formulae for	viii
Terms of Short Period in the	215
in Longitude	3
Oberon, Fourth Satellite of Uranus	662, 663, 664
Obliquity of the Ecliptic, True	3
Mean	xvi
Short Period Terms of Nutation in	215
Observatories, Positions of, etc.	600
Occultations, Elements for Prediction of	500
Example of Computation of	750
Mean Places of Stars	500
Visible at Washington	600
Opposition of Planets	600
Orbits of the Planets, Elements of	xvii
Orbit Positions of Sirius, Procyon, and α^2 Centauri	x
Parallax, Annual of τ Ceti, ϵ Eridani, Sirius, Procyon, α Centauri, Altair, and 61 Cygni	ix
Corrections to, of the Moon	x
Horizontal, of Jupiter	174, 546
of Mars	162

GENERAL INDEX.

775

	Page.
Parallax, Horizontal, of Mercury	134, 538
of Moon	xvi, 118, 522
of Neptune	198, 552
of Saturn	184, 548
of Sun	2
of Uranus	193, 550
of Venus	150, 542
Solar, Constant of	vii, xvi
Period, Length of Seconds	xvi
Perigee of the Moon	117
Longitude of Moon's	609
Perihelia of Planets	xvii, 666
Phases of Eclipses of Jupiter's Satellites	631
of the Moon	117
Phenomena, Eclipses, Occultations, Satellites, etc., Part III	555
of Jupiter's Satellites	630
Planetary Configurations	666
Phœbe, Ninth Satellite of Saturn	653, 657
Physical Observations of Jupiter, Ephemeris for	622
of Mars, Ephemeris for	620
of the Moon, Ephemeris for	610
of the Sun, Ephemeris for	608
Planetary Configurations	666
Orbits, Elements of	xvii
Planets, Aspects of	666
at Greatest Brilliancy (see Stellar Magnitude under each planet)	
at Stationary Points	666
in Ascending and Descending Node	666
in Conjunction	666
in Elongation	666
in Opposition	666
in Perihelion and Aphelion	666
in Quadrature	666
Semidiameters of	xvii
Signs of	xviii
Polaris (Alpha Ursæ Minoris), Apparent Place	232, 703
Azimuth of, at All Hour Angles, Table IV	690
Azimuth of, at Elongation, Table V	696
for Finding the Times of Upper and Lower Culminations from Observations in Connection with Zeta Ursæ Majoris (Mizar), S. P. and Delta Cassiopeiæ, S. P., Table VI	702
Mean Place	231
Table I, for Determining Latitude by Observations of Polaris	679
Time of Upper Culmination, and Time interval between Upper Culmination and Elongation, Table VII	703
Pole Star (see Polaris).	
Pollux (Beta Geminorum), Apparent Place	382
Mean Place	221
Procession, General	xvi
in Longitude	3
Procyon (Alpha Canis Minoris), Apparent Place	381
Mean Place	221
Orbit Position	x
Parallax	ix
Prodrature of Planets	666

	Page
Radius Vector of the Earth, logarithm of	3
of the Planets, logarithm of	142
Reduction of Sidereal to Solar Time, and <i>vice versa</i> , Tables II, III	684
of Stars to Apparent Place, Formulæ for	200
Example of	746
Regulus (Alpha Leonis), Apparent Place	390
Mean Place	222
Rhea, Fifth Satellite of Saturn	653, 656, 659, 661
Rigel (Beta Orionis), Apparent Place	300
Mean Place	230
Rings of Saturn	652
Roman Indiction	xv
Satellites of Jupiter	628
of Neptune	664
of Saturn	653
of Uranus	662
Saturn, Distance from Earth, logarithm of	184
Elements of Orbit of	xvii
Greenwich Transit of	184
Heliocentric Longitude and Latitude of	192
Horizontal Parallax of	184, 548
Radius Vector (Distance from Sun), logarithm of	192
Reduction to Orbit	192
Right Ascension and Declination at Greenwich Mean Noon	184
at Washington Transit	548
Rings, Elements for Determining Geocentric Position of	652
Satellites, Diagram of Apparent Orbits of	653
Differential Coordinates of Phœbe	657
Greatest Elongations of	654
Names of	653
Synodic Periods of	653
Tables for Determining Position Angle and Distance	658
Semidiameter, Adopted Constant of	xvii
Apparent Polar	184, 548
Sidereal Time of, Passing Meridian	548
Stellar Magnitude of	548, 652
Washington Transit of	548
Schedir (Alpha Cassiopeie), Apparent Place	320
Mean Place	217
Seasons, Beginning of	666
Semidiameter of Jupiter	174, 546
of Mars	162
of Mercury	134, 538
of Moon	118, 522
of Neptune	196, 552
of Saturn	184, 548
of Sun	2, 514
of Uranus	193, 550
of Venus	150, 542
Semidiameters of the Sun and Moon, Adopted Constants of	xi, xvii
of the Planets, Adopted Constants of	xvii
Short Period Terms of Nutation	215
in Star Numbers	200
Sidereal into Mean Solar Time, Table II	684
Noon, Greenwich Mean Time of	3
Time of Washington Mean Noon	514

GENERAL INDEX.

777

	Page.
Sidereal Time or Right Ascension of Mean Sun	2
Signs of the Zodiac	xviii
Sirius (Alpha Canis Majoris), Apparent Place	374
Mean Place	221
Orbit Position	x
Parallax	ix
Solar Cycle	xv
Ephemeris	2, 514
into Sidereal Time, Table III	687
Solstices	666
Spheroid, Hayford's	xvi
Spica (Alpha Virginis), Apparent Place	422
Mean Place	224
Stars, Apparent Places of 790 Standard	316
of 35 Circumpolar	232
Elements of Occultations	568
Example of Reduction to Apparent Position	746
Formulae for Reduction to Apparent Position	ix, 200
Index to the Apparent Places	765
Mean Places for Beginning of the Year, of 790 Standard	217
of 35 Circumpolar	231
of Stars Occulted by the Moon	564
Occultations visible at Washington	606
Star Numbers, Besselian and Independent, omitting short-period terms	214
Besselian, including short-period terms	202
Formulae used in Computing	viii, 200
Independent, including short-period terms	206
Sun, Aberration of	3
Constant of	xvi
Coordinates, rectangular	18
Formulae for	vii
Distance from Earth, Mean	xvi
Distance from Earth at Gr. Mean Noon, logarithm of	3
Eclipses of, Charts	following pages 558, 560
Elements and Circumstances of	556, 666
Example of Computation of	755
Local Circumstances of	562
Ephemeris for Physical Observations of	608
Formulae used	xi
Examples in the Reduction of	742
Longitude and Latitude, Greenwich Mean Noon	3
Mean, R. A. of, at Greenwich Mean Noon	2
Parallax, Constant of	vii, xvi
Horizontal	2
R. A. and Decl. at Greenwich Mean Noon	2
at Washington Apparent Noon	514
Semidiameter, Adopted Constant of	xi, xvii
Apparent	2, 514
Sidereal Time of, Passing Meridian	514
Sunrise and Sunset for Northern Latitudes, Table VIII	704
for Southern Latitudes, Table IX	720
Symbols and Abbreviations	xviii
Synodic Month, Length of	12
Periods of the Planets	12
Terms of Short Period in the Nutation	653, 655, 657
Tethys, Third Satellite of Saturn	
Thanksgiving Day, Date of	

1









